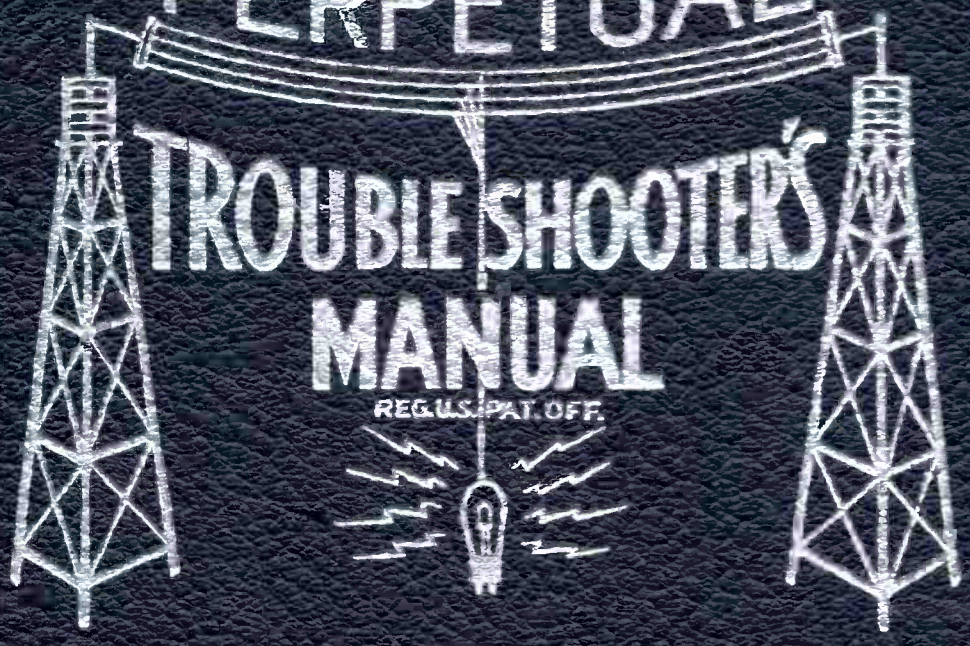
VOLUME IX

PERPETUAL TROUBLE SHOOTER'S MANUAL

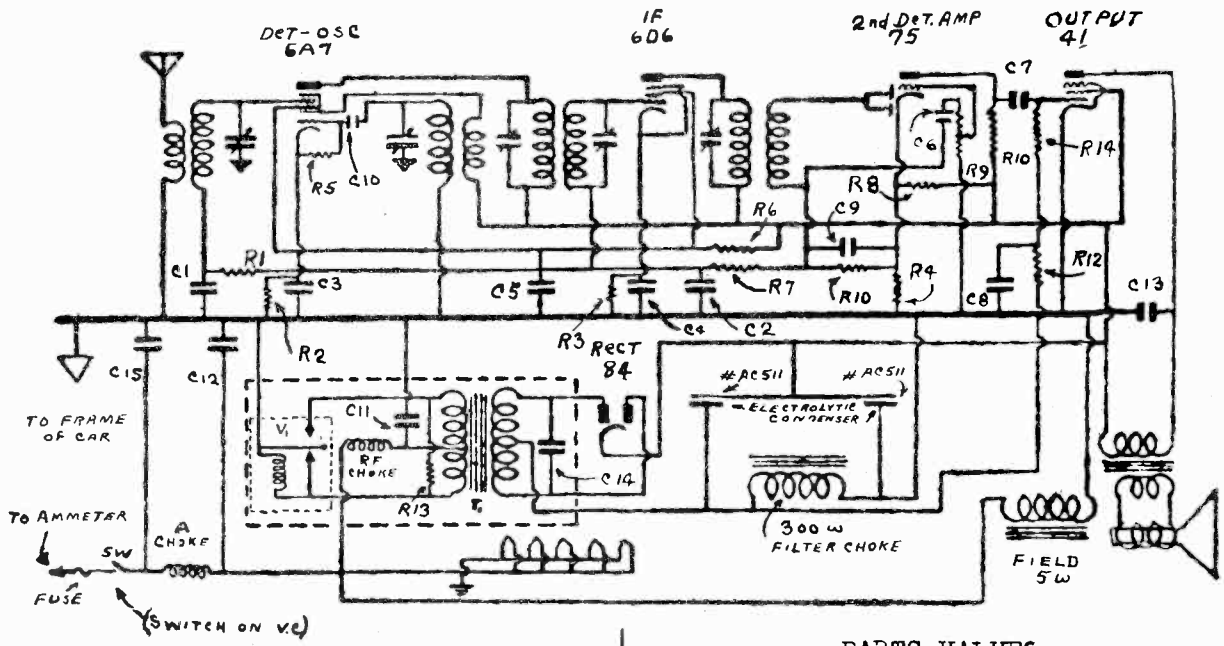
REG. U.S. PAT. OFF.



JOHN F. RIDER

SEARS-ROEBUCK & CO.

MODEL A 1
Schematic, Voltage
Socket, Trimmers
Alignment



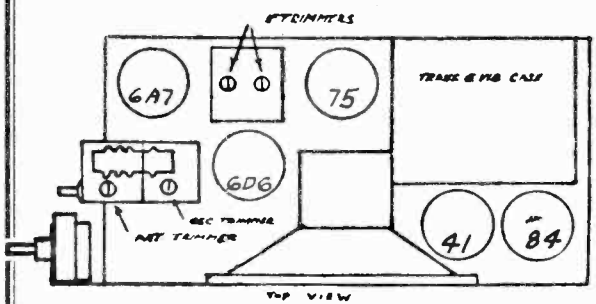
TUBE SOCKET DATA (Voltages to Ground)

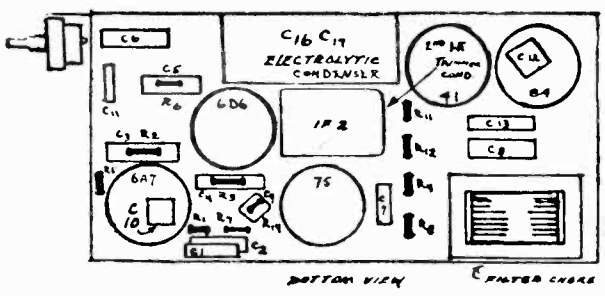
Tube	Fil.	Plt.	Scr.	Cath.
6A7 Det. Osc.	6.1	220	95	3
6D6 I.F.	6.1	220	95	3.7
75 2nd Det. Amp.	6.1	120		1.3
41 Output	6.1	200	220	
84 Rectifier	6.1			220

Note: 6A7 Osc. Plate---200 Volts
41 Bias--14 Volts (Drop across B choke)

PARTS VALUES

C15	.5 MFD.	R7	1,000,000
C3,C4,C5,C8	.1 MFD.	R1,R14	500,000
C1,C2	.05 MFD.	R10,R11,R12	250,000
C6,C7	.02 MFD.	R8	100,000
C13	.005MFD.	R5	50,000
C14	.02 MFD.	R6	30,000
C10	.0001 Mica	R3,R4	600
C9	.0005 Mica	R2	400
C11,C12	.002 Mica	R13	150





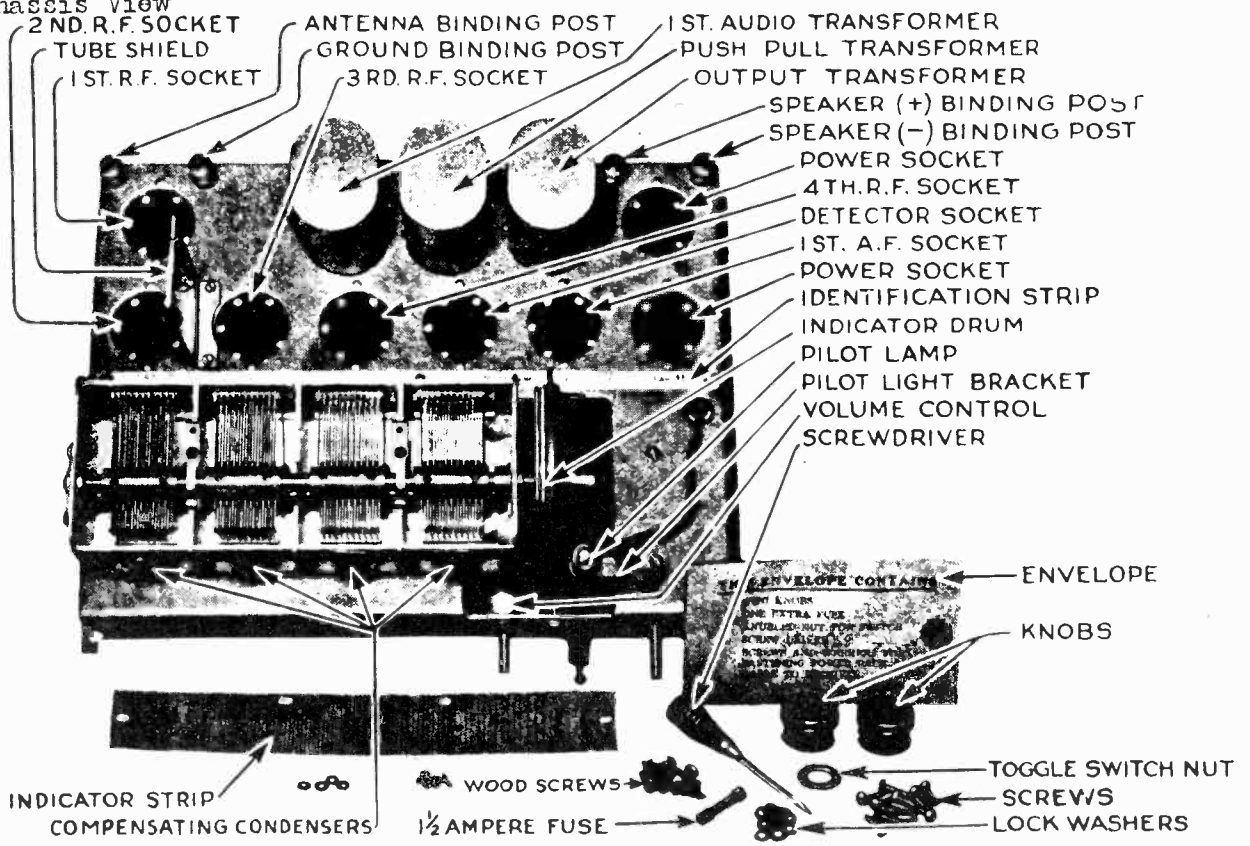
ALIGNMENT PROCEDURE

I.F.Alignment. Connect a signal generator set at 480kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I.F. condensers on the composite coil and the single I.F. condenser on the output I.F. coil for maximum response.

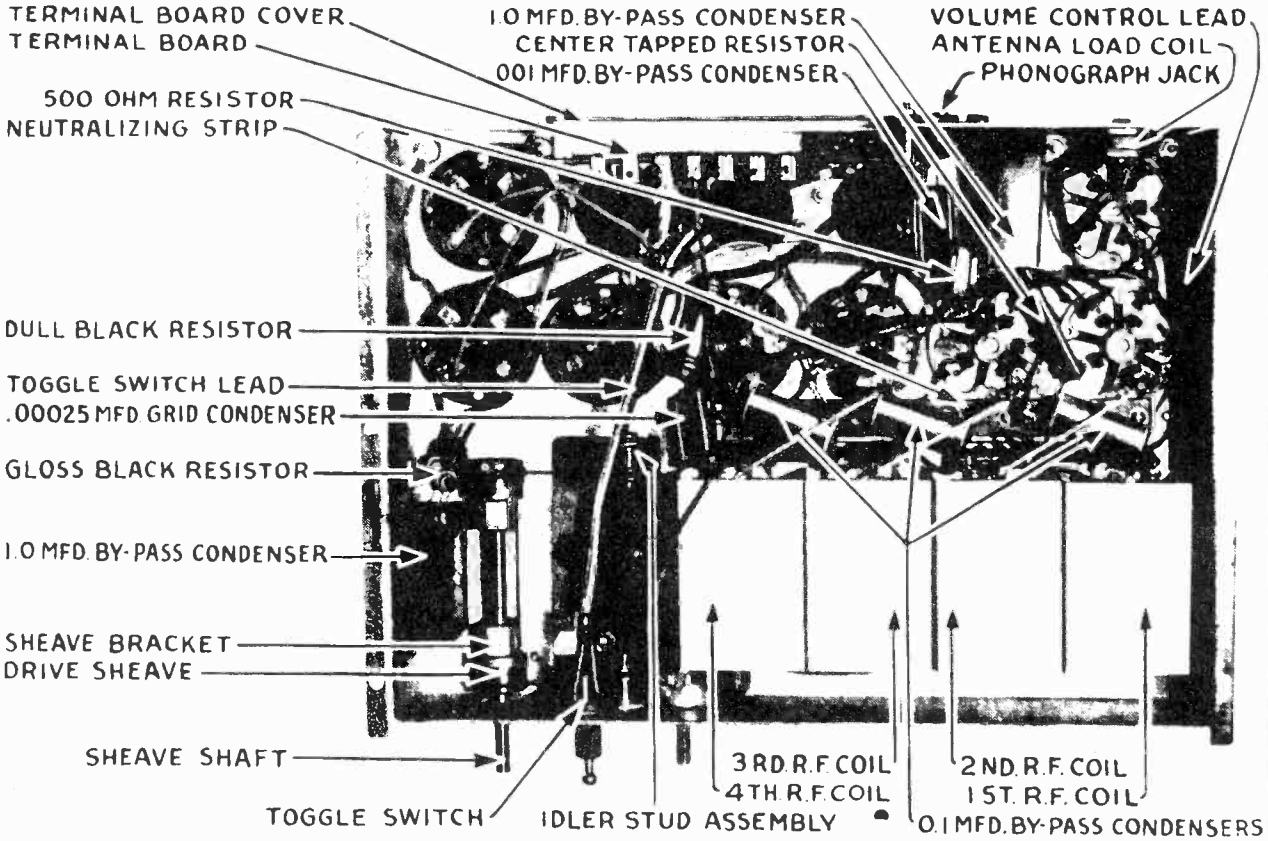
Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 150 mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Then trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

MODELS 52,95
Socket, Trimmers
Chassis View

SEARS-ROEBUCK & CO.



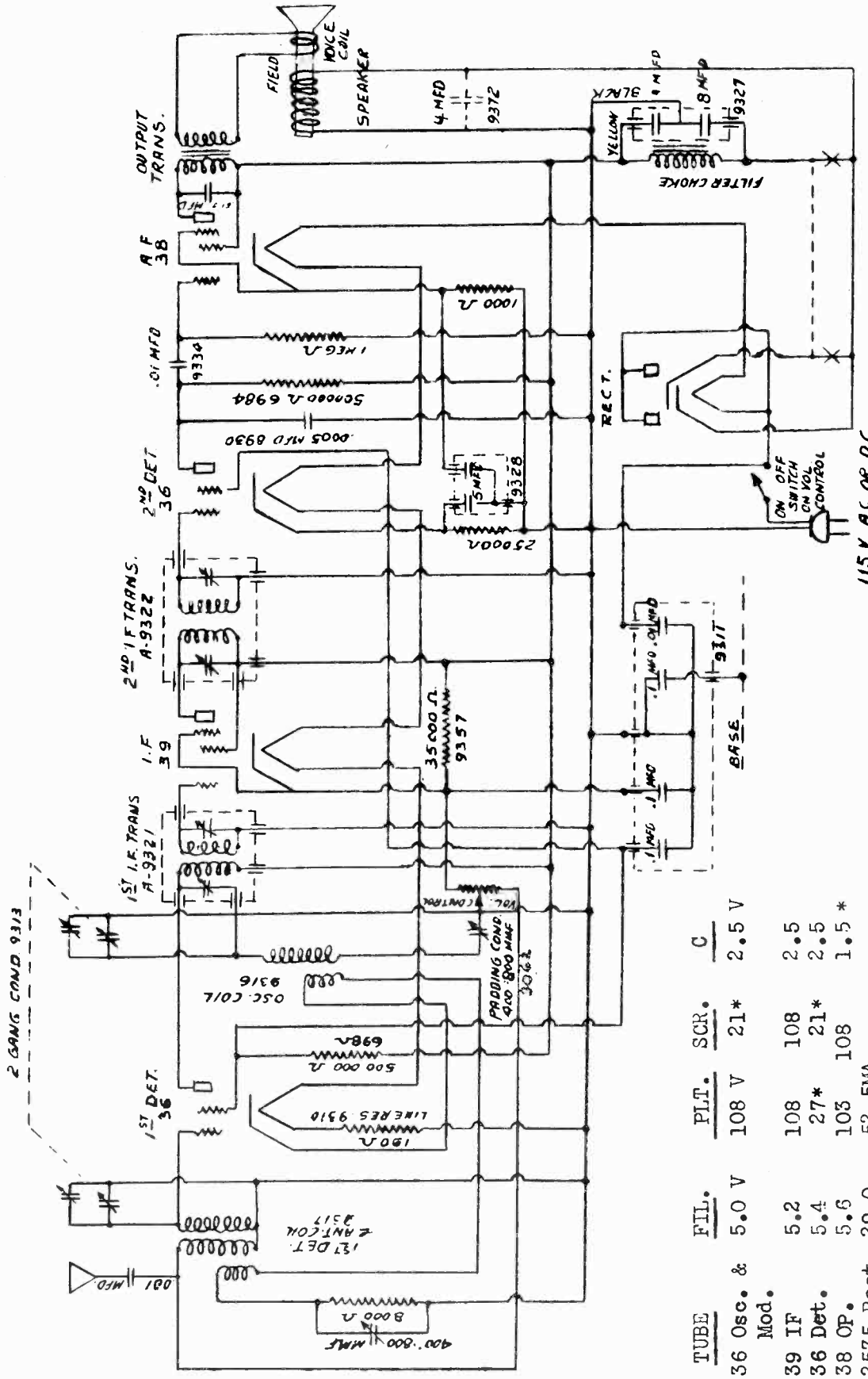
—Top View of Chassis—



Bottom View of Chassis

SEARS-ROEBUCK & CO.

MODEL 550
Schematic, Voltage
Alignment



TUBE	FIL.	PLT.	SCR.	C
36 Osc. & Mod.	5.0 V	108 V	21*	2.5 V
39 IF	5.2	108	108	2.5
36 Det.	5.4	27*	21*	2.5
38 OP.	5.6	103	108	1.5 *
2525 Rect.	29.0	52.5MA		

* Readings are comparative voltages only. Voltage readings taken at these points in series with very high resistances.

IF ALIGNMENT: - Conn. test osc. op. to control grid of Osc.Mod (36)- Leave cap off. Set osc. for 265 KC, align IF for max. response.

RF ALIGNMENT: - Set dial and test osc. at 1720 KC, adjust Osc. and Ant. trimmers for max. response. Set dial and test osc. to 600 Kc, Adjust padder at 600 Kc. Repeat adjustments.

MODELS 802,812
Socket,Trimmers
Alignment,Transf.Data

SEARS-ROEBUCK & CO.

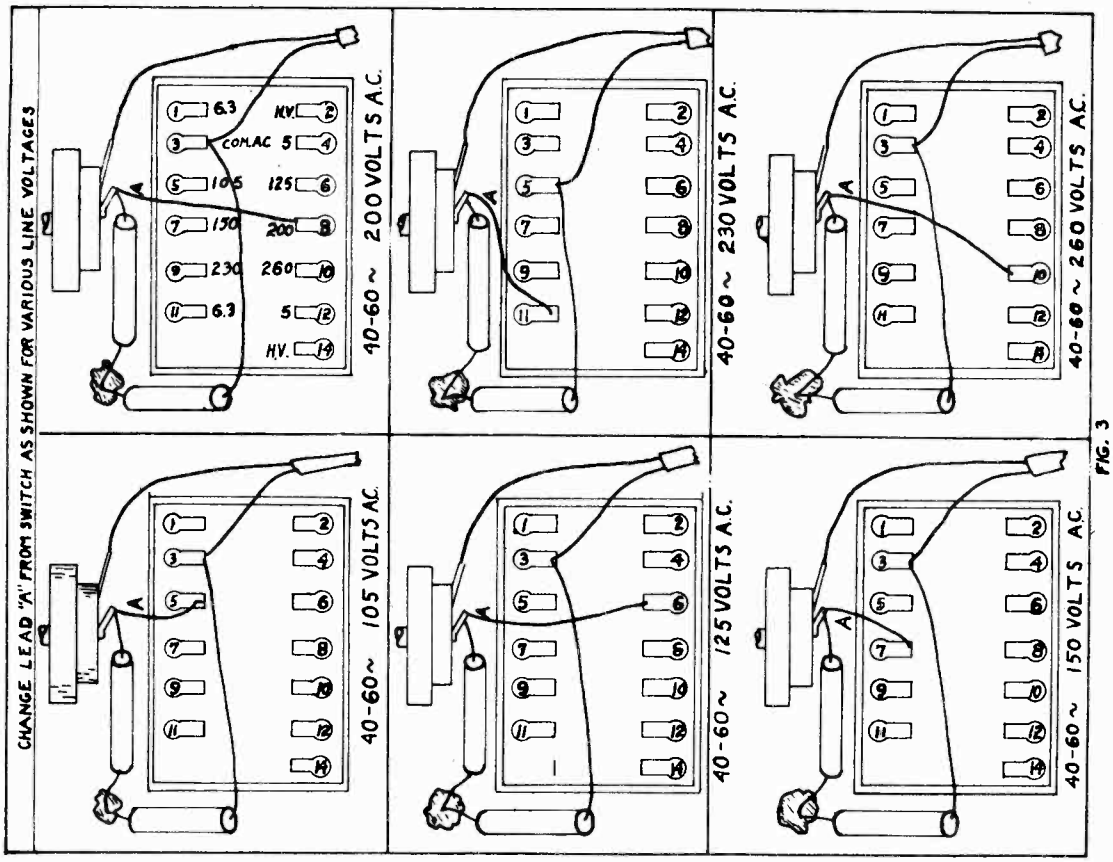


FIG. 3

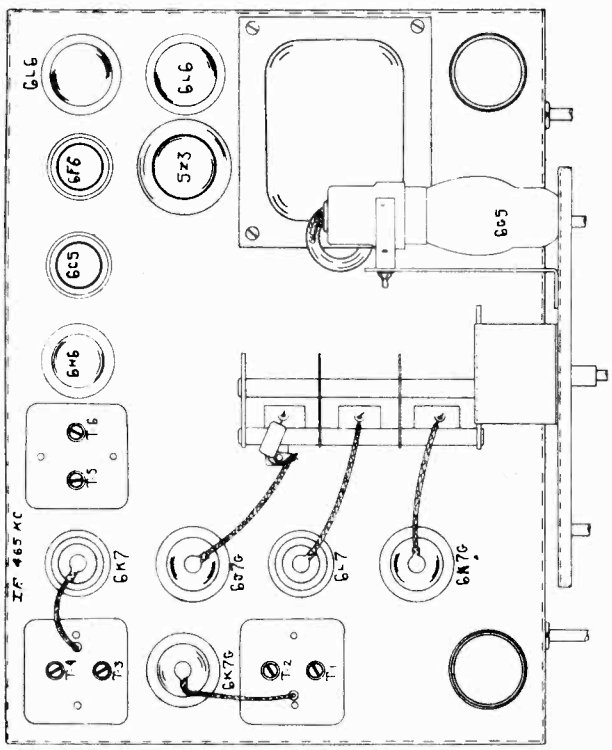


FIG. 4

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. NOTE: If oscillation is present when aligning the I. F.'s with the sensitivity control full on, reduce the sensitivity slightly until the oscillation stops.

IMPORTANT: ALIGN THE SET WITH THE SELECTIVITY CONTROL ALL THE WAY TO THE RIGHT, IN THE SHARP TUNING POSITION.

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.

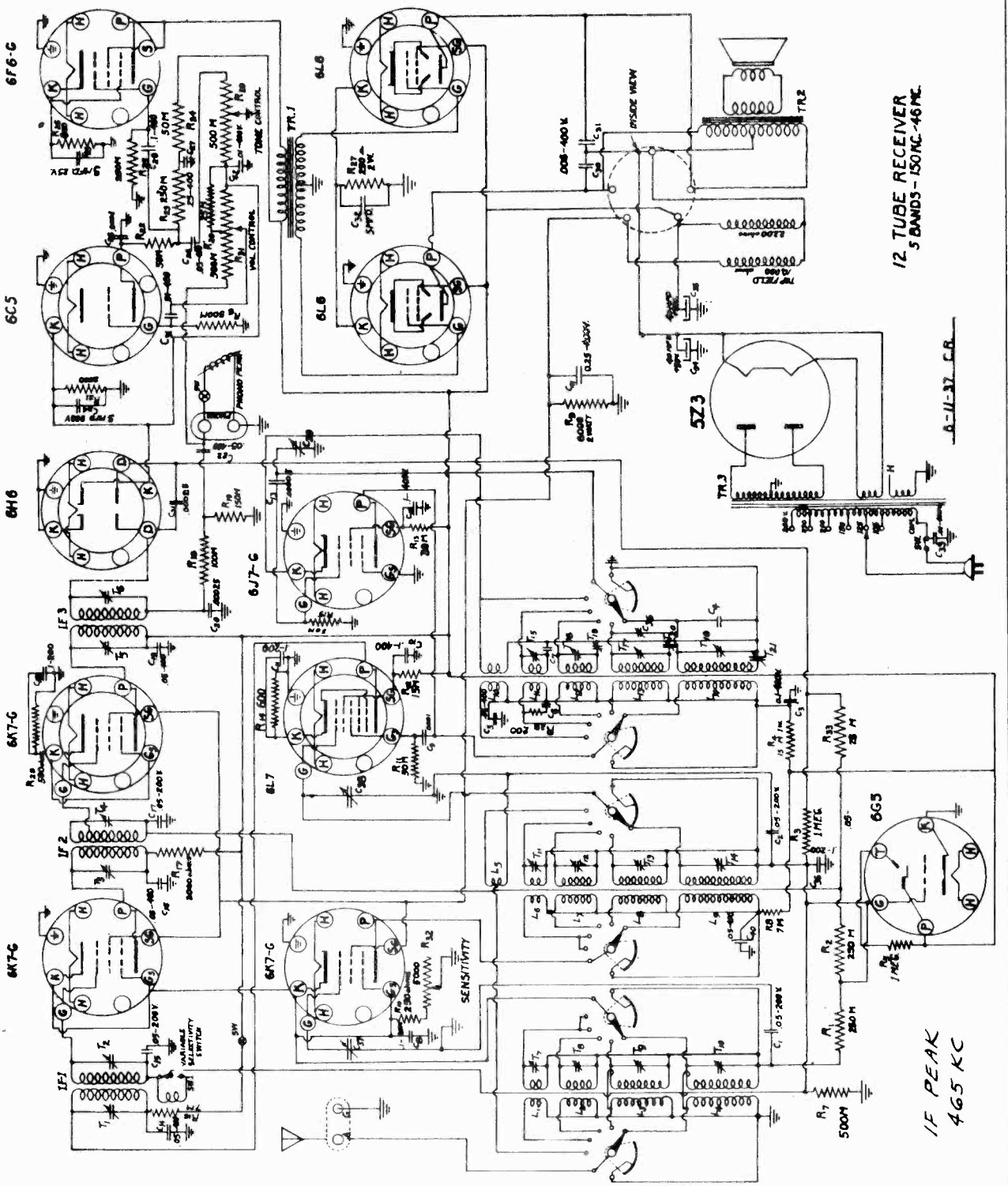
MODELS 802,812
Schematic
Phono. Data

SEARS-ROEBUCK & CO.

The Phono terminal at the back of the chassis may be used for phanograph connection.

NOTE: WHEN THE PHONOGRAPH IS NOT BEING USED BE SURE AND REMOVE CONNECTION FROM THE TERMINALS OTHERWISE THE RADIO WILL NOT WORK PROPERLY.

With some models a phono-radio switch is used by extending wires from the chassis. This circuit is shown on the schematic diagram.



MODELS 802,812
Trimmers,Voltage

SEARS-ROEBUCK & CO.

TUBE	POSITION	PLATE	SCREEN GRID	KATHODE	OSC. PLATE	FILAMENT
6K7-G	1st. R.F.	225 V.	105 V.	4V to 14V	-	6.25V.
6L7	Mixer	230 V.	130 V.	5.2	-	6.25V.
6J7-G	Osc.	112 V.	137 V.	-	-	6.25V.
6K7-G	1st. I.F.	217 V.	102 V.	4V to 14V	-	6.25V.
6K7	2nd. I.F.	240 V.	102 V.	4 V.	-	6.25V.
6H6-G	Diode Det.	-	-	2.4 V.	-	6.25V.
6C5	Audio	65 V.	-	2.4 V.	-	6.25V.
6F6G	Audio 2nd.	230 V.	-	16; V.	-	6.25V.
6L6	P.P. Audio	320 V.	230 V.	22 V.	-	6.25V.

SOCKET READINGS FOR MODEL A-12 SERIES

All Voltages taken from ground with line voltage 115 volts.
No load in antenna.
Sensitivity control variation changes kathode voltage.

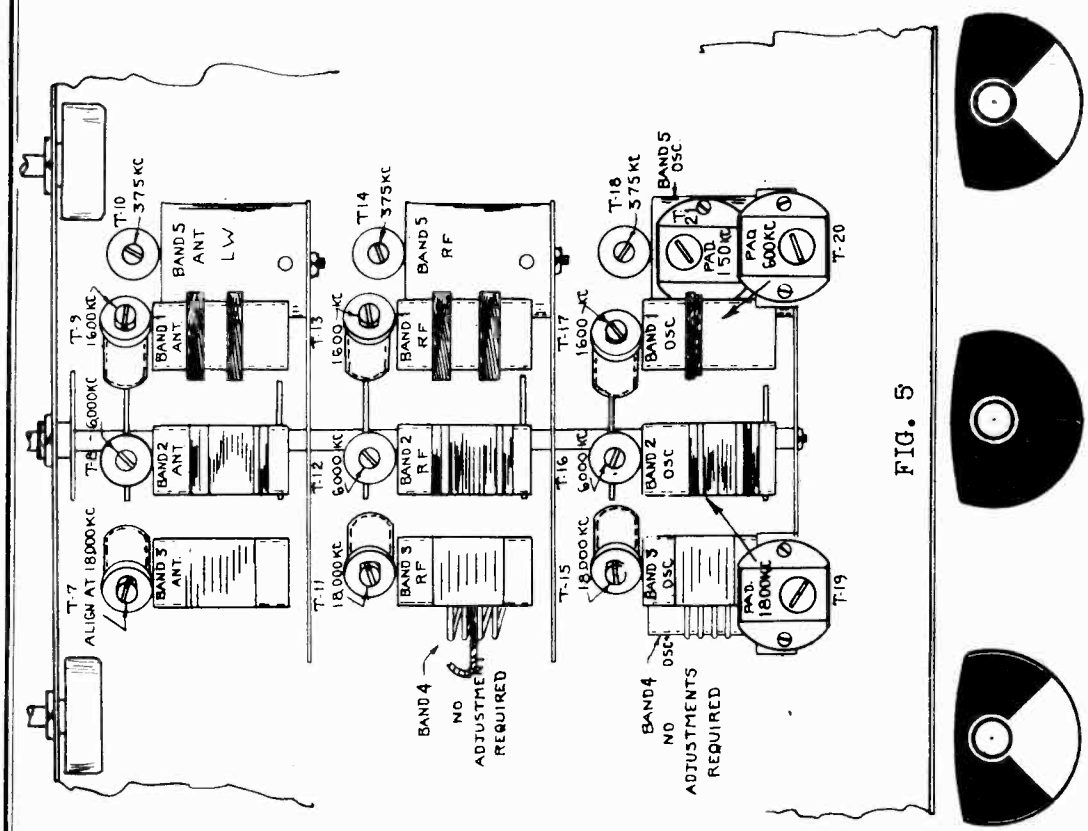


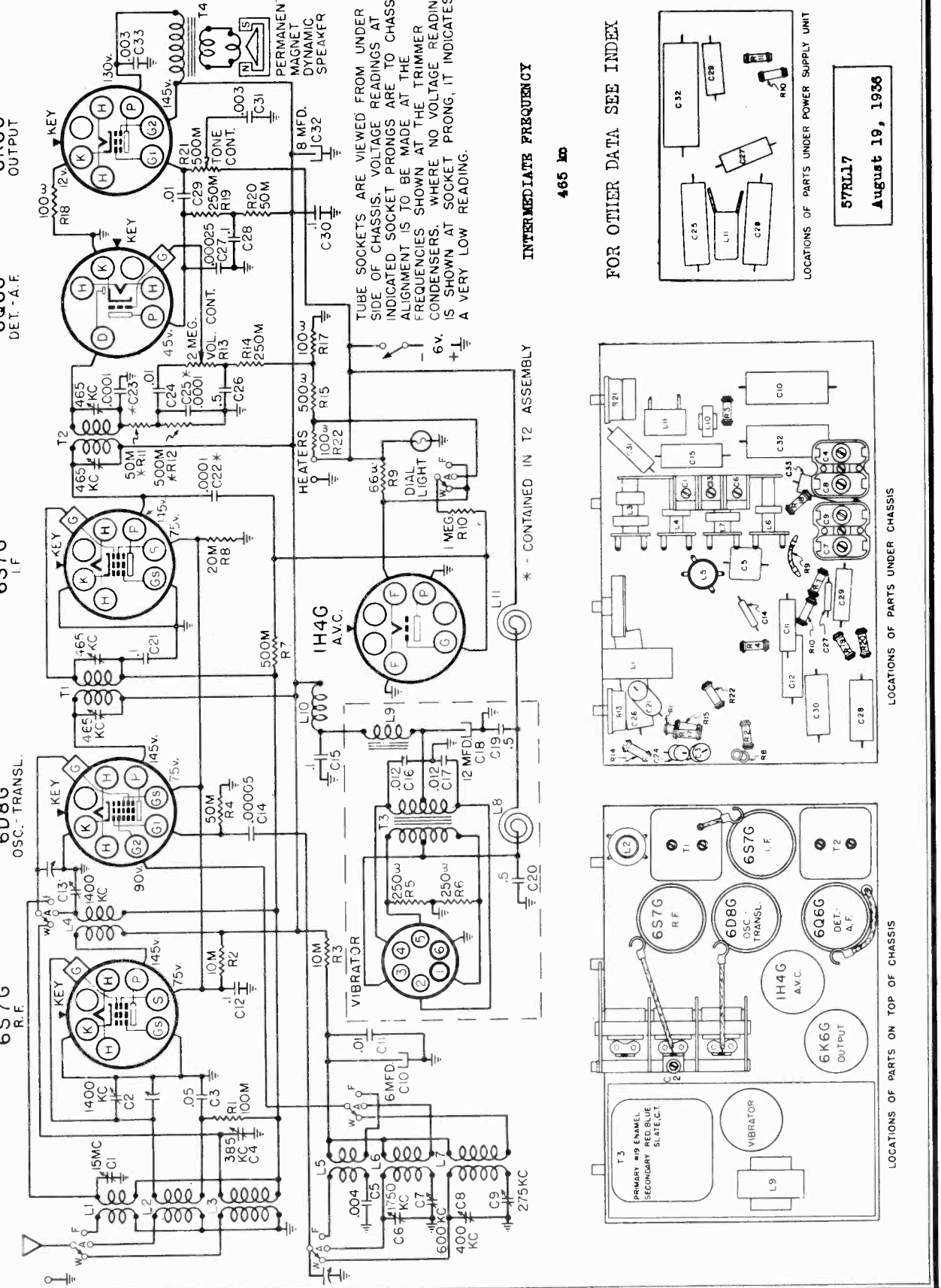
FIG. 5

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 4405A,4428A,4433,4448A
4453,4528A,4548A
Schematic,Socket,Trimmers
Chassis View,Voltage



ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:

6S7G	RF (Band "A" only)
6D8G	Oscillator-Translator
6S7G	IF
1H4G	AVC
6Q6G	Detector-AF
6K6G	Output

POWER SUPPLY:
All models available - 6 volt storage "A" battery; 3 ampere drain

FREQUENCY RANGES:

Band "W"	220-400 kc
Band "A"	540-1750 kc
Band "P"	5.6-17.5 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "W"	400 kc	385 kc	275 kc
Band "A"	1750 kc	1400 kc	600 kc
Band "P"	-	15 mc	Fixed

POWER OUTPUT:

Type	Single Pentode
Undistorted	.5 watts
Maximum	1.6 watts

LOUD SPEAKER:

Type	Permanent Magnet Dynamic
Size	6½" or 8"

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

CHASSIS FEATURES:
Number RF stages - One on band "A" only
Number IF stages - One
Antenna - Marconi
Plug-in Synchronous Vibrator

MECHANICAL SPECIFICATIONS

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

CONTROL OPERATION:
Turning right: volume increase
Turning right: "W", "A", "P"

Tuning ratio: 20:1

Turning right: power on; bass to treble

GENERAL INFORMATION

THE AVC CIRCUIT:

The grid of the 1H4G AVC tube is used as a diode plate. A portion of the IF signal at the plate of the 6S7G IF tube is fed to the 1H4G through the .0001 mfd. condenser, C22. The resulting diode current creates a voltage drop across the one megohm resistor, R10. This voltage is applied to the control grids of the 6S7G and 6D8G tubes to provide AVC. On bands "P" and "W" residual bias is furnished by the drop across the 1H4G tube filament. On band "A" residual bias is furnished by the drops across the resistors R17 and R15 which,in series with R22,are across the six volt supply.

REMOVING THE ESCUTCHEON:

The escutcheon is held in place with two "speed-nuts", behind the front panel. These "speed-nuts" can be loosened and removed by grasping one end of them with a pair of long-nose pliers and bending it away from the front panel of the set.

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".

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection	Across speaker voice coil
Output meter reading to indicate 50 milliwatts	.45 volts
Approximate 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	All the way on
Position of tone control	Fully clockwise

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"A"	Closed	465 kc	.1 mfd.	6D8G Grid	T2, T1	-
"A"	Fully open	1750 kc	.0002 mfd.	Antenna Lead	C6	25
"A"	1400 kc	1400 kc	.0002 mfd.	Antenna Lead	C2, C13	10
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C7	12
"W"	Fully open	400 kc	.0002 mfd.	Antenna Lead	C8	95
"W"	385 kc	385 kc	.0002 mfd.	Antenna Lead	C4	100
"W"	275 kc (rock)	275 kc	.0002 mfd.	Antenna Lead	C9	110
"P"	15 mc (rock)	15 mc	400 ohms	Antenna Lead	C1	18
"P"	6 mc	6 mc	400 ohms	Antenna Lead	-	75

IMPORTANT ALIGNMENT NOTES

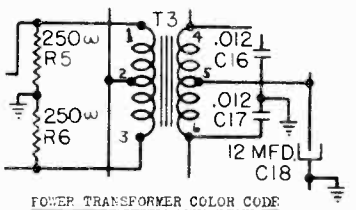
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Alignment must be made in the sequence indicated.

All of the adjustment should be repeated in their original order for greater accuracy. In particular, the band "W" adjustments should be gone over two or three times since one adjustment affects the others.

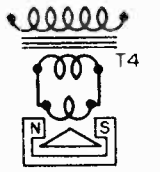
Always keep the output from the signal generator at its lowest possible value in order to make the AVC action of the receiver ineffective.

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

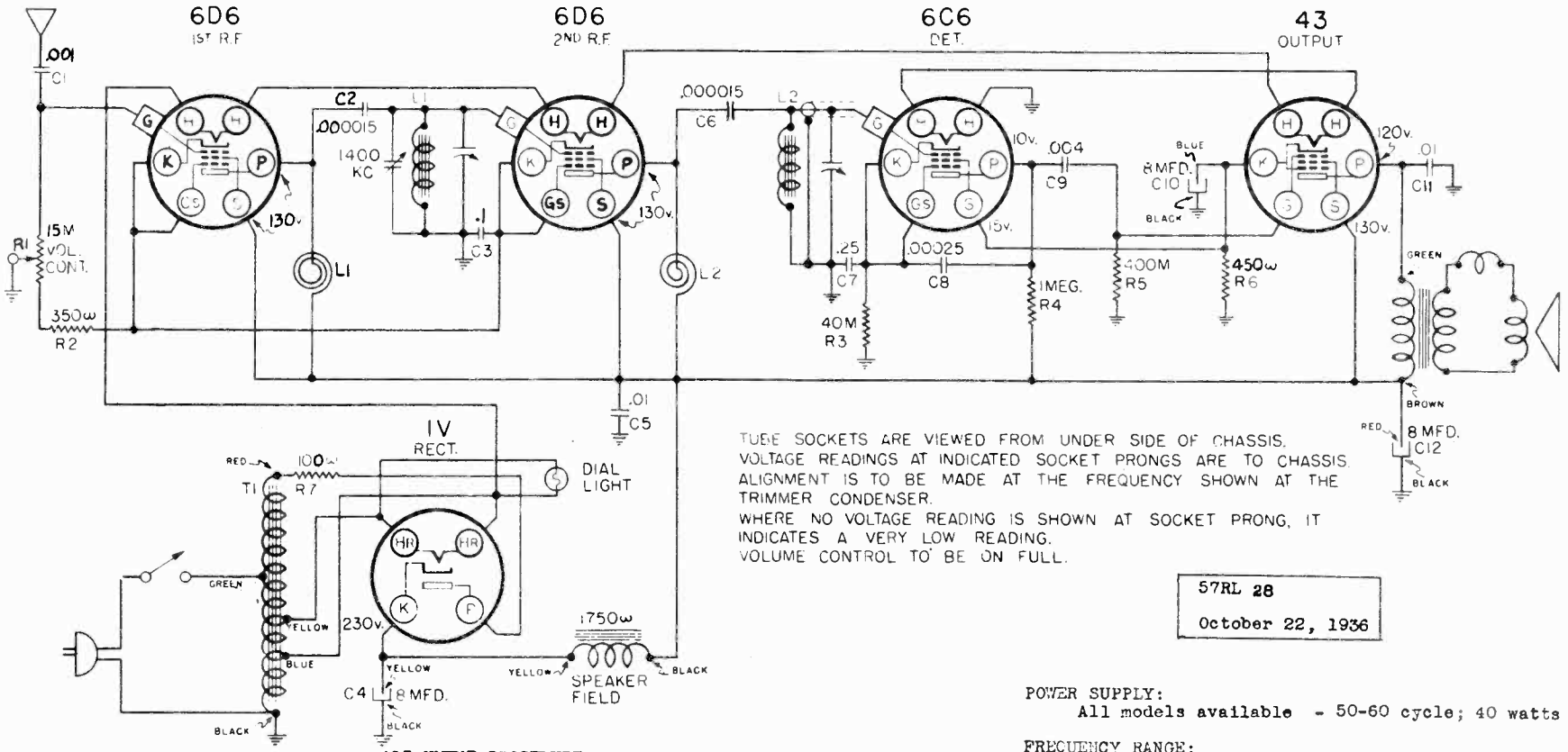


POWER TRANSFORMER COLOR CODE

1,2,3 - Solid Conductor
4 - Red
5 - Slate
6 - Blue



PERMANENT MAGNET DYNAMIC SPEAKER



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.

57RL 28

October 22, 1936

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 bottom of the cabinet. An insulated screw driver should be used since the chassis may be above ground potential, as explained previously.

An auto-transformer is used, instead of the usual power transformer having separate primary and secondary windings. For this reason, under certain conditions the chassis may be 115 volts above ground potential.

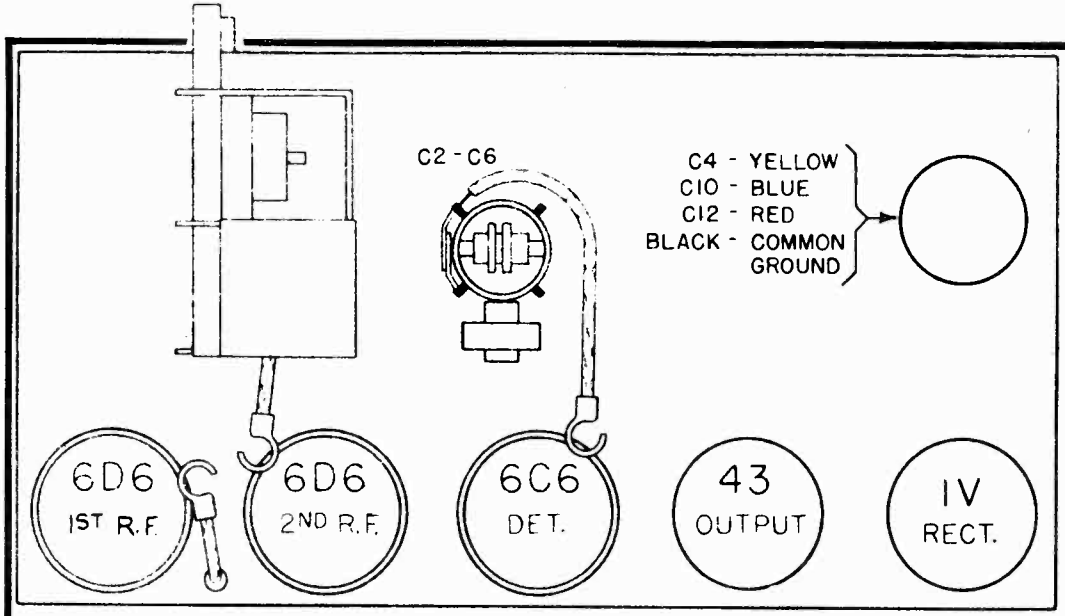
POWER SUPPLY:
All models available - 50-60 cycle; 40 watts

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

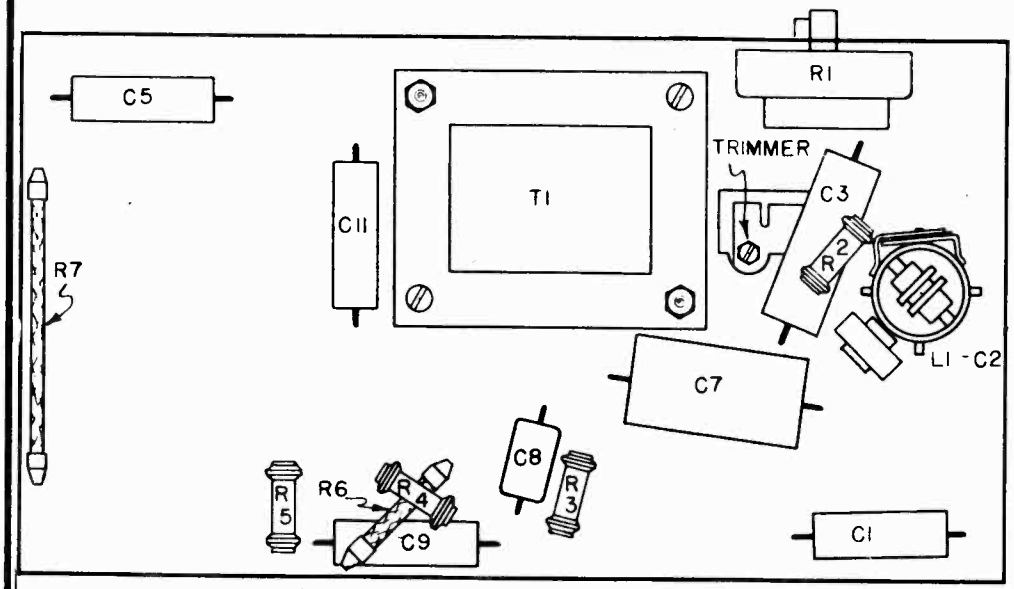
POWER OUTPUT:
Type - - - - - - - - - Single Pentode
Undistorted - - - - - - - - - .98 watts
Maximum - - - - - - - - - 1.64 watts

ALIGNMENT FREQUENCY:
1400 kc

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

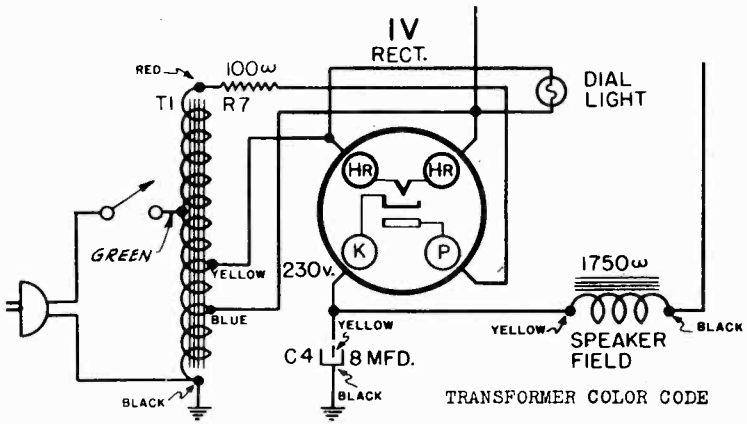


LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS.

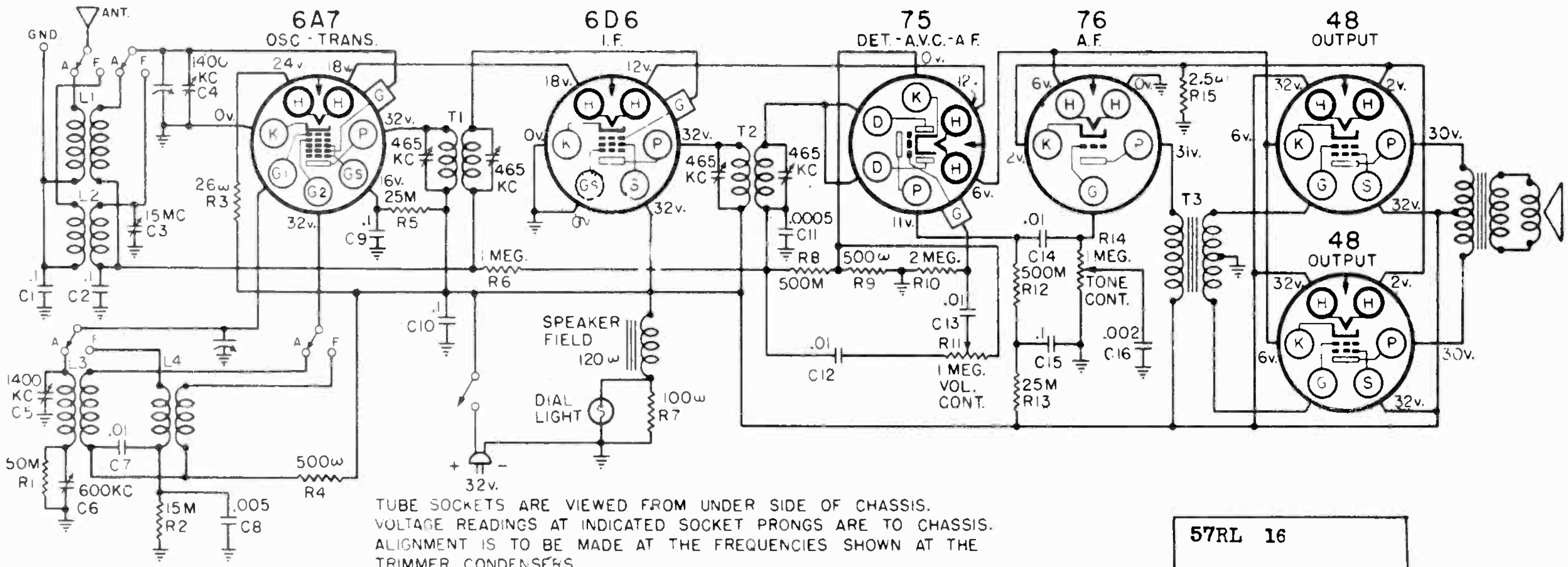
LOCATION	PART NUMBER	DESCRIPTION
	1015514723	Antenna - Wire
	1015414200	Button - Snap, variable shield mounting
	1015414479	Clip - Grid
L1-C2, L2-C6	1012814032	Coil - RF
	1011615503	Condenser - Variable
C4,C10, C12	1012015401	Condenser - Electrolytic, triple, dry
C7		Condenser - .25 mfd. 200 V.
C3		Condenser - .1 mfd. 200 V.
C5,C11		Condenser - .01 mfd. 400 V.
C9		Condenser - .004 mfd. 400 V.
C1		Condenser - .001 mfd. 400 V.
C8		Condenser - .00025 mfd. mica
R1	1012415502	Control - Volume, with switch
	1015514721	Cord - Power
	1016015559	Cover - Cabinet back
	1014015506	Dial - Station selector
	1013915507	Knob - Volume
	1013915508	Knob - Tuning
	101492288	Lamp - Dial
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
R7		Resistor - 100 ohms, 1 watt, flexible
	1015814058	Speaker - 5", Dynamic
	1015714871	Cone and voice coil
	1011514872	Field coil
	1011314873	Transformer
T1	1011014062	Transformer - Power



TRANSFORMER COLOR CODE

MODELS 4429,4449
4529,4549
Schematic,Voltage
Specs.,Speaker Conn.

SEARS-ROEBUCK & CO.



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.

57RL 16

August 13, 1936

ELECTRICAL SPECIFICATIONS

POWER SUPPLY:
All models available - 32 Volts, DC; 36.8 Watts

FREQUENCY RANGES:
Band "A" - - - - - - - - - 540-1750 kc
Band "F" - - - - - - - - 5475-16500 kc

ALIGNMENT FREQUENCIES:

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

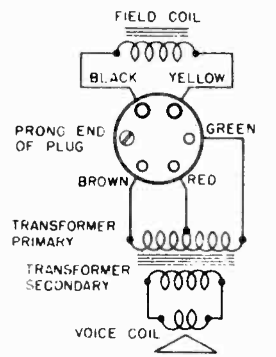
INTERMEDIATE FREQUENCY - 465 kc

POWER OUTPUT:
Type - - - - - - - - - - - - Push-Pull
Undistorted - - - - - - - - .15 watts
Maximum - - - - - - - - - - .32 watts

LOUD SPEAKER:
Type - - - - - - - - - - - - - Dynamic
Size - - - - - - - - - - - - - - - 6"
Field Coil Resistance - - - 120 ohms

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

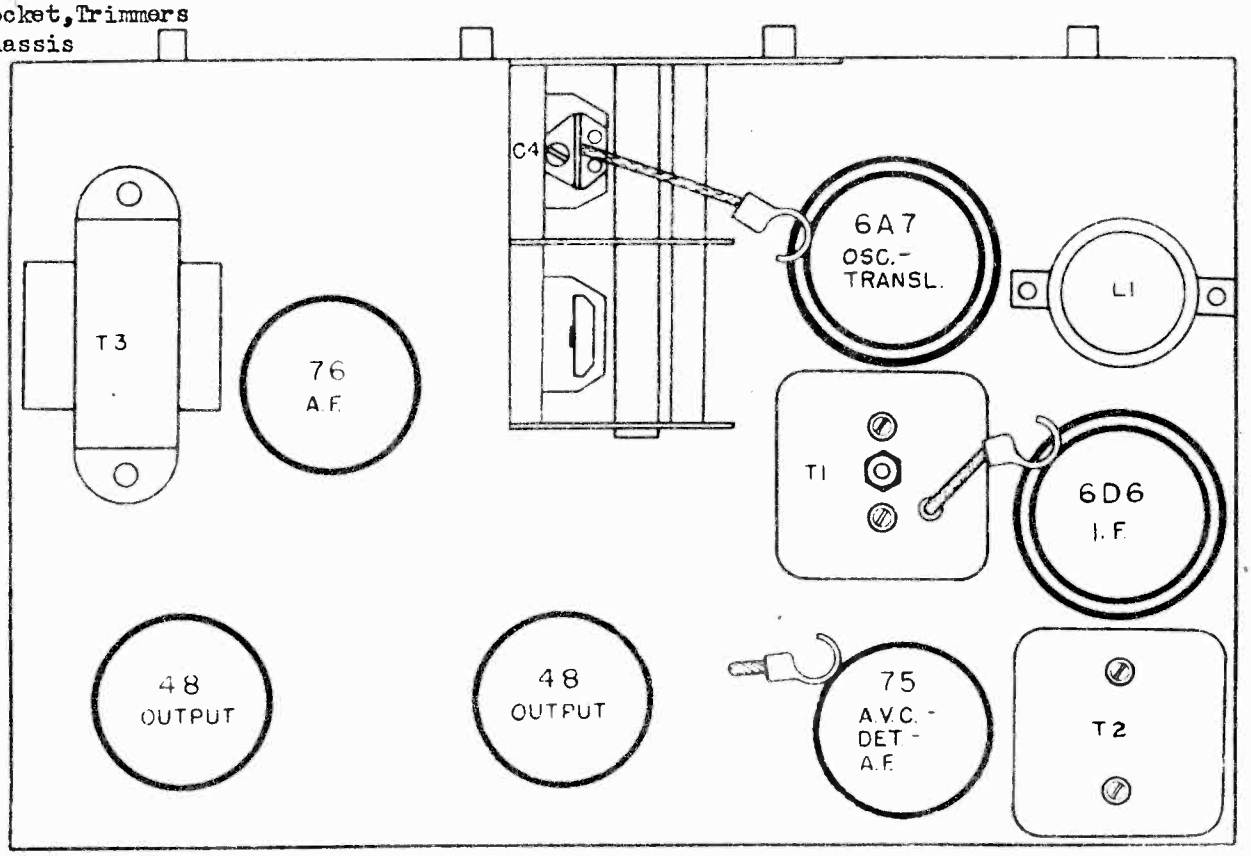
CHASSIS FEATURES:
Number IF stages - - - - - - - - - One
Antenna - - - - - - - - - Conventional
Push-Pull Output



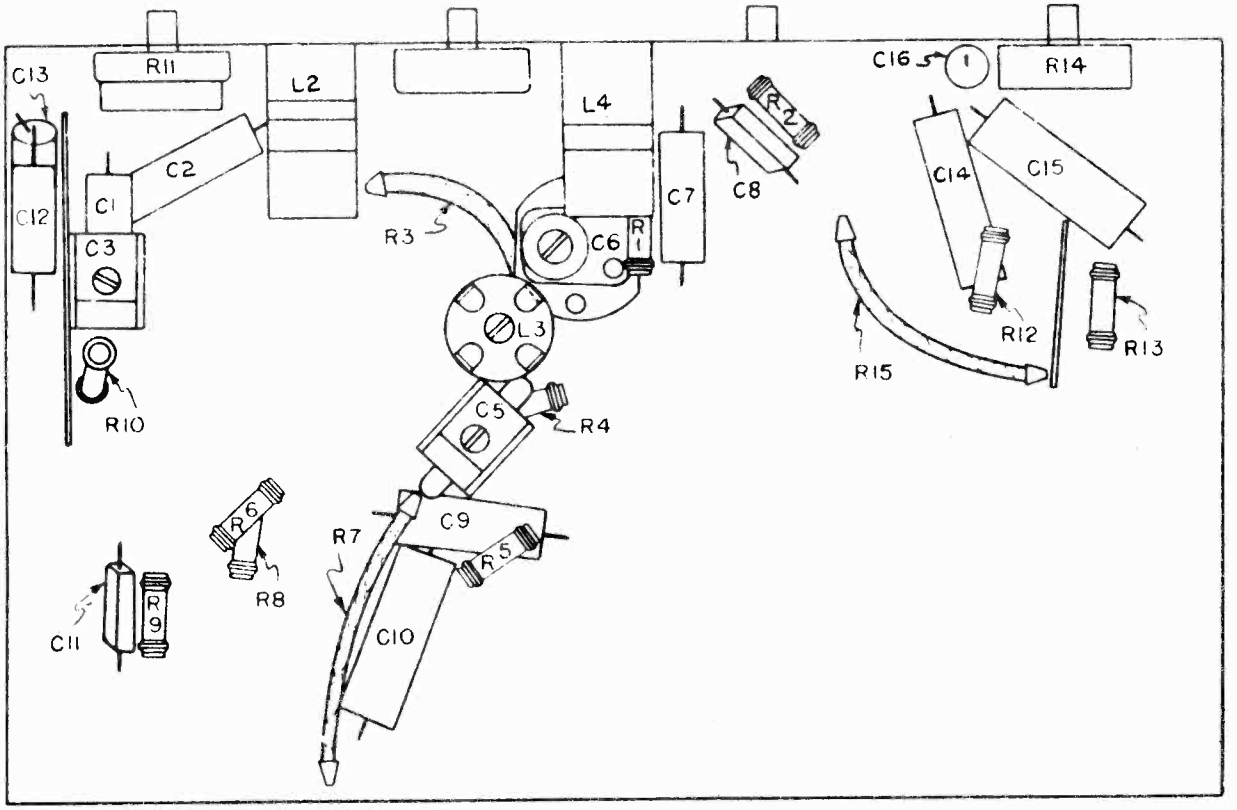
SPEAKER CONNECTIONS

MODELS 4429,4449
4529,4549
Socket,Trimmers
Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

SEARS-ROEBUCK & CO.

MODELS 4429,4449
4529,4549
Alignment,Notes

ALIGNMENT PROCEDURE

Output meter connection - Across speaker voice coil

Output meter reading to indicate 50 milliwatts output - - - - - - - - - - - - - .45 volts

Approximate average sensitivity in microvolts for 50 milliwatts 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 ground lead connection - To receiver chassis

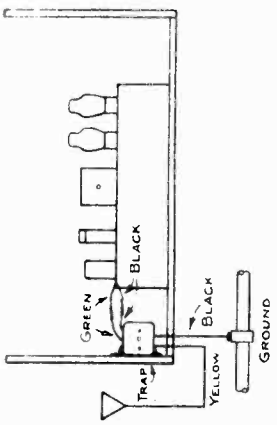
Generator modulation - 30%, 400 cycles

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	TRIMMERS ADJUSTED (IN ORDER SHOWN)	MICROVOLTS
"A"	1000 kc	465 kc	.1 mfd.	6A7 Grid	T2,T1	-
"A"	1400 kc	1400 kc	.0002 mfd.	Antenna Lead	C5,C4	35
"A"	600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C6	25
"F"	15 mc (rock)	15 mc	400 ohms	Antenna Lead	C3	30
"F"	6 mc	6 mc	400 ohms	Antenna Lead	-	125



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".

CHANGE TO REDUCE MINIMUM VOLUME:

If the minimum volume is not low enough, examine the Volume Control, R11. If one side of the control is connected to ground, disconnect it from the ground and run the connection to the cathode of the 75 tube. It is shown wired this way in the Schematic Wiring Diagram.

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 NOISE SUPPRESSION EQUIPMENT:

Two condensers and a suppressor are supplied for eliminating the electrical interference created by the gasoline engine that drives the 32 volt lighting plant generator.

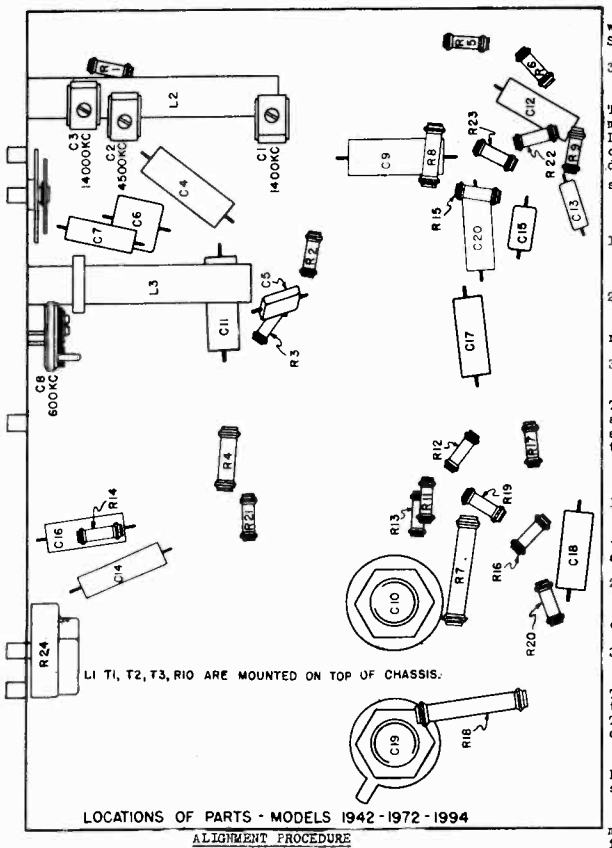
In single cylinder installations, cut the high tension wire going to the spark plug and screw the suppressor onto the two ends of the wire. In multi-cylinder installations, cut the high tension wire going to the center terminal of the distributor cap and screw the suppressor onto the two ends of the wire.

Connect one of the condensers between the two generator brushes. Ground the generator frame. Connect the other condenser from the battery side of the ignition coil to ground.

MODELS 1942,1972,1994
Chassis 391Y

SEARS-ROEBUCK & CO.

Chassis Alignment
Sensitivity



LOCATIONS OF PARTS - MODELS 1942-1972-1994

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 various points mentioned below for alignment. Connect the low scale of an output meter across the loud speaker voice coil. A reading of one volt or less will be obtained during most of the alignment. Connect a jumper between the "B" and "C" terminals of the antenna terminal block at the rear of the chassis.

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, the Tone Control to its brilliant position (clockwise), and the Selectivity Control to its #1 position (sharp).

3. Alignment:

(a) Set the test oscillator to 175 kc. Connect the output lead of the test oscillator (in series with a .1 mfd condenser) to the control grid of the 6K7MG IF tube. Peak the IF output transformer, T2. This transformer is the square can unit mounted at the extreme left rear corner of the chassis, as one faces the rear of the chassis.

(b) Change the test oscillator output lead connection to the control grid of the 6A8MG oscillator-translator tube. Peak the IF input transformer, T1. This transformer is the square can unit with a grid lead coming out of its top.

(c) Repeat the adjustments in their original order for greater accuracy. (Change the test oscillator output lead back to the 6K7MG tube for T2 adjustment and then connect it to the 6A8MG tube again for T1 adjustment.) Always keep the test oscillator output at its lowest possible value.

RF ALIGNMENT

Important:

Alignment of band "B" or "C" affects the alignment of the other lower frequency bands. Therefore, band "C" must be aligned first, then band "B", then band "A".

SHORT WAVE BAND "C" ALIGNMENT

1. Connections:

Connections for band "C" alignment are the same as for IF alignment except that the .1 mfd condenser is disconnected from the output lead of the test oscillator. In its stead a 400 ohm carbon resistor is to be connected from the test oscillator output lead to the "A" terminal on the antenna terminal block at the rear of the chassis.

2. Receiver Settings:

Turn the Volume Control all the way on, the Tone Control all the way to the right, the Wave Switch to the "C" position, and the Variable Selectivity Control to its #1 position.

3. Alignment:

(a) Set the test oscillator to 14,000 kc and tune in its signal. Then adjust the short wave translator trimmer, C3, for maximum output meter reading. Locations of all of the trimmers are shown in the Location of Parts Illustration. The variable should be rocked a degree or two while making the adjustment. If two peaks are found at two different settings of C3, use the adjustment in which the trimmer is screwed further in (greater capacity).

SHORT WAVE BAND "B" ALIGNMENT

1. Connections:

Connections remain the same as for band "C" alignment.

2. Receiver Settings:

Turn the Wave Band switch to the "B" position. Other settings remain the same as for band "C" alignment.

3. Alignment:

(a) Set the test oscillator to 4500 kc and tune in its signal. Then peak the translator trimmer, C2. 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 adjustment in which the trimmer is screwed further in (greater capacity).

BROADCAST BAND "A" ALIGNMENT

1. Connections:

Connections remain the same as for band "B" alignment except that the 400 ohm resistor is removed from the test oscillator output lead and a .0002 mfd mica condenser connected in its place.

2. Receiver Settings:

Turn the Wave Band switch to the BROADCAST ("A") position. All other settings remain the same as for band "B" alignment.

3. Alignment:

(a) 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 on the middle section of the variable condenser. The broadcast translator trimmer, C1, is mounted on the translator coil as shown in the Location of Parts Illustration.

(b) Set the test oscillator to 600 kc and tune in its signal. Peak the broadcast oscillator padding condenser, C8. The variable should be rocksd a degree or two during the adjustment.

(c) Repeat the 1400 kc adjustments and then the 600 kc adjustment for greater accuracy. Always keep the test oscillator output at its lowest possible value.

(d) Recheck the setting or band "C" translator trimmer, C3, at 14,000 kc.

Dial Calibration:

Set the test oscillator to 900 kc and tune in its signal, or tune in a 900 kc station. Then set the dial pointer to 900 kc without changing the setting of the variable condenser.

Adjustment To Minimize Image Response:

1. Set the test oscillator to 1000 kc and tune in its signal. If the test oscillator output is calibrated it should be set to .1 volts. Leaving the receiver tuned to 1000 kc, change the test oscillator frequency until the image is heard. This will occur when the test oscillator is tuned to 1350 kc.

2. There is a yellow lead running from the Wave Switch to one side of the translator trimmer condenser, C3. The image response can be minimized by placement of this yellow lead.

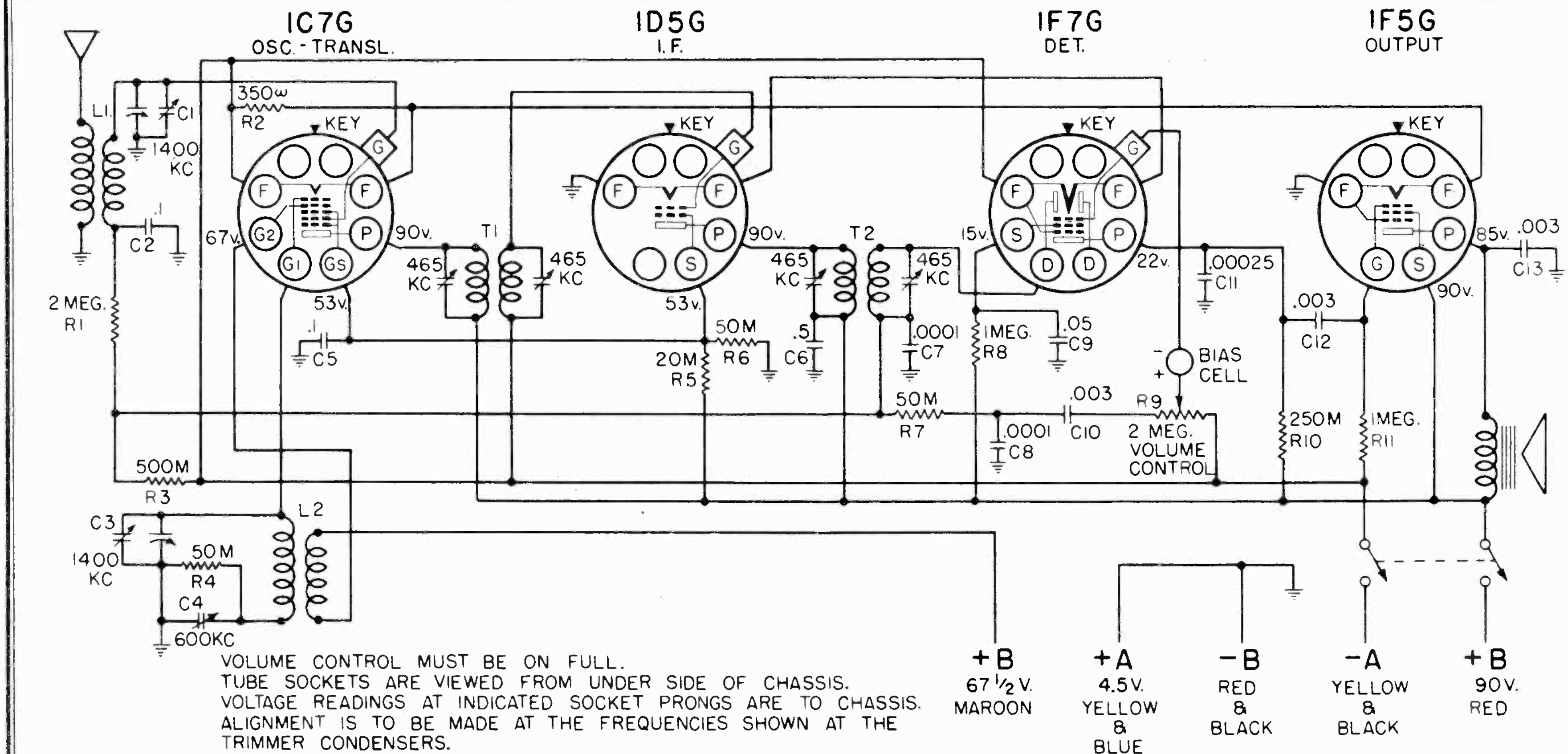
SENSITIVITIES

The following are approximate sensitivities but they will serve as a guide in trouble shooting. In order to make the measurements a test oscillator having a calibrated attenuator must be used. The figures given are those required to obtain an output meter reading of 1.1 volts. Readings for the IF stage are to be made with a .1 mfd condenser, in series with the test oscillator output lead. Readings for the Broadcast band are with a .0002 mfd mica condenser, and for the Short Wave bands with a 400 ohm carbon resistor in series with the test oscillator output lead, as used during the alignment procedure. The receiver Volume Control must be turned all the way to the right, the Tone Control all the way to the right and the Selectivity switch to its #1 position.

	Test Oscillator Connected To:	Frequency	Microvolts To Secure 1.1 Volts Output Meter Reading
Stage Gains	6K7MG - Grid	175 kc	5000
	6A8MG - Grid	175 kc	70
	6A8MG - Grid	1000 kc	60
	Stator - Middle section of Variable	1000 kc	70
Band "A"	Antenna	600 kc	20
	Antenna	1000 kc	25
	Antenna	1400 kc	25
Band "B"	Antenna	1800 kc	35
	Antenna	3000 kc	25
	Antenna	4500 kc	25
Band "C"	Antenna	6000 kc	40
	Antenna	10000 kc	25
	Antenna	14000 kc	15

MODELS 4431, 4432, 4435
4436, 4531
Schematic, Voltage
Specifications

SEARS-ROEBUCK & CO.



VOLUME CONTROL MUST BE ON FULL.
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.

57RL 30
November 12, 1936

POWER SUPPLY:
- "A" Battery (4½ volt dry) - 1 - #5031P
- "A" Battery (4 volt storage) 1 - #5049
- "B" Ba tteries - - - - - - - - 2 - #5503P
- "A" Drain - - - - - - - - - .18 amperes
- "B" Drain - - - - - - - - - - - - - 12 ma

FREQUENCY RANGE:
- Broadcast - - - - - - - - - 540-1750 kc

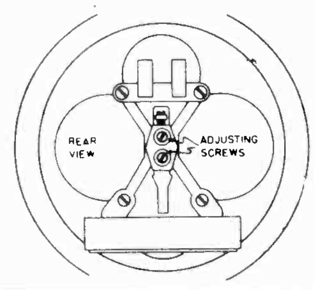
ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1750 kc.	1400 kc.	600 kc

INTERMEDIATE FREQUENCY - 465 kc

POWER OUTPUT:
- Type - - - - - - - - - - Single Pentode
- Undistorted - - - - - - - - - .14 watts
- Maximum - - - - - - - - - - - .24 watts

LOUD SPEAKER:
- Type - - - - - - - - - - - - - Magnetic
- Size - - - - - - - - - - - - - - 6 inch
- DC resistance - - - - - - App.1000 ohms



MODELS 4431,4432,4435
4436,4531

SEARS-ROEBUCK & CO.

Alignment,Sensitivity
Socket,Trimmers,Chassis

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	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2,T1	IF	150
Fully Open	1750 kc	.0002 mfd.	Antenna Lead	C3	Osc. Trim.	150
1400 kc.	1400 kc	.0002 mfd.	Antenna Lead	C1	Transl. Trimmer	90
600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C4	Osc. Pad.	45

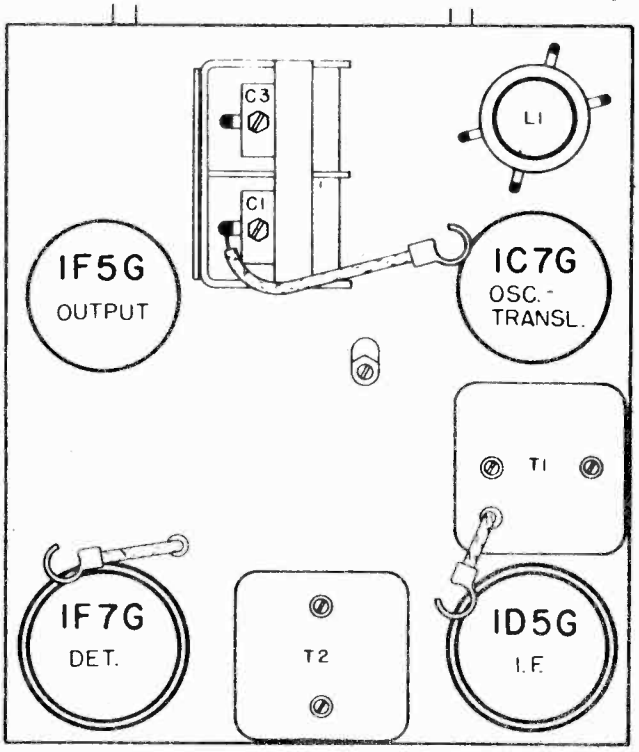
IMPORTANT ALIGNMENT NOTES

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

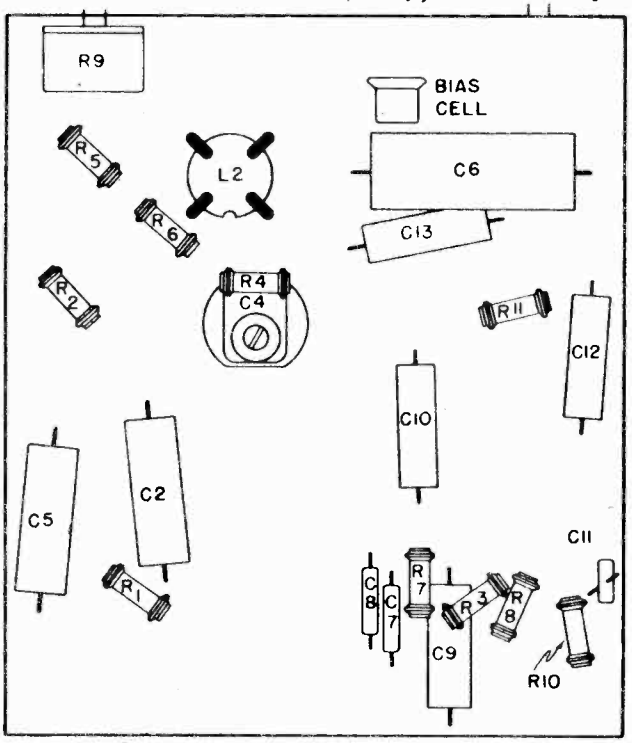
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

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.



LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	1014114137	Adapter - Dial pointer
	1014614081	Bearing - Dial drive shaft
	1015415563	Board - Bias, cell mtg.
	1015413407	Bushing - Rubber mounting
	1014114358	Bushing - Dial protecting
	1015515623	Cable - Battery
	1012715564	Cell - Bias
	1015412808	Clip - Grid
L1	1012814084	Coil - Antenna
L2	1012814085	Coil - Oscillator
	1011614079	Condenser - Variable
C4	1011714433	Condenser - Padder
C6		Condenser - .5 mfd. 200 V.
C2,C5		Condenser - .1 mfd. 200 V.
C9		Condenser - .05 mfd. 200 V.
C10,C12,C13		Condenser - .003 " 400 V.
C11		Condenser - .00025 mfd. mica
C7,C 8		Condenser - .0001 mfd. mica
R9	1012415547	Control - Volume, with switch
	10145139742	Cord - Condenser drive, with spring
	10140140891	Dial - Station selector
	10145139996	Drum - Condenser drive
	1014414092	Escutcheon - With glass
	1013914094	Knob - Tuning
	1013914095	Knob - Volume
	1015915654	Leaflet - Instruction
	1015414400	Nut - Escutcheon mtg.
	10141140781	Pointer - Dial
R1		Resistor - 2 megohms, 1/3 watt
R8,R11		Resistor - 1 megohm, 1/3 watt
R3		Resistor - 500M ohms, 1/3 watt
R10		Resistor - 250M ohms, 1/3 watt
R4,R6,R7		Resistor - 50M ohms, 1/3 watt
		Resistor - 50M ohms, 1/3 watt
R5		Resistor - 20M ohms, 1/3 watt
R2		Resistor - 350 ohms, 1/3 watt
	1014614082	Shaft - Condenser drive
	1015315648	Shield - Tube
	1011813173	Socket - 8 prong, Octal
	1015814136	Speaker - Magnetic
	1015715089	Cone
	1011515090	Actuating coils
	1014513948	Spring - Condenser drive cord
T1	10133155441	Transformer - IF Input
T2	1013515546	Transformer - IF Output

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".

THE AVC CIRCUIT:

The diode current of the 1F7G tube, flowing through the 500M ohm resistor, R3, creates a voltage drop across it. This voltage is applied to the control grid of the 1C7G tube to provide AVC.

BATTERY REPLACEMENT:

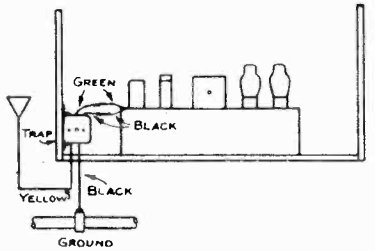
The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. The "B" batteries should be replaced when the total voltage has dropped to 68 volts, under load.

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%.

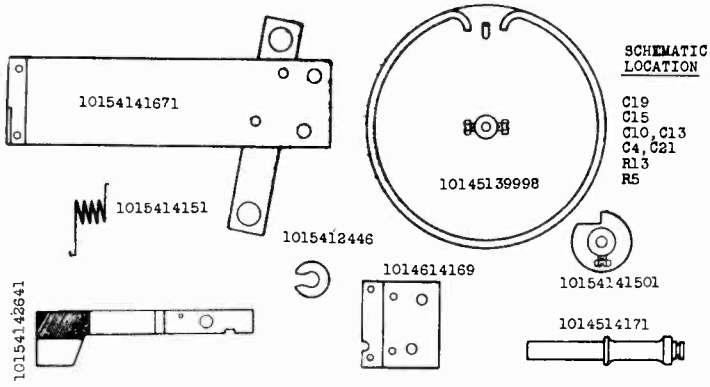


CHASSIS FEATURES:
Number RF stages - - - - - - - - None
Number IF stages - - - - - - - - - One
Number condensers in gang - - - - Two
Antenna - - - - - - - - - Conventional
Dial calibrated in kilocycles and meters

OPERATING FEATURES:
Fidelity Range - - - - 35-2500 cycles
Automatic Volume Control

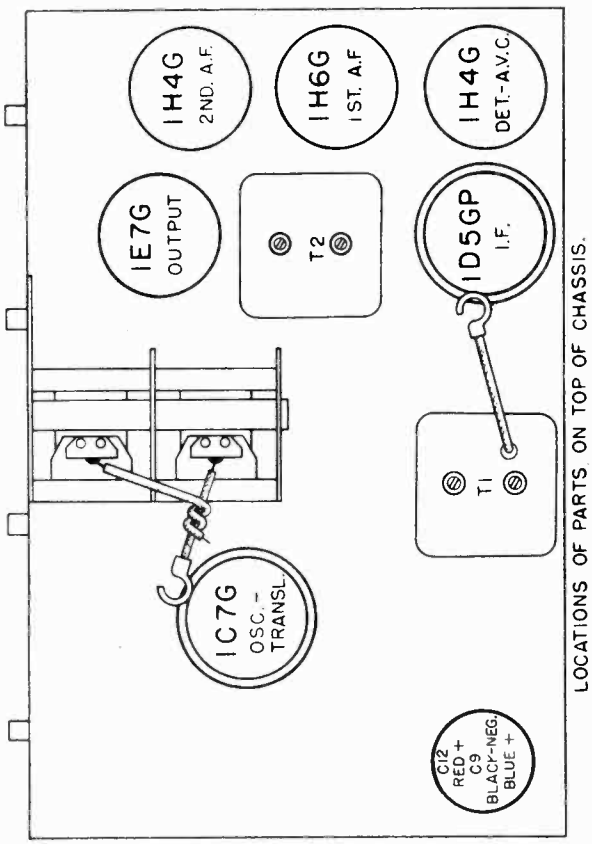
MODELS 4437,4438,4477
4478,4537,4577
Socket,Trimmers,Parts
Chassis

SEARS-ROEBUCK & CO.

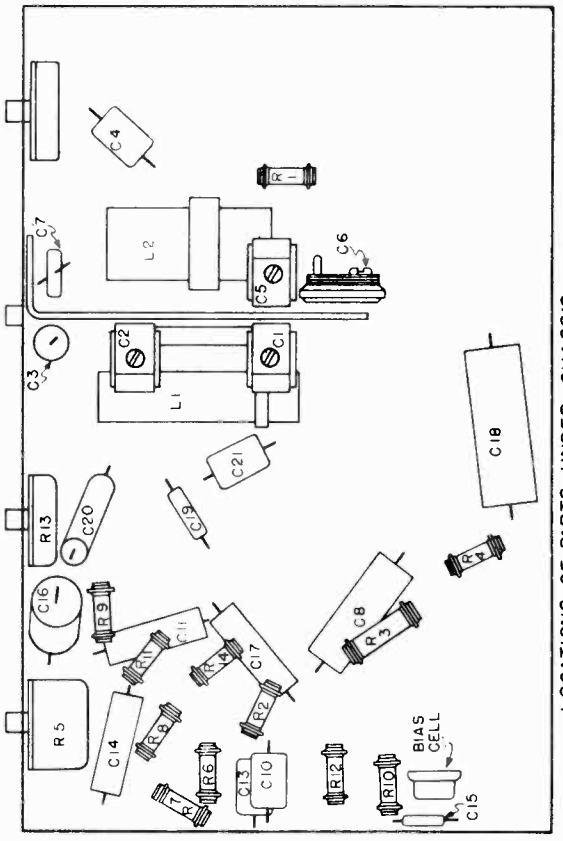


SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	10154142641	Arm - "On-Off" indicator
	1015413407	Bushing - Rubber, chassis
	10154141671	Bracket - Dial mounting
	1014614169	Bracket - Dial drive shaft front bearing
	1015515577	Cable - Battery
	10154141501	Cam - "On-Off" indicator actuating
	1012715584	Cell - Bias
	1015412808	Clip - Grid
L1	1012815571	Coil - Antenna
L2	1012815572	Coil - Oscillator
	1011515609	Condenser - Variable
	10116156091	Condenser - Variable, with drive assembly
C9,C12	1012015576	Condenser - Electrolytic, dry
C1,C2	1011715573	Condenser - Trimmer, dual
C5	1011715723	Condenser - Trimmer, single
C6	1011714433	Condenser - Padding
C16,C18		Condenser - .5 mfd. 200 volts
C3,C8		Condenser - .1 mfd. 200 volts
C20		Condenser - .05 mfd. 200 volts
C11,C14,C17		Condenser - .003 " 400 volts
C7	1011914470	Condenser - .005 mfd. mica
C19		Condenser - .0005 mfd. mica
C15		Condenser - .00025 mfd. mica
C10,C13		Condenser - .0001 mfd.mica
C4,C21		Condenser - .00005 mfd. mica
R13	1012515567	Control - Tone
R5	1012415883	Control - Volume
	10145139740	Cord - Condenser drive
	1014015574	Dial - Station selector
	10145139998	Drum - Condenser drive
	1014414092	Escutcheon - With glass
	1015410980	Grommet - Variable condenser mounting
	1013914405	Knob - Tuning
	1013914095	Knob - Volume
	1013914858	Knob - Wave switch
	1013914425	Knob - Tone
	1015916085	Leaflet - Instruction
	1014314400	Nut - Escutcheon mounting
	10141140781	Pointer - Dial
R2		Resistor - 2 megohms, 1/3 watt
R6,R10,R11		Resistor - 500M ohms, 1/3 watt
R8,R12		Resistor - 250M ohms, 1/3 watt
R1,R14		Resistor - 50M ohms, 1/3 watt
R3		Resistor - 30M ohms, 1/3 watt
R4		Resistor - 20M ohms, 1/3 watt
R9		Resistor - 120 ohms, 1/3 watt
R7		Resistor - 10 ohms, 1/3 watt
	1014514171	Shaft - Dial drive
	1015315648	Shield - Tube
	1015315650	Shield - Tube, base
	1011888315	Socket - 4 prong, Speaker
	1011812757	Socket - 7 prong, Octal
	1011813173	Socket - 8 prong, Octal
	1015815759	Speaker - 6"
T3	1011315761	Transformer
	1015815796	Speaker - 8"
T3	1011315798	Transformer
	1014513948	Spring - Condenser drive cord tension
	1015414151	Spring - "On-Off" indicator tension
	1013715610	Switch - Wave
T1	10133155691	Transformer - IF Input
T2	1013515570	Transformer - IF Output
	1015412446	Washer - "U", shaft retaining

WHEN NO PART NUMBER IS ASSIGNED ORDER BY DESCRIPTION AND RATING



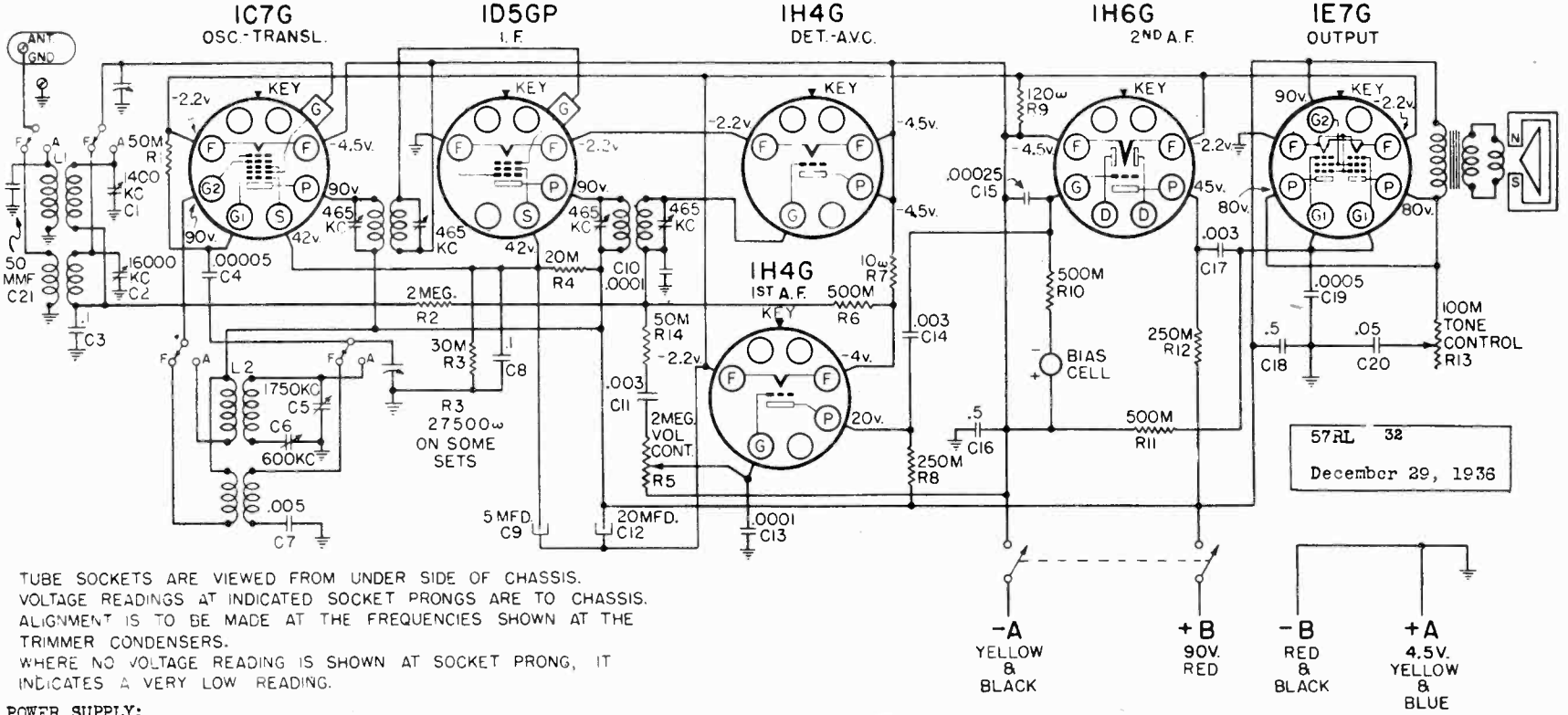
LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

SEARS-ROEBUCK & CO.

MODELS 4437, 4438, 4477
4478, 4537, 4577
Schematic, Voltage, Notes



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

"A" Drain . . . . . 0.3 amperes
"B" Drain . . . . . 22 ma

FREQUENCY RANGES:
Band "A" . . . . . 540-1750 kc
Band "F" . . . . . 6-18 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1750 kc	1400 kc	600 kc
Band "F"	-	16 mc	Fixed

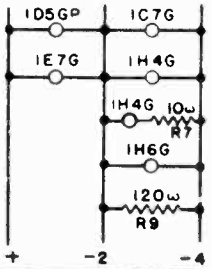
INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT
Type . . . . . Twin Pentode
Undistorted . . . . . 0.25 watts
Maximum . . . . . 0.6 watts

OPERATING FEATURES:
Fidelity Range . . . 50 - 5000 cycles
Tone Control . . . . . Variable
Automatic Volume Control
"On-Off" Indicator

THE FILAMENT CIRCUIT:

Since the tubes have two volt filaments and the "A" supply is 4 volts, a series parallel arrangement is used for the filament circuit. The 1C7G, 1H6G, and 1H4G tubes are connected as one parallel group. The 1D5GP and the 1E7G form another parallel group. These two groups are then connected in series. In addition, a 120 ohm resistor, R9, is in parallel with the group of four tubes so that the group of two tubes will have the proper current. If any one tube burns out, it will affect the filament voltage and current of all of the other tubes. A simplified diagram of the filament circuit is shown below.



LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6" and 8"

CHASSIS FEATURES:
Number IF stages . . . One
Antenna . . . . . Marconi

MODELS 4437,4438,4477
4478,4537,4577 SEARS-ROEBUCK & CO.
Alignment,Notes,Sensitivity

ALIGNMENT PROCEDURE

PRELIMINARY:

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

Output meter reading to indicate 50 milliwatts . . . . . 0.48 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 VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	465 kc	.1 mfd.	1C7G Grid	T2, T1	IF Output, IF Input	80
"A"	Fully Open	1750 kc	.0002 mfd.	Ant. Lead	C5	Oscillator	90
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Lead	C1	Translator	18
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Lead	C6	Padder	15
"F"	16 mc (rock)	16 mc	400 ohms	Ant. Lead	C2	Translator	10
"F"	7 mc	7 mc	400 ohms	Ant. Lead	-	-	70

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.

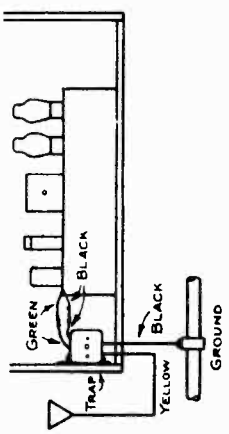
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

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.



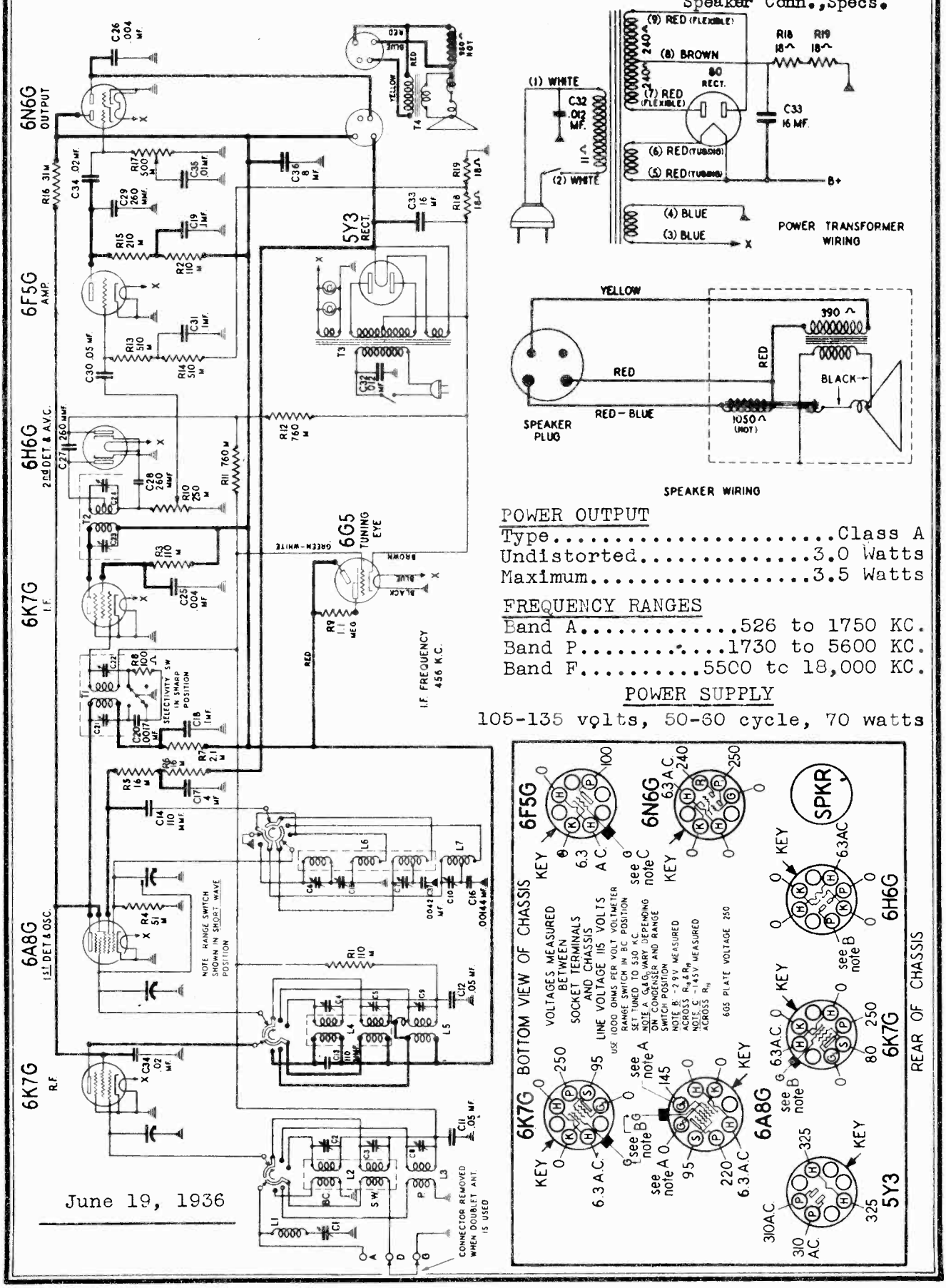
BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. Approximately 600 hours of service can be expected before the battery voltage drops to this value. The "B" batteries should be replaced when the voltage of the 90 block has dropped to 68 volts, under load. Approximately 300 hours of service can be expected before this point is reached. For longer uninterrupted service heavy duty "B" batteries should be recommended.

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

SEARS ROEBUCK & CO.

MODELS 4465,4485,4565 4585. Chassis 100.151 Schematic,Socket,Voltage, Speaker Conn.,Specs.



POWER OUTPUT

Type	Class A
Undistorted	3.0 Watts
Maximum	3.5 Watts

FREQUENCY RANGES

Band A	526 to 1750 KC.
Band P	1730 to 5600 KC.
Band F	5500 to 18,000 KC.

POWER SUPPLY

105-135 volts, 50-60 cycle, 70 watts

June 19, 1936

ALIGNMENT PROCEDURE

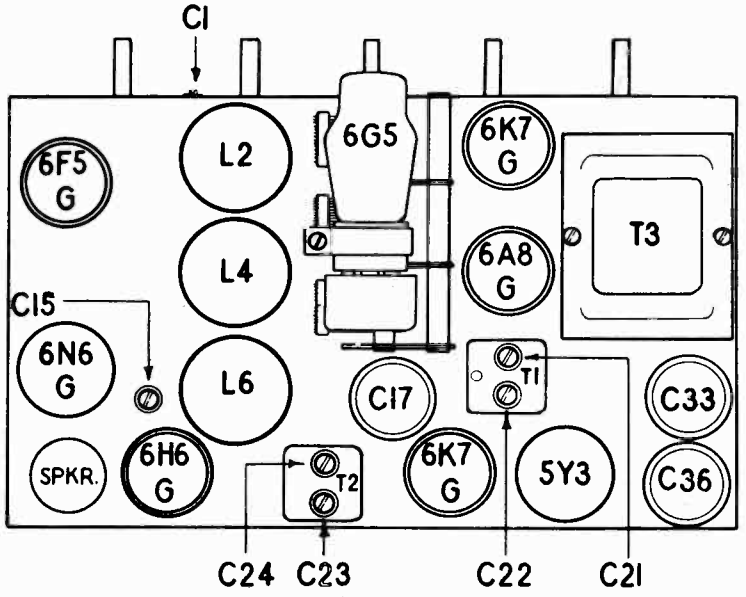
PRELIMINARY

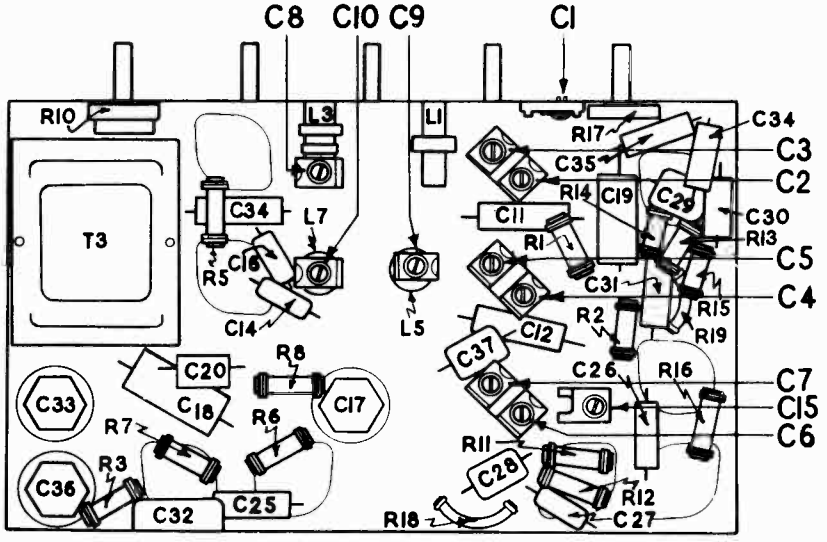
Output meter connections.....Across voice coil leads
Output meter reading to indicate 1 watt output.....1.44 volts
Average sensitivity in microvolts for 1 watt output.....See chart below

Generator ground connection.....Receiver Chassis
Dummy antenna 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 selectivity control.....Sharp position (clockwise)
Position of volume control.....Maximum clockwise
Position of tone control.....Maximum clockwise

BAND SWITCH	POSITION OF * DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (In order shown)	MICRO-VOLTS (Sharp Pos.)
Band A I.F.	1000 KC.	456 KC.	.1 Mfd.	6A8-G Grid	C21, C22, C23, C24	150
I.F. Trap	600 KC.	456 KC.	.00025 Mfd.	Ant. Lead	C1 for Min.Output	
	1500 KC.	1500 KC.	.00025 Mfd.	Ant. Lead	C6,C4,C2	15
	600 KC. ** (Rock Dial)	600 KC.	.00025 Mfd.	Ant. Lead	C15	15
Band P	5000 KC.	5000 KC.	400 Ohm.	Ant. Lead	*** C10,C9,C8	30
Band F	16000 KC.	16000 KC.	400 Ohm.	Ant. Lead	*** C7,C5,C3	30





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.

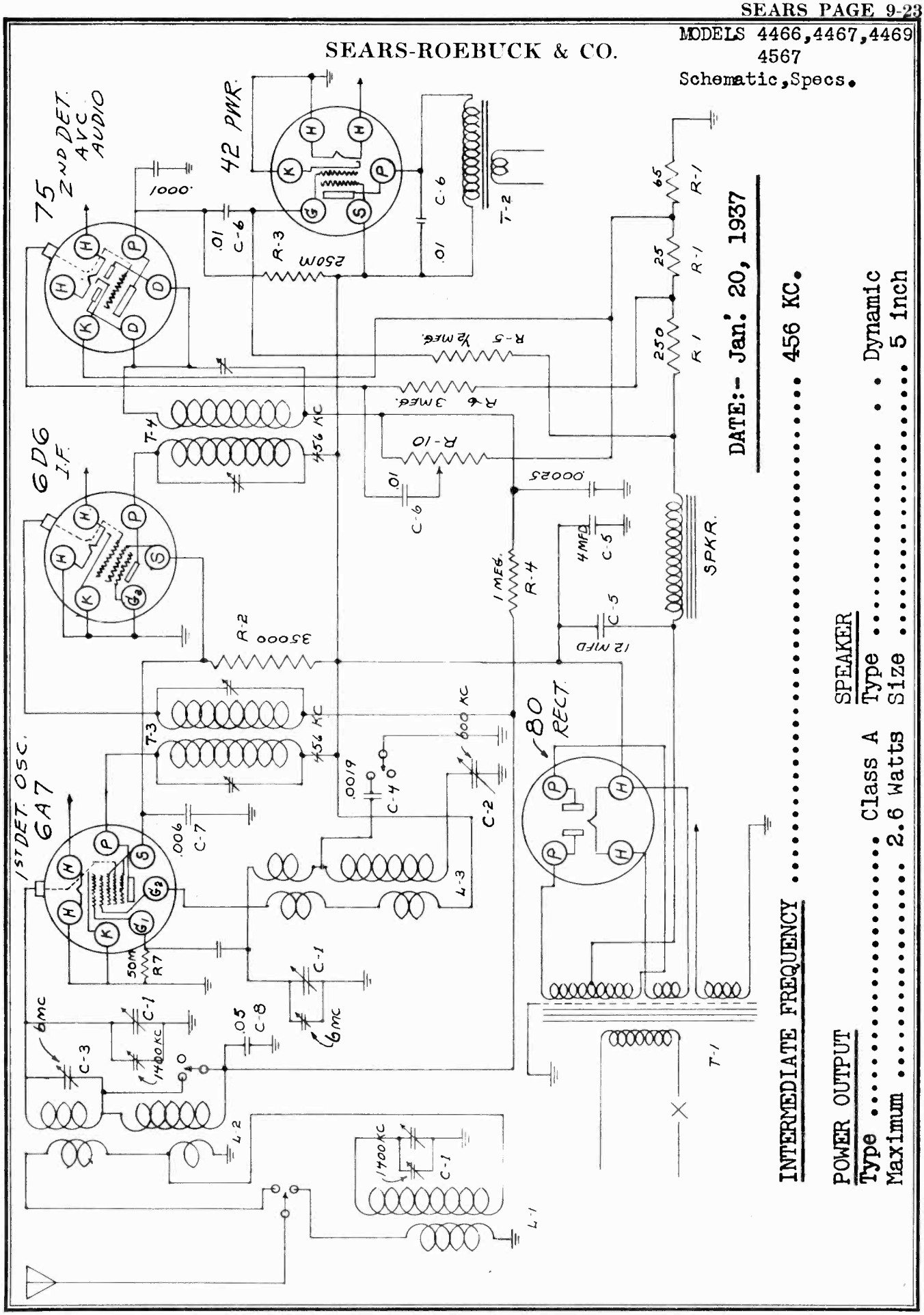
After adjusting the I.F. trimmers C21, C22, C23 and C24, go back and repeat the adjustment, since the setting of each trimmer will have some effect on others. When adjusting C1, antenna trap trimmer, increase generator output to obtain clearly defined trimmer setting for a minimum.

** When aligning the broadcast band at 600 KC. it is necessary to adjust trimmer C15 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 taken in adjusting trimmers C7 and C10, 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 4466,4467,4469
4567
Schematic,Specs.



DATE:- Jan. 20, 1937

INTERMEDIATE FREQUENCY ..... 456 KC.

SPEAKER
Type ..... Dynamic
Size ..... 5 inch

POWER OUTPUT
Type ..... Class A
Maximum ..... 2.6 watts

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections ..... Across voice coil leads
Output meter to indicate 500 MW. ..... below
Average sensitivity in microvolts for 500 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	6 A 7 GRID	I. F. TRIMMERS	
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 C3	38
BAND A	600 KC ROCKGANG	600 KC	.00025	Ant. LEAD	C2	24
BAND A	1400 KC	1500 KC	.00025	Ant. LEAD	(1) on Var. Rear Sec. (2) on Var. Front Sec.	19

Align Short Wave Before Broadcast band as indicated in chart.

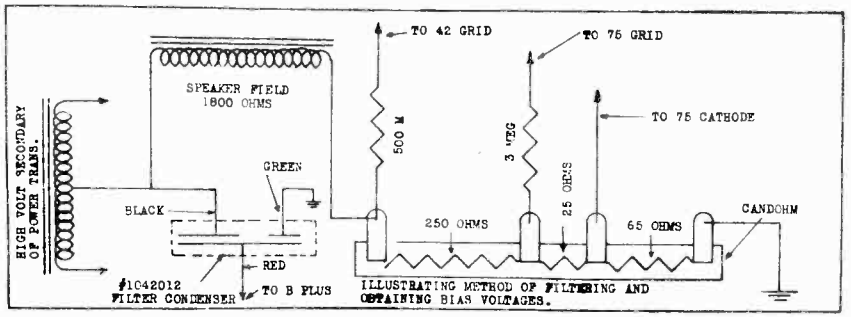
IMPORTANT ALIGNMENT NOTES

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 2 while slowly rocking the gang condenser through a small distance. Rocking the gang is essential if max. sensitivity is to be obtained.

It would be advisable that after the set is aligned to go over the balancing procedure for a second time as it may be possible to derive additional sensitivity and selectivity by doubly checking the alignment.



ILLUSTRATING METHOD OF FILTERING AND OBTAINING BIAS VOLTAGES.

STEP BY STEP ALIGNMENT PROCEDURE

(1) - Peak I.F. transformers carefully at 456 Kc.

(2) - Set band switch to short wave position.

(3) - Set dial pointer at 6 Mc.

(4) - Adjust trimmer on center section of variable condenser to bring in proper peak of 6 Mc signal.

(5) - Adjust trimmer on coil L2.

(6) - Change band switch position to broadcast.

(7) - Turn dial pointer to approximately 600 Kc.

(8) - While 600 Kc signal is being fed into antenna lead, adjust padder C-2 for maximum gain, while variable gang is being rocked.

(9) - Set variable to 1400 Kc and adjust two trimmers on variable, the front and rear sections.

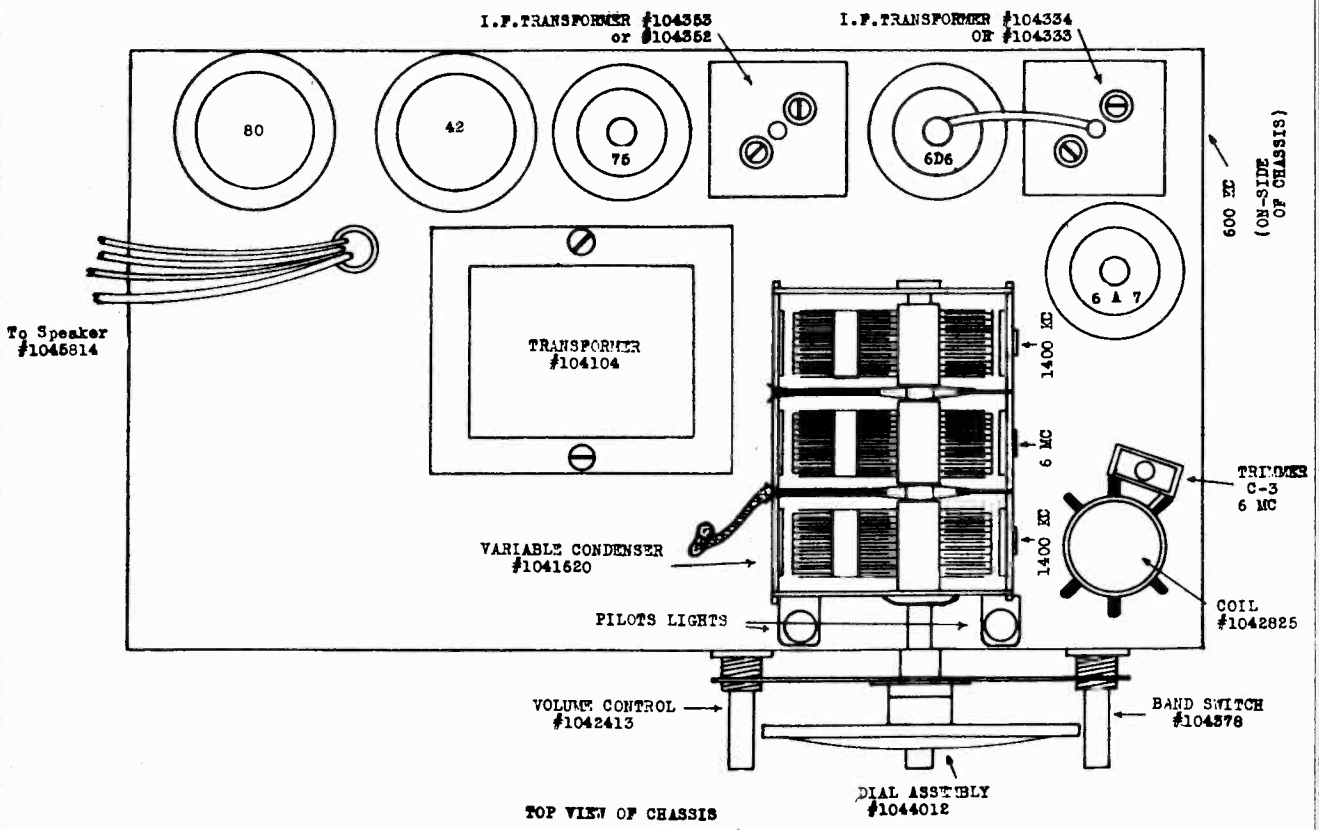
(10) - If variable center section (osc) has been set correctly, 1720 Kc will automatically fall broadcast scale. A very slight adjustment of the center trimmer on the gang will correct this if no police calls are heard.

VOLTAGE CHART
ALL VOLTAGES MEASURED FROM CHASSIS TO SOCKET TERMINALS. USE 1000 OHM PER VOLT VOLT METERS.

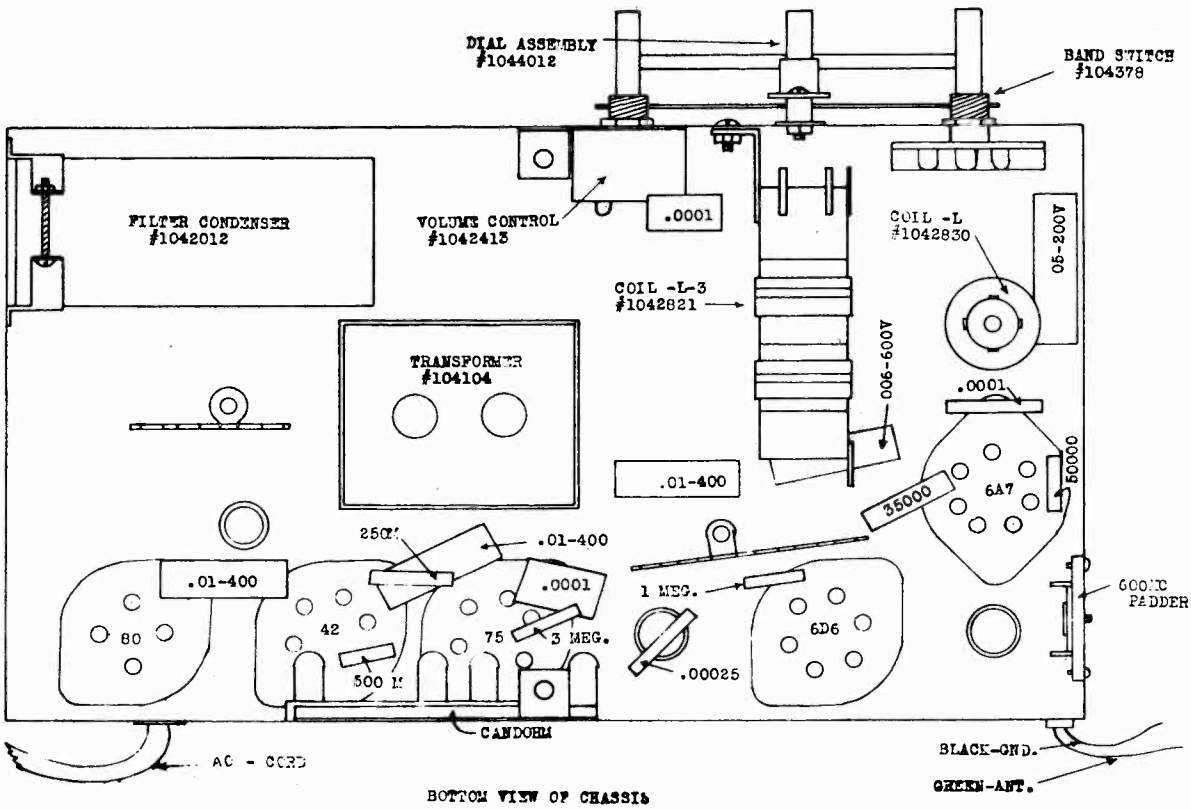
TUBE	PLATE	SCREEN	SUPPRESSOR	OSC. PLATE	OSC. GRID	CATHODE	CONTROL GRID
6A7	195	80	-	195	-8.	0	-.4
6D6	190	80	0	-	-	0	-.4
75	80	DIODES -2.1	-2.1	-	-	-2.8	-2.4
42	180	195	-	-	-	0.	-.6
80	FILAMENT 195	195	-	-	-	-	-

SEARS-ROEBUCK & CO.

MODELS 4466,4467,4469
4567
Socket,Trimmers,Chassis



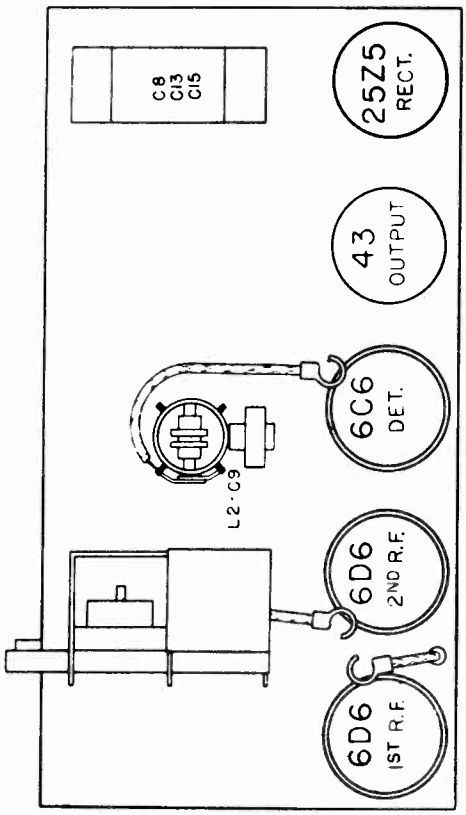
TOP VIEW OF CHASSIS



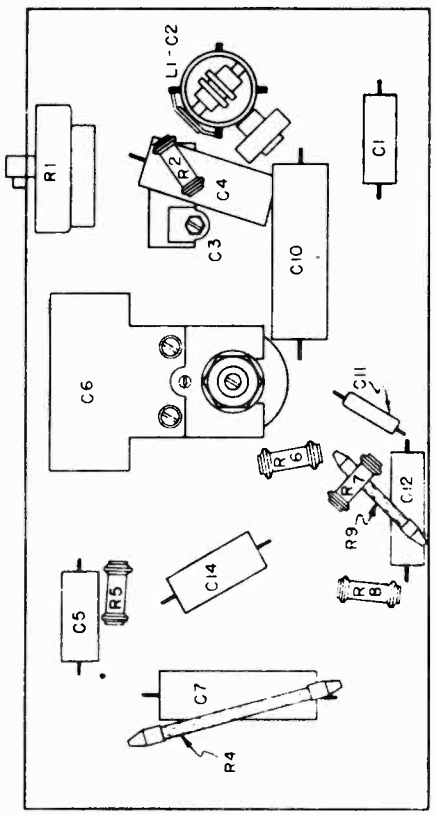
BOTTOM VIEW OF CHASSIS

MODELS 4502,4504,4508
Socket,Trimmers,Chassis
Alignment,Parts

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

WHEN NO PART NUMBER IS ASSIGNED ORDER BY DESCRIPTION AND RATING

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	1015514747	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-C2, L2-C9	1012814032	Coil - RF
	1011614035	Condenser - Variable
C8,C13, C15	1012014036	Condenser - Electrolytic, triple, dry
C6	1012014415	Condenser - Electrolytic, 8 mfd. 100 V.
C10		Condenser - .25 mfd. 200 V.
C4		Condenser - .1 mfd. 200 V.
C7		Condenser - .05 mfd. 600 V.
C5,C14		Condenser - .01 mfd. 400 V.
C12		Condenser - .004 " 400 V.
C1		Condenser - .001 " 400 V.
C11		Condenser - .00025" mica
R1	1012414034	Control - Volume, with "On-Off" switch
R3	1015514416	Cord - Line, black
R3	1015514738	Cord - Line, white
R3	1015514722	Cord - Line, brown
	1016014476	Cover - Cabinet bottom
	1015414052	Grommet - Chassis mtg.
	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
	101391 537	Knob - Volume Control, brown
R7		Resistor - 1 megohm, 1/3 watt

FOR OTHER DATA SEE INDEX

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R8		Resistor - 400M ohms, 1/3 watt
R6		Resistor - 40M ohms, 1/3 watt
R9		Resistor - 450 ohms, 1 watt, flexible
R2		Resistor - 350 ohms, 1/3 watt
R5		Resistor - 300 ohms, 1/3 watt
R4		Resistor - 50 ohms, 2 watts, flexible
	1015314244	Shield - Tube
	101188092	Socket - 6 prong
	1015814058	Speaker - 5", Dynamic
	1015714871	Cone and voice coil
	1011514872	Field coil
T1	1011314873	Transformer
	10138144191	Switch - AC, DC

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. An insulated screw-driver should be used since the chassis may be above ground potential, as explained previously.

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 CONTROLS:
Large Upper Knob - - - - - - - - Tuning
Small Lower Knob - - "On-Off" switch and Volume.

CONTROL OPERATION:
Direct drive
Turning right; Power on; volume increase

MODELS 4472,4473,4533
Schematic,Voltage,Specs.
Socket,Trimmers,Chassis

SEARS-ROEBUCK & CO.

POWER SUPPLY:
"A" Battery (4½ volt dry) 1 - #5031P
"A" Battery (4 volt storage) 1 - #5049
"B" Batteries . . . . . 2 - #5140P

"A" Drain . . . . . 0.18 amperes
"B" Drain . . . . . 12 ma

FREQUENCY RANGE:
Broadcast . . . . . 540-1750 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1750 kc	1400 kc	600 kc

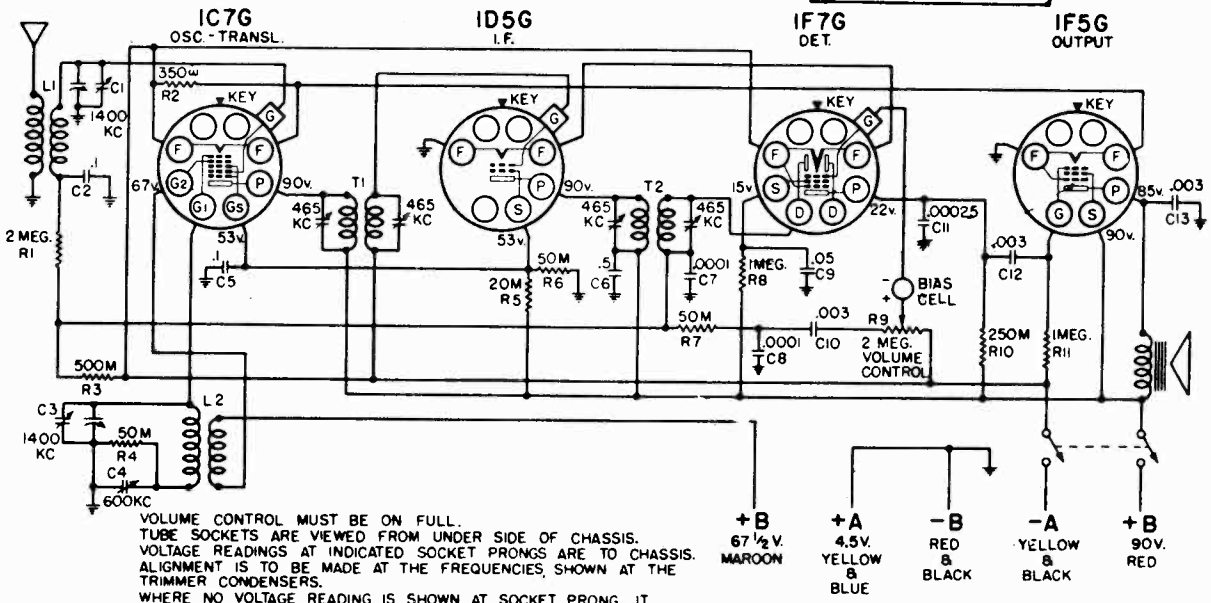
INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Single Pentode
Undistorted . . . . . 0.14 watts
Maximum . . . . . 0.24 watts

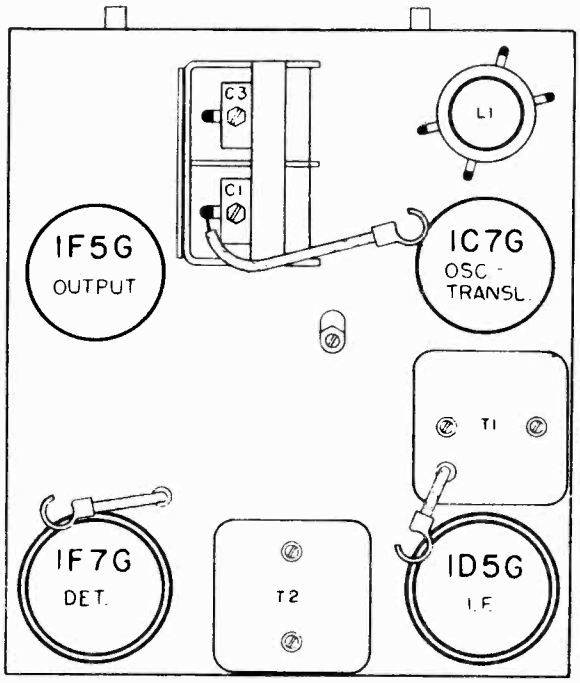
LOUD SPEAKER:
Type . . . . . Magnetic
Size . . . . . 8 inch
DC resistance . . . . App. 1000 ohms

OPERATING FEATURES:
Fidelity Range . . . 35 - 2500 cycles
Automatic Volume Control

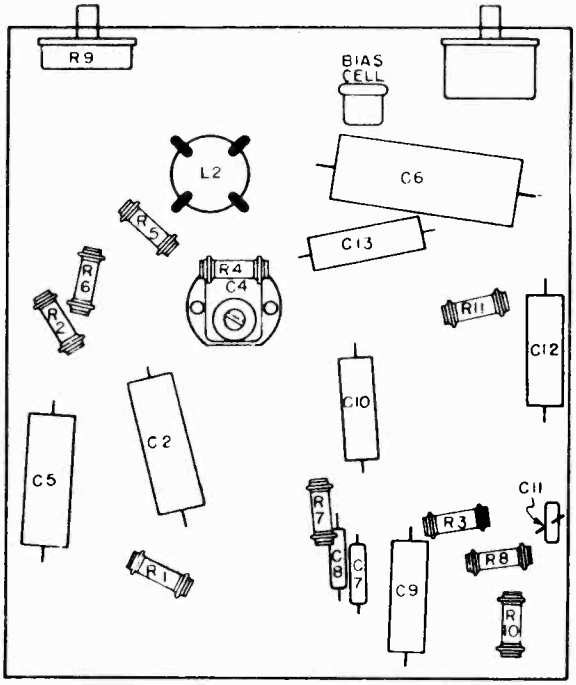
57RL 3S
January 11, 1937



VOLUME CONTROL MUST BE ON FULL.
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.



LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS

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.

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".

THE AVC CIRCUIT:

The diode current of the 1F7G tube, flowing through the 500M ohm resistor, R3, creates a voltage drop across it. This voltage is applied to the control grid of the 1C7G tube to provide AVC.

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.

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.

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	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2,T1	IF	150
Fully Open	1750 kc	.0002 mfd.	Antenna Lead	C3	Osc. Trim.	150
1400 kc	1400 kc	.0002 mfd.	Antenna Lead	C1	Translator Trimmer	90
600 kc (rock)	600 kc	.0002 mfd.	Antenna Lead	C4	Osc. Pad.	45

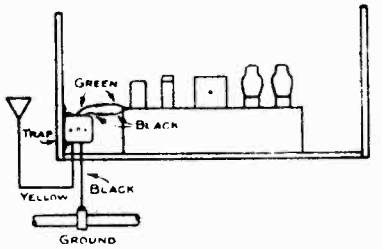
IMPORTANT ALIGNMENT NOTES

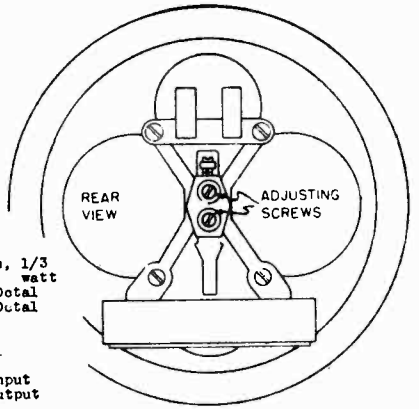
The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

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.





SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	1015415563	Board - Bias cell mounting
	1015413407	Bushing - Rubber, chassis mounting
	1015515623	Cable - Battery
	1012715564	Cell - Bias
	1015412808	Clip - Grid
L1	1012814084	Coil - Antenna
L2	1012814085	Coil - Oscillator
	1011615764	Condenser - Variable
C4	1011714433	Condenser - Padding
C6		Condenser - .5 mfd. 200 V.
C2,C5		Condenser - .1 mfd. 200 V.
C9		Condenser - .05 " 200 V.
C10,C12, C13 C11		Condenser - .003 " 400 V.
		Condenser - .00025 mfd. mica
C7,C8		Condenser - .0001 mfd. mica
R9	1012415763	Control - Volume
	1014015765	Dial - Station selector
	1013914405	Knob - Station selector
	1013914220	Knob - Volume control
	1013914221	Knob - "On-Off" switch
	1015915758	Leaflet - Instruction
	10141159071	Pointer - Dial
R1		Resistor - 2 megohms, 1/3 watt
R8,R11		Resistor - 1 megohm, 1/3 watt
R3		Resistor - 500M ohms, 1/3 watt
R10		Resistor - 250M ohms, 1/3 watt
R4,R6,R7		Resistor - 50M ohms, 1/3 watt
R5		Resistor - 20M ohms, 1/3 watt
R2		Resistor - 350 ohms, 1/3 watt
	1011812757	Socket - 7 prong, Octal
	1011813173	Socket - 8 prong, Octal
	1015814136	Speaker
	1015715089	Cone
	1011515090	Actuating coil
	1013815889	Switch - Filament
T1	10133155441	Transformer - IF Input
T2	1013515546	Transformer - IF Output

WHEN NO PART NUMBER IS ASSIGNED ORDER BY DESCRIPTION AND RATING

SEARS-ROEBUCK & CO.

MODEL 4487
Schematic, Changes
MODEL 4587
Changes

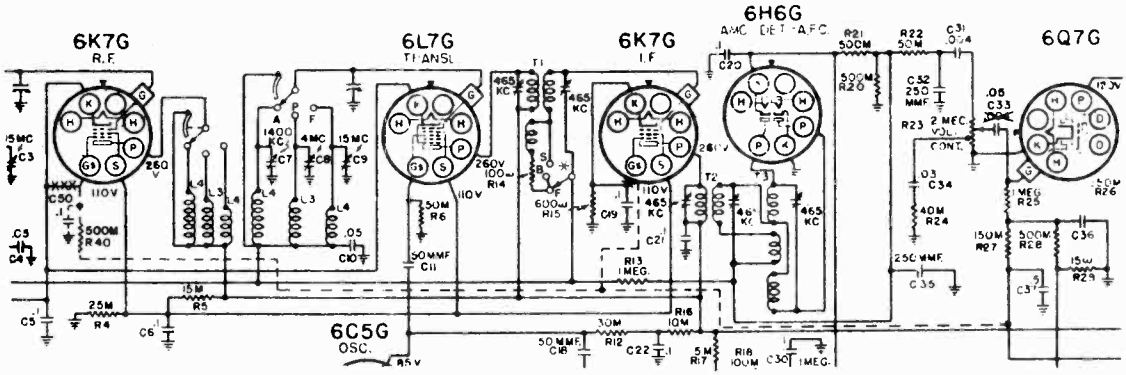


FIG. 3 - Schematic otherwise the same as Model 4587

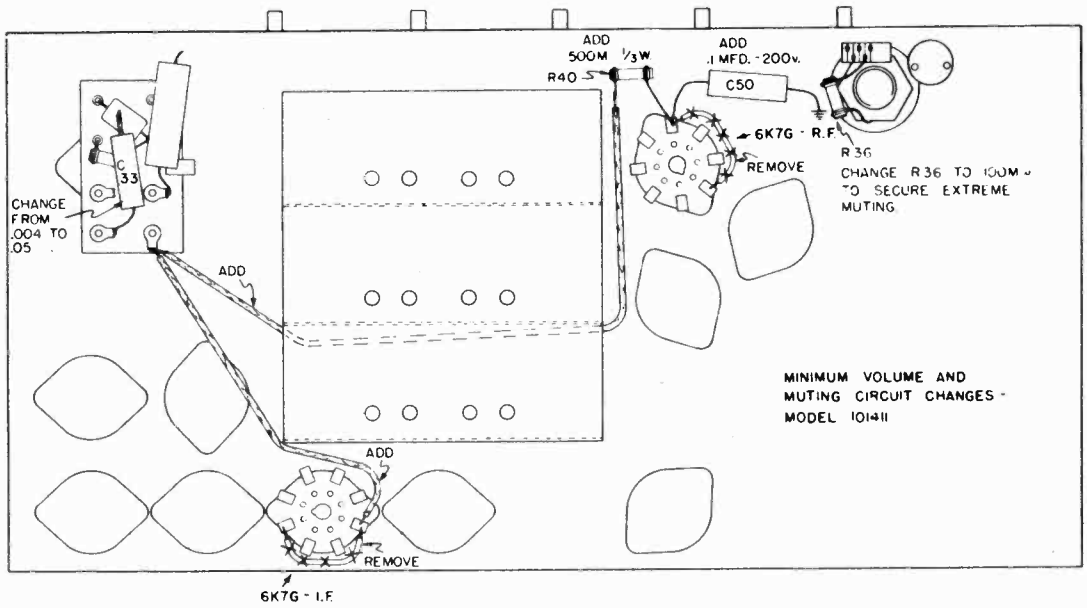


FIG. 3A

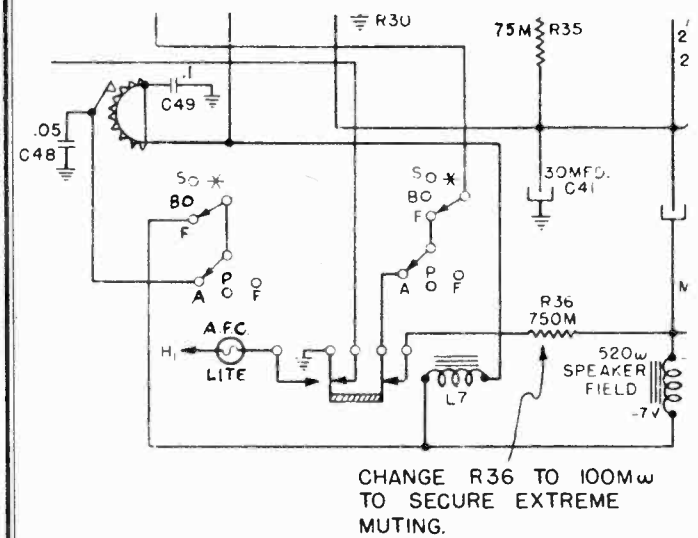


FIG. 1

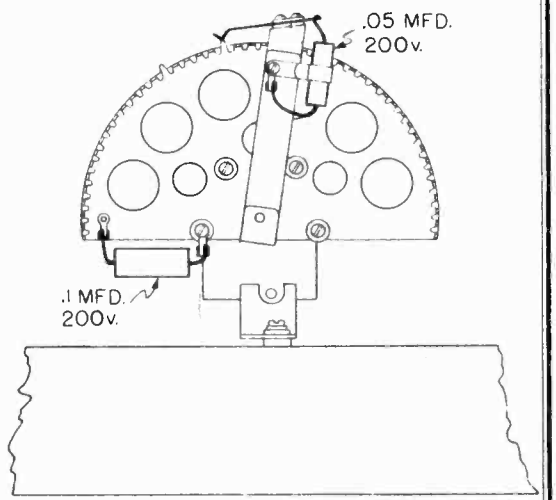


FIG. 2

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, "P", 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, "P", or subsequent letter.

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.

To Correct Relay Trouble	(1 - type #3 relay (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

The Service Instructions, 57RL 22, (MODEL 4587) 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.

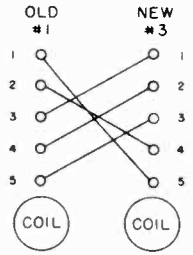
Relay Type Number	Identification
#1	No shield cover. Shield cover but no paint spot on shield cover. Yellow paint spot on shield cover.
#2	Red paint spot on cover. Red and green paint spot on cover.
#3	Blue paint spot on cover.

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:

Certain circuit changes are required when relay type #3 is installed. The resistor, R37, across the relay coil is removed from the circuit. 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 to be connected from the semi circular toothed disc to ground. These condensers are C48 and C49 in the Schematic Section, Fig. 1. Fig. 2 shows how the condensers should be mounted.

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, change the value of the condenser, C33, connected to the movable arm of the Volume Control, from .004 mfd. to .05 mfd.

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 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 of the contacting arm.

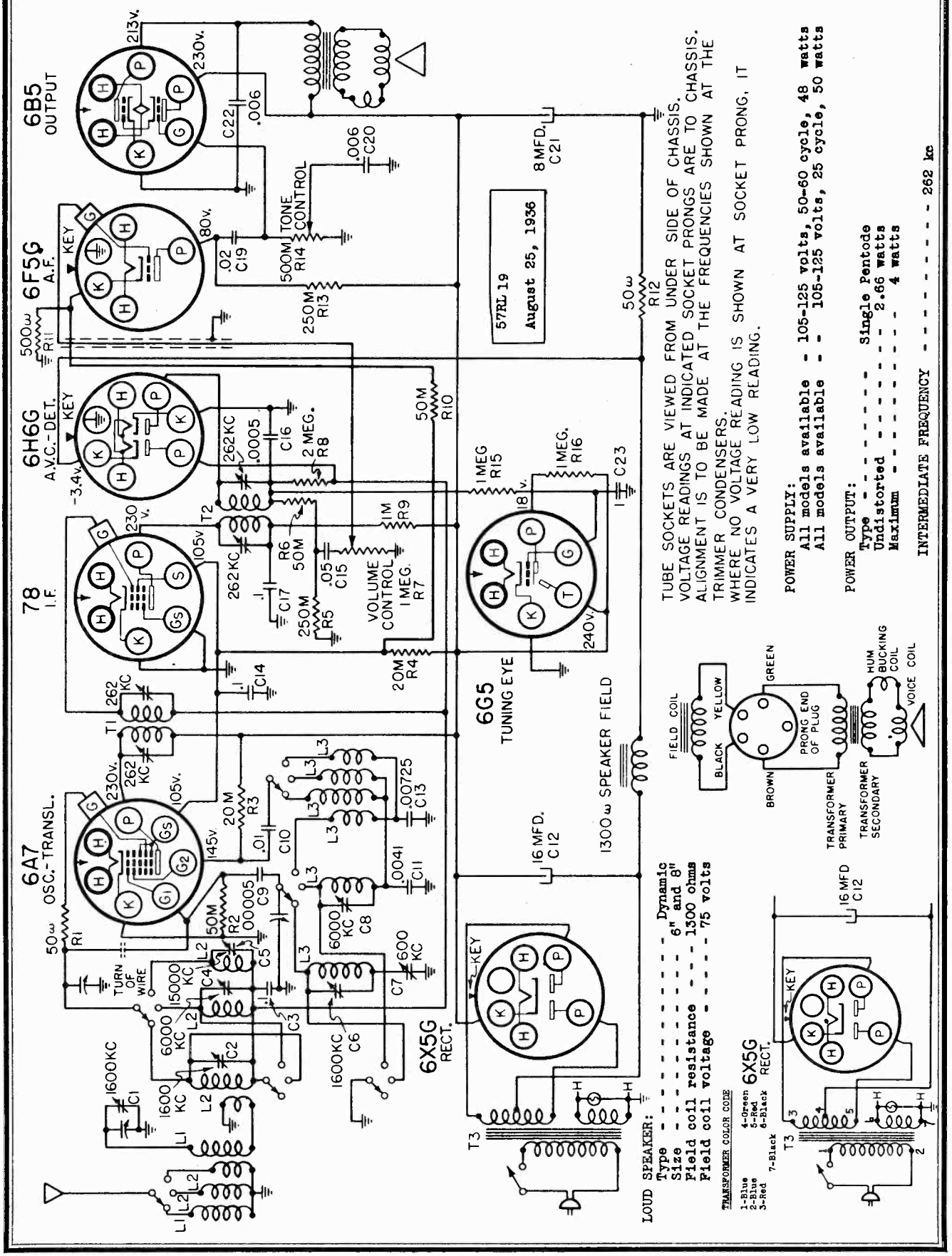
CORRECTING FAULTY A.F.C. MUTING:

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, R40. A .1 mfd. 200 volt condenser, C50, 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 C37, 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 R36 from 750M ohms 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.

SEARS-ROEBUCK & CO.

MODEL 4566
Schematic, Voltage
Speaker Conn., Specs.
Transformer Conn.



MODEL 4566

Socket, Trimmers
Chassis, Alignment
Sensitivity, Changes

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	-
-	To fall on center line of dial when variable is fully meshed.	-	-	-	-	-
"A"	1600 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
"F"	15 mc (rock)	15 mc	400 ohms	Antenna Terminal	C5	30
"F"	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.

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.

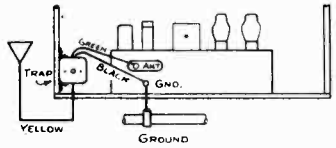
Values shown under, "Microvolts", are only approximate.

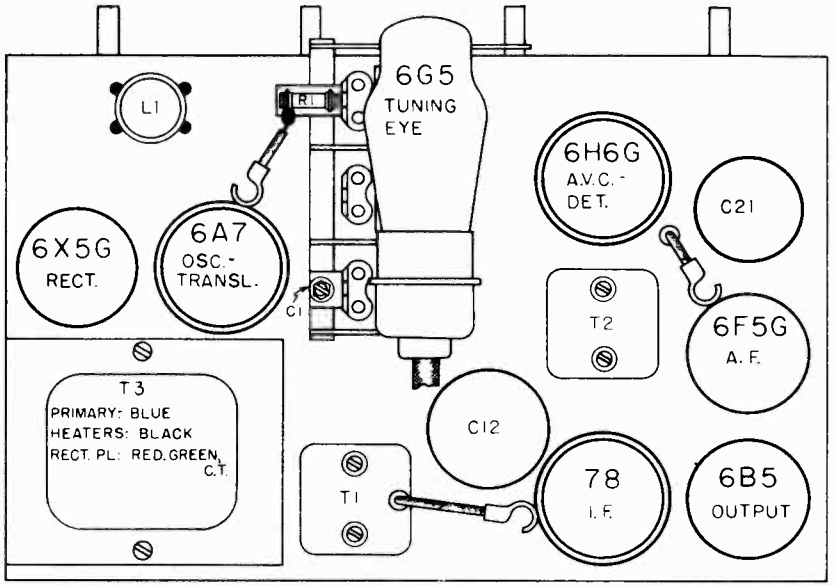
WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

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 wire 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 the black lead from the wave-trap to the ground terminal on the chassis.

The traps are pre-tuned to the IF frequency so that ordinarily no further adjustment will be necessary. 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.

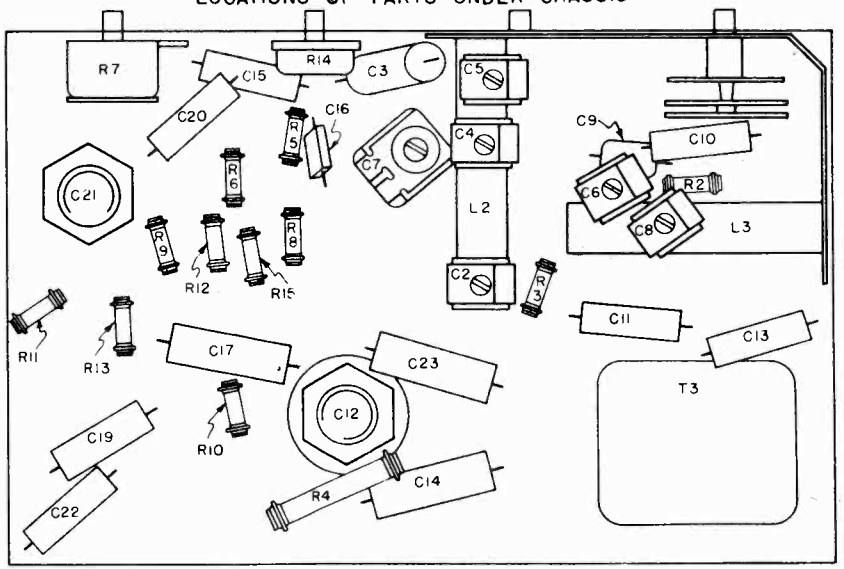
In LATE PRODUCTION of this trap only two leads were used, black and green. The green lead is to be connected to the green antenna lead of the receiver or connected to the ant. term. if the rec. has a term. Bd. The black lead of the trap is to be connected to ground.





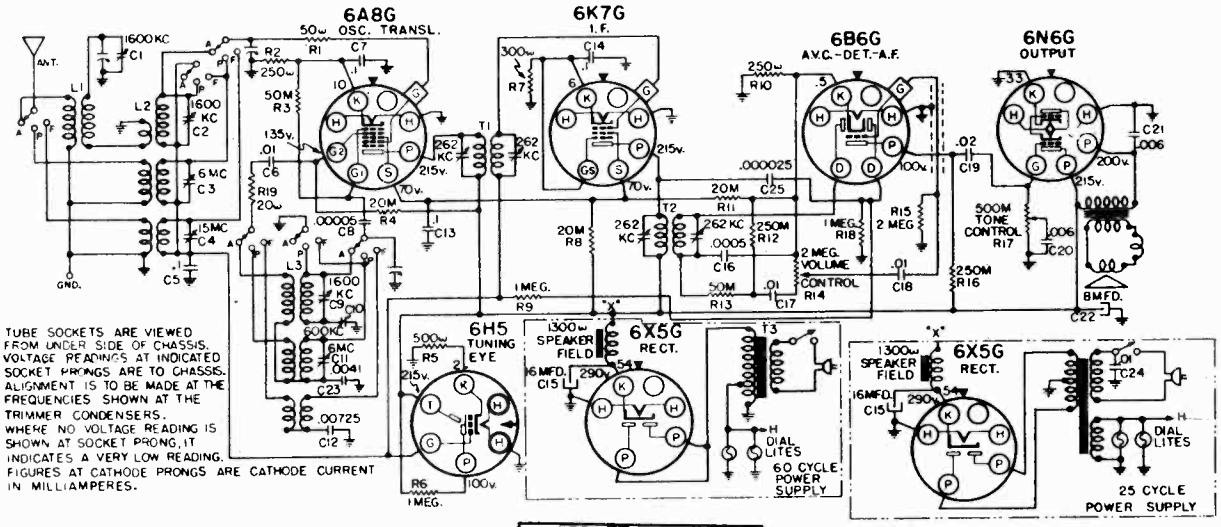
LOCATIONS OF PARTS ON TOP OF CHASSIS

LOCATIONS OF PARTS UNDER CHASSIS



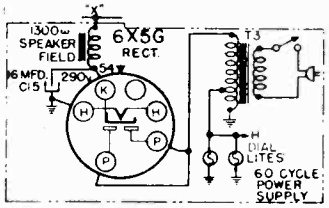
SEARS-ROEBUCK & CO.

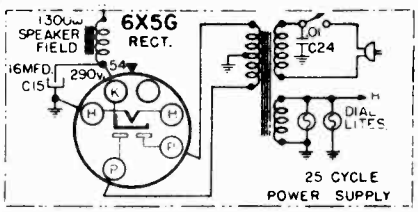
MODEL 4593
Schematic, Voltage
Transf., Specs.

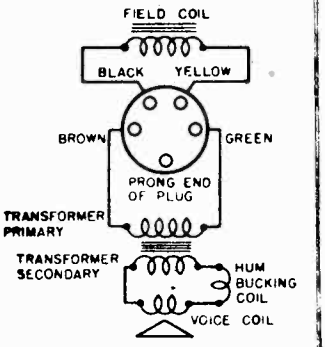


57RL 37

January 25, 1937







60 CYCLE TRANSF. COLOR CODE		25 CYCLE TRANSF. COLOR CODE	
1-Red	3-Black	1,3-Red	4,5-Blue
2-Orange	4,5-Blue	2-Green	6,7-Black

POWER SUPPLY:
All models available . . . . . 105-125 volts, 50-30 cycle, 55 watts
All models available . . . . . 105-125 volts, 25 cycle, 45 watts

FREQUENCY RANGES:
Band "A" . . . . . 540-1800 kc
Band "P" . . . . . 2-6.5 mc
Band "F" . . . . . 6.4-19.2 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1600 kc	1600 kc	600 kc
Band "P"	6 mc	6 mc	Fixed
Band "F"	-	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . . 262 kc

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

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

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

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

MECHANICAL SPECIFICATIONS

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

CONTROL OPERATION:
Turning right: Power on; Volume increase
Turning right: Bass to Treble
Tuning ratio: 20 to 1
Turning right: "A", "P", "F"

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 last indicating mark of band "A" scale (past 550), when variable is fully closed.

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	92
"A"	1600 kc	1600 kc	.0002 mfd.	Ant. Term.	C9,C2,C1	Osc., Transl., Antenna	35
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C10	Osc. Pad.	35
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C11	Oscillator	-
"P"	6 mc (rock)	6 mc	400 ohms	Ant. Term.	C3	Translator	35
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	40
"F"	7 mc	7 mc	400 ohms	Ant. Term.	Loop at bracket end of L3		120

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.

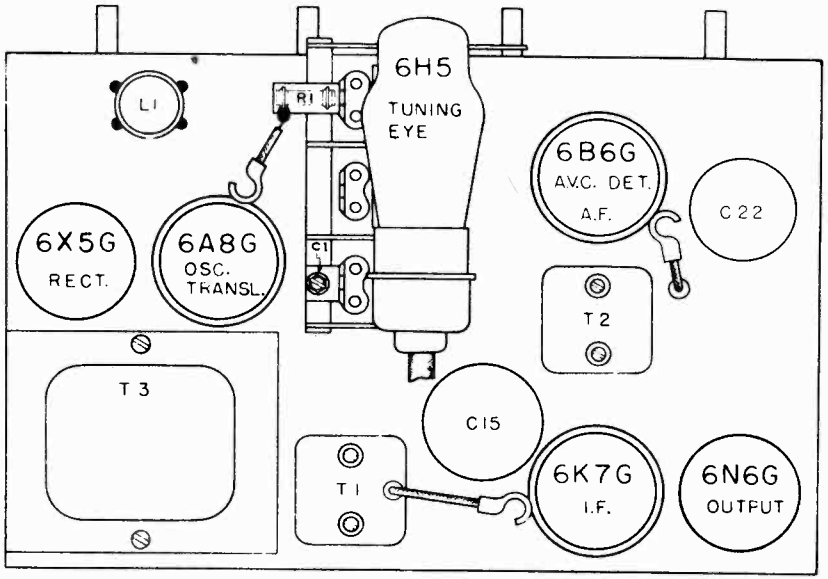
Values shown under, "Microvolts", are only approximate.

THE AVC CIRCUIT:

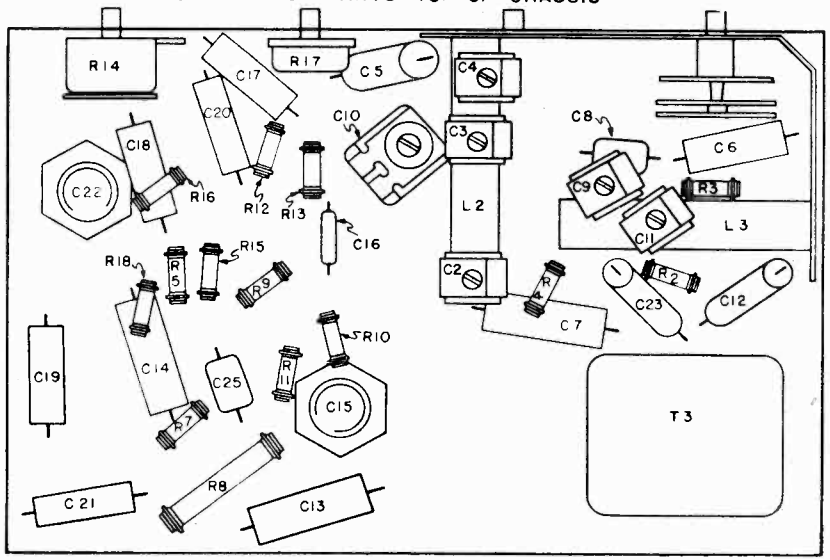
The diode current of one of the diode plates of the 6B6G tube, flowing through the one megohm resistor, R18, creates a voltage drop across this resistor. This voltage is applied to the control grids of the 6A8G and 6K7G tubes to provide AVC.

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.

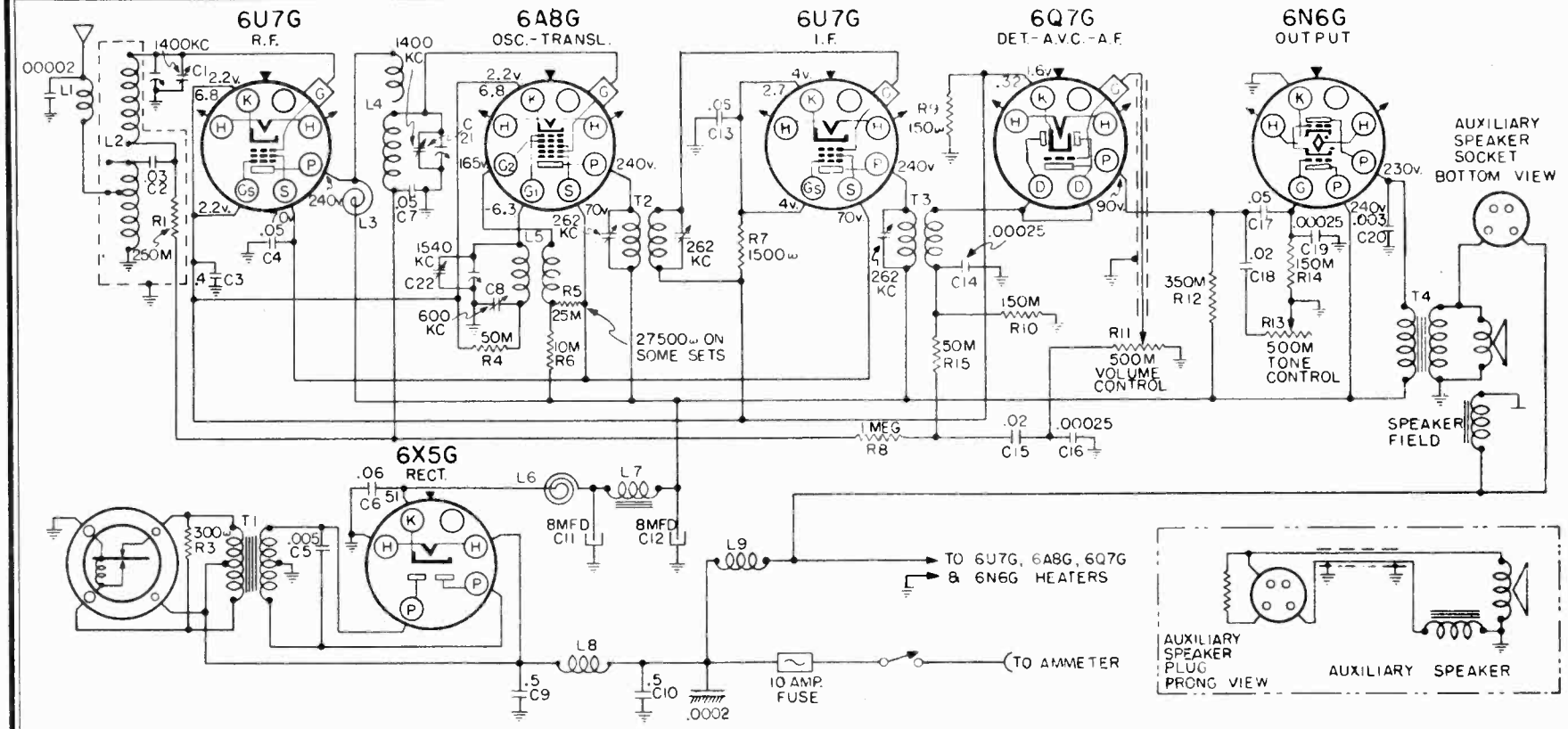


LOCATIONS OF PARTS TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

SEARS-ROEBUCK & CO.



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

MAY 24, 1937

CHASSIS 101.458

POWER TRANSFORMER COLOR CODE

1,2,3-Solid Conductor — 5-Slate
4-Red — 6-Blue

FREQUENCY RANGE:
Broadcast . .540-1540 kc

ALIGNMENT FREQUENCIES:

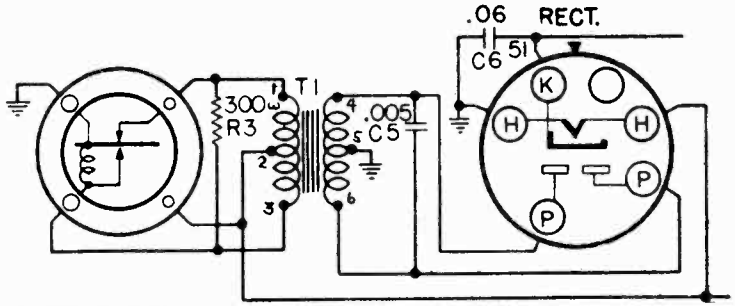
	Oscillator Trimmer	Ant.-Translator Trimmer	Padder
	1540 kc	1400 kc	600 kc

INTERMEDIATE FREQUENCY . . . . . 362 kc

POWER OUTPUT:
Type . . . . Triple Twin
Undistorted . 3.5 watts
Maximum . . . . 6 watts

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

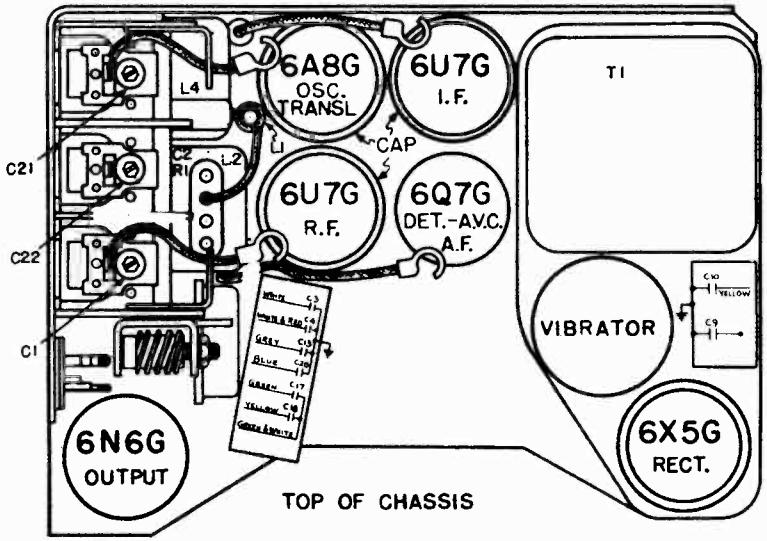
POWER SUPPLY:
"A" . . . . . 6 volt, Automobile storage battery.
"B" . . . . . Vibrator-Rectifier
"A" Drain .. 7.6 amperes
"B" Drain . . . . 54 ma



SEARS ROEBUCK & CO.

MODEL 4600
Chassis 101.458
Schematic, Voltage

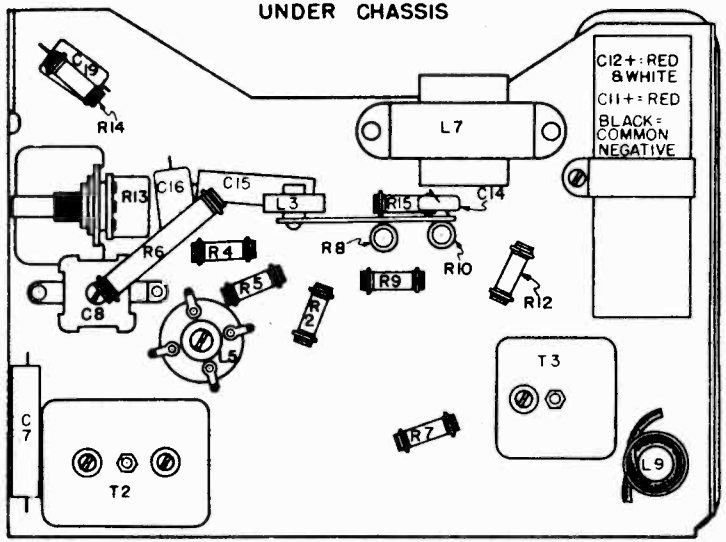
MODEL 4600 SEARS ROEBUCK & CO. Alignment, Chassis Sensitivity
Chassis 101.458
Socket, Trimmers



TOP OF CHASSIS

LOCATIONS OF PARTS

UNDER CHASSIS



PRELIMINARY:

ALIGNMENT PROCEDURE

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

Output meter reading to indicate 1 watt . . . . . 1.34 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 . . . . . #1 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	362 kc	.1 mfd.	6A8G Grid	T3,T2	IF	600
Fully Open	1540 kc	.0002 mfd.	Antenna Conn.	C22	Osc. Trim.	1
1400 kc	1400 kc	.0002 mfd.	Antenna Conn.	C1,C21	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.

Antenna Matching:

Two separate adjustments are provided for matching the receiver to the particular car antenna. One adjustment consists of two taps on the antenna coil. The second adjustment is a trimmer, C1, on the variable condenser. It is accessible through a hole in the bottom cover of the receiver case. These adjustments are to be made as follows:

The Tapped Antenna Coil:

The adjustment of the tapped antenna coil should be made before installing the receiver on the car. Removal of the bottom cover of the receiver will reveal a terminal board mounted in the antenna coil shield can. The variable condenser plates must be closed for it to be seen. This terminal board has four jack holes, only two of which are used. These two are marked with the numerals "1", "2". In some sets these marked holes are the first two holes. In other sets they are the two end holes. In either case they are marked. The sets are shipped with the plug in hole #1. This adjustment is correct for factory built-in aerials in cars having a fabric top. It is also correct for SILVERTONE Catalog #57E5559 Standard "V" Type Under-car Aerial; Catalog #57E5556 Deluxe Auto Aerial; Catalog #57E5570 Aerod Auto Aerial.

The plug must be removed from hole #1 in the terminal board and inserted in hole #2 for cars having the following types of aerial.

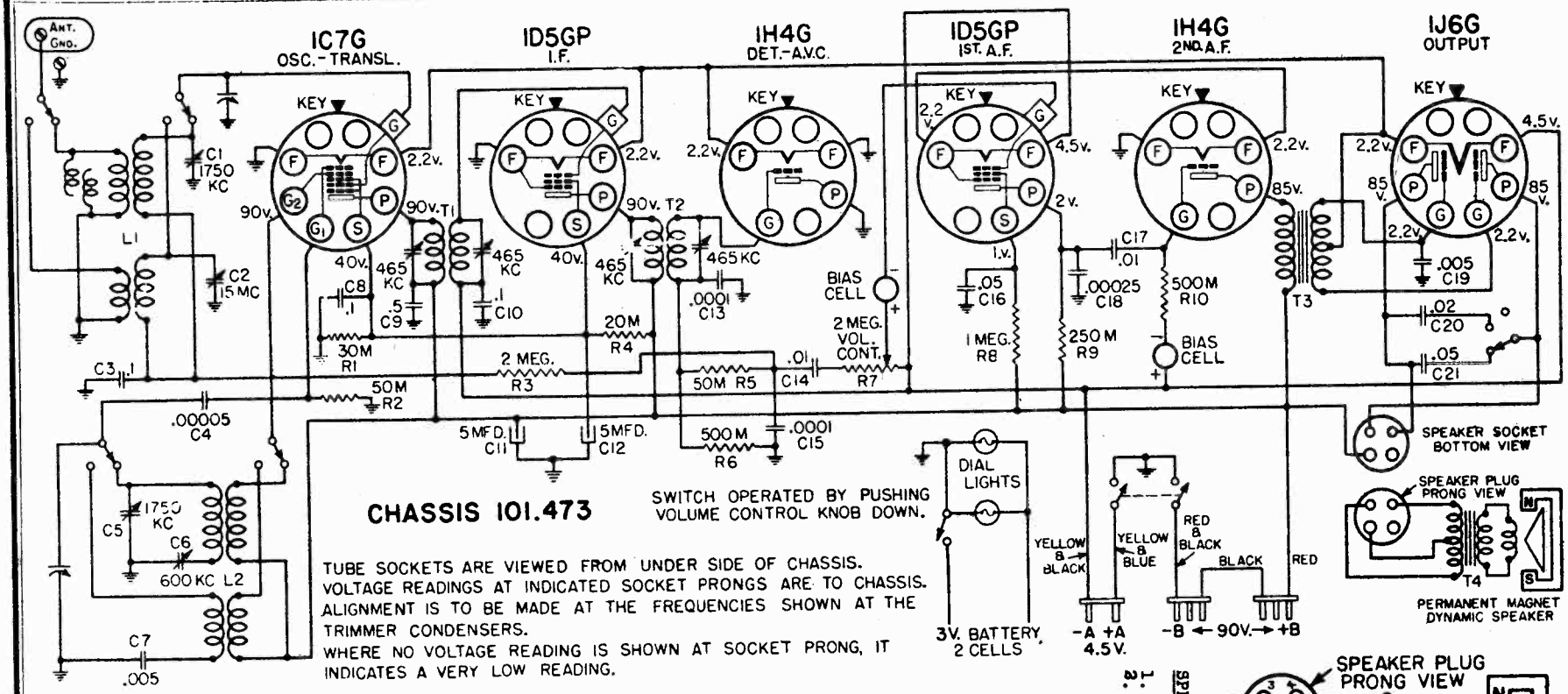
1. Cars having an insulated steel top connected at the factory for use as an aerial.
2. Cars using insulated running boards as the aerial (1937 Buicks and Oldsmobiles).
3. Cars using some insulated part of the car as the aerial. For example, insulated trunks, rear-deck covers, spare tire covers, etc.

The Antenna Trimmer Adjustment:

With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the car's antenna may be such that the other antenna tap adjustment should be used.

SEARS ROEBUCK & CO.

MODELS 4606-7, 4626-7, 4646-7
4726, 4746 Chassis 101.473
Schematic, Voltage, Specs.



CHASSIS 101.473

SWITCH OPERATED BY PUSHING VOLUME CONTROL KNOB DOWN.

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 SUPPLY:
"A" Battery (4½ volt dry) . . 1 - #5032
"A" Battery (4 volt storage) 1 - #5049
"B" Batteries . . . . . 2 - #5131P

FREQUENCY RANGES:
Band "A" . . . . . 540-1750 kc
Band "F" . . . . . 5.8-18 mc

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Class "B"
Undistorted . . . . . 0.4 watts
Maximum . . . . . 1.1 watts

OPERATING FEATURES:
Tone Control . . . . . Three Point
Automatic Volume Control
"On-Off" indicator
Dial Flash-O-Lite

"A" Drain . . . . . 0.3 amperes
"B" Drain . . . . . 21 ma

ALIGNMENT FREQUENCIES:

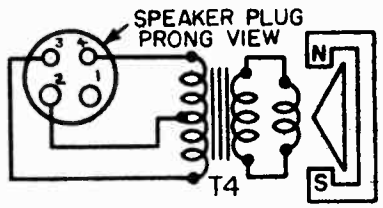
	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	-	15 mc	Fixed

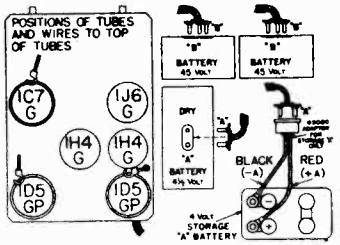
LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6 inch

CHASSIS FEATURES:
Number IF stages . . . . . One
Antenna . . . . . Marconi
Built-in wave-trap for signals of IF frequency

SPEAKER PLUG COLOR CODE
1. Blank
2. Red
3. Brown
4. Green

AUGUST 10, 1937





MODELS 4606-7,4626-7,4646-7
4726,4746 Chassis 101.473

SEARS ROEBUCK & CO.

Socket,Trimmers,Chassis
Alignment,Sensitivity,Data

LOCATIONS OF PARTS ON TOP OF CHASSIS

LOCATIONS OF PARTS UNDER CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . . 0.42 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 with variable fully closed . . . To fall in center of embossed gold block that is about 1/4" to the left of the letters, "MC", at the low frequency end of the FOREIGN scale.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	465 kc	.1 mfd.	1C7G Grid	I2,T1	IF Output, IF Input	150
"A"	1400 kc	1400 kc	.0008 mfd.	Ant. Term.	C1, C5	Antenna Oscillator	65
"A"	600 kc (rock)	600 kc	.0008 mfd.	Ant. Term.	C6	Padder	30
"A"	1400 kc	1400 kc	.0008 mfd.	Ant. Term.	C1, C5	Antenna Oscillator	65
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C2	Translator	40
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	250

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.

Note that the 1400 kc alignment is to be repeated after the 600 kc padder adjustment.

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.

The high frequency limit of the Broadcast band is 1750 kc although the last dial marking is 1800 kc. This dial marking is only to obtain symmetry of appearance in the dial.

BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. Approximately 610 hours of service can be expected before the "A" battery voltage drops to this value (based on 3 to 4 hours a day use). If the storage "A" battery is used, it should be recharged every 3 to 4 weeks. Approximately 375 hours of service can be expected from the "B" batteries supplied. Since this receiver uses a class "B" output stage the "B" drain will vary with the volume at which the radio is played. The customer should be informed of this fact and told that for longest "B" battery life the radio should not be played louder than necessary. The "B" batteries should be replaced when the voltage of the 90 volt block has dropped to 68 volts, under load. For longer uninterrupted service, heavy duty "B" batteries should be recommended.

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 980 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.

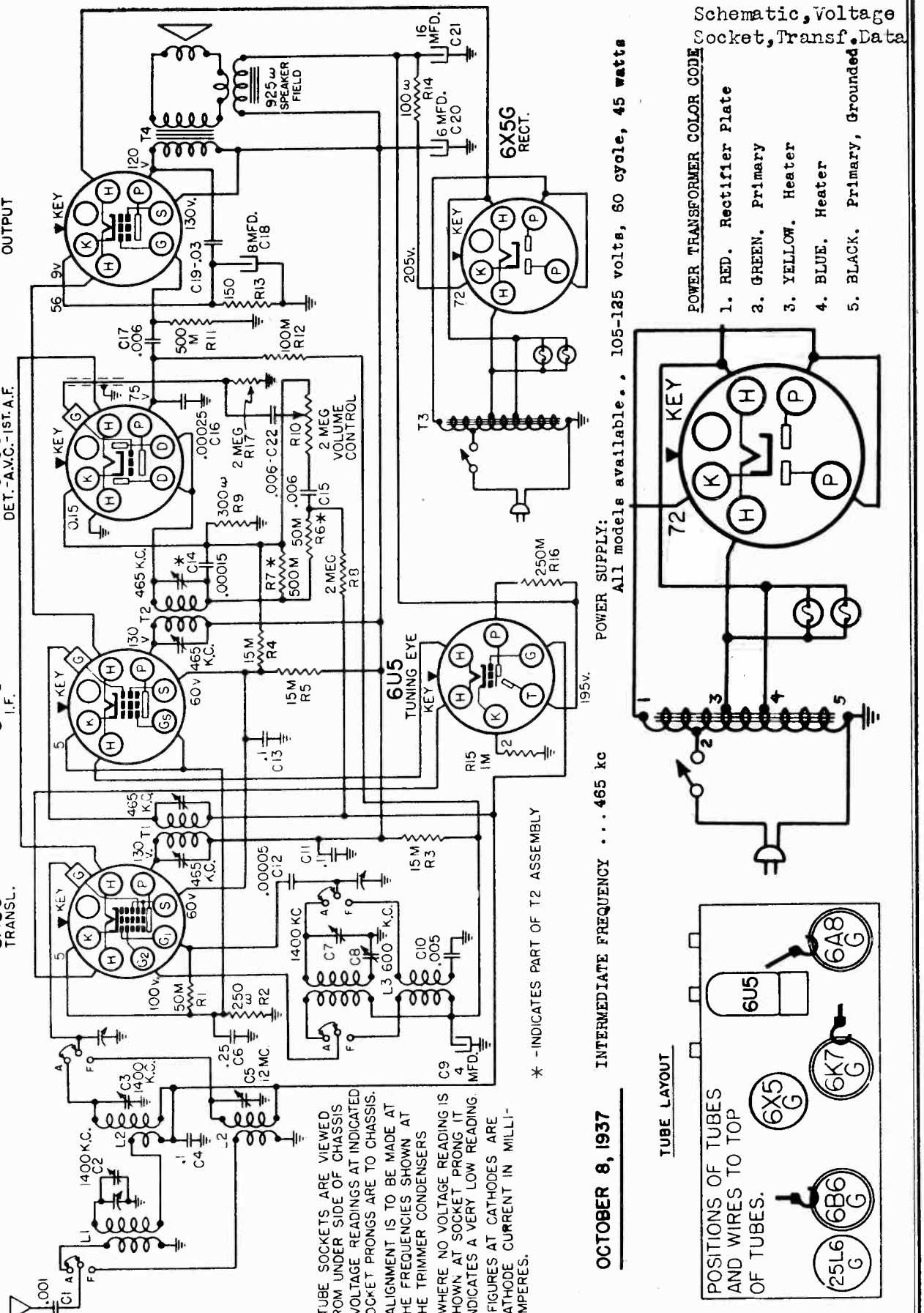
DIFFERENCES IN TONE CONTROLS:

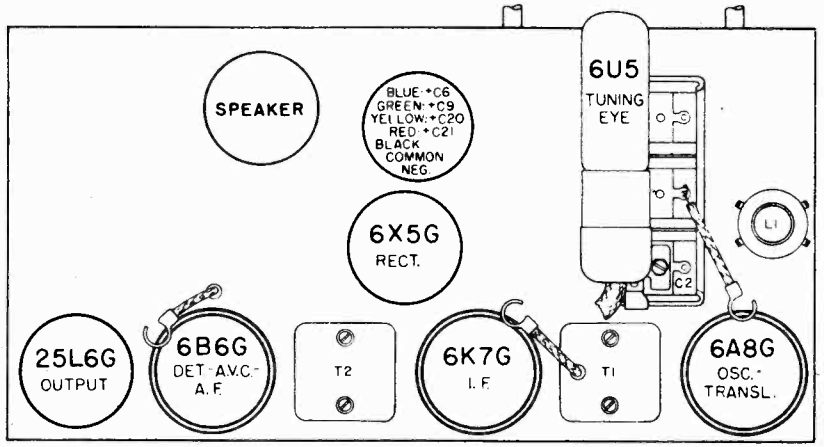
Earlier production used a tone control knob having only two positions marked, "HI", "LO". Later production used three positions marked, "HI", "MED", "LO". In both types of set the Tone Control switch is a three position one and the medium tone adjustment can be had with the two position knob by turning the knob so that the marker pin is between "HI" and "LO".

SEARS ROEBUCK & CO.

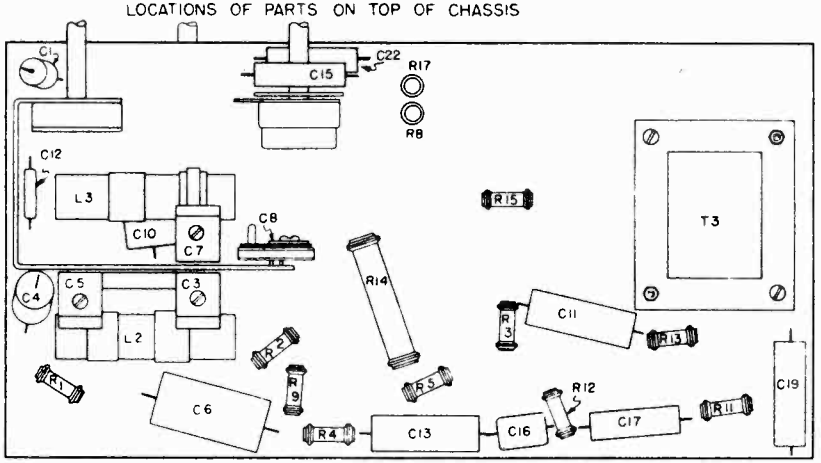
MODELS 4611,4660
Chassis 101.487
Schematic, Voltage
Socket, Transf. Data

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.487





LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS.

FREQUENCY RANGES:

American	540-1750 kc
Foreign	3800-13,200 kc

POWER OUTPUT:

Type	Beam Tube
Undistorted	1.8 watts
Maximum	2.5 watts

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
American	1750 kc	1400 kc	600 kc
Foreign	-	13 mc	-

LOUD SPEAKER:

Type	Dynamic
Size	6 inch
Field coil resistance (App.)	925 ohms

ALIGNMENT PROCEDURE

Output meter connnections	Across speaker voice coil
Output meter reading to indicate 50 milliwatts output	.0.38 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	To external ground
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Dial Pointer with variable fully closed	To fall along bottom edge of letters "MC" and "KC" at the 550 kc end of the dial.

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.	6A8G Grid	T2,T1	IF	75
"AM"	Fully open	1750 kc	.0002 mfd.	*	C7	Oscillator Trimmer	150
"AM"	1400 kc	1400 kc	.0002 mfd.	*	C2,C3	Antenna Translator	100
"AM"	600 kc (rock)	600 kc	.0002 mfd.	*	C8	Padder	50
"FOR"	13 mc (rock)	13 mc	400 ohms	*	C5	Translator Trimmer	70

IMPORTANT ALIGNMENT NOTES

* Push a pin through the attached antenna wire at a point near where it comes out of the chassis so that the pin makes contact with the antenna wire inside the insulation. Connect the generator output lead to the pin. The generator output connection should not be made to the free end of the attached antenna wire.

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.

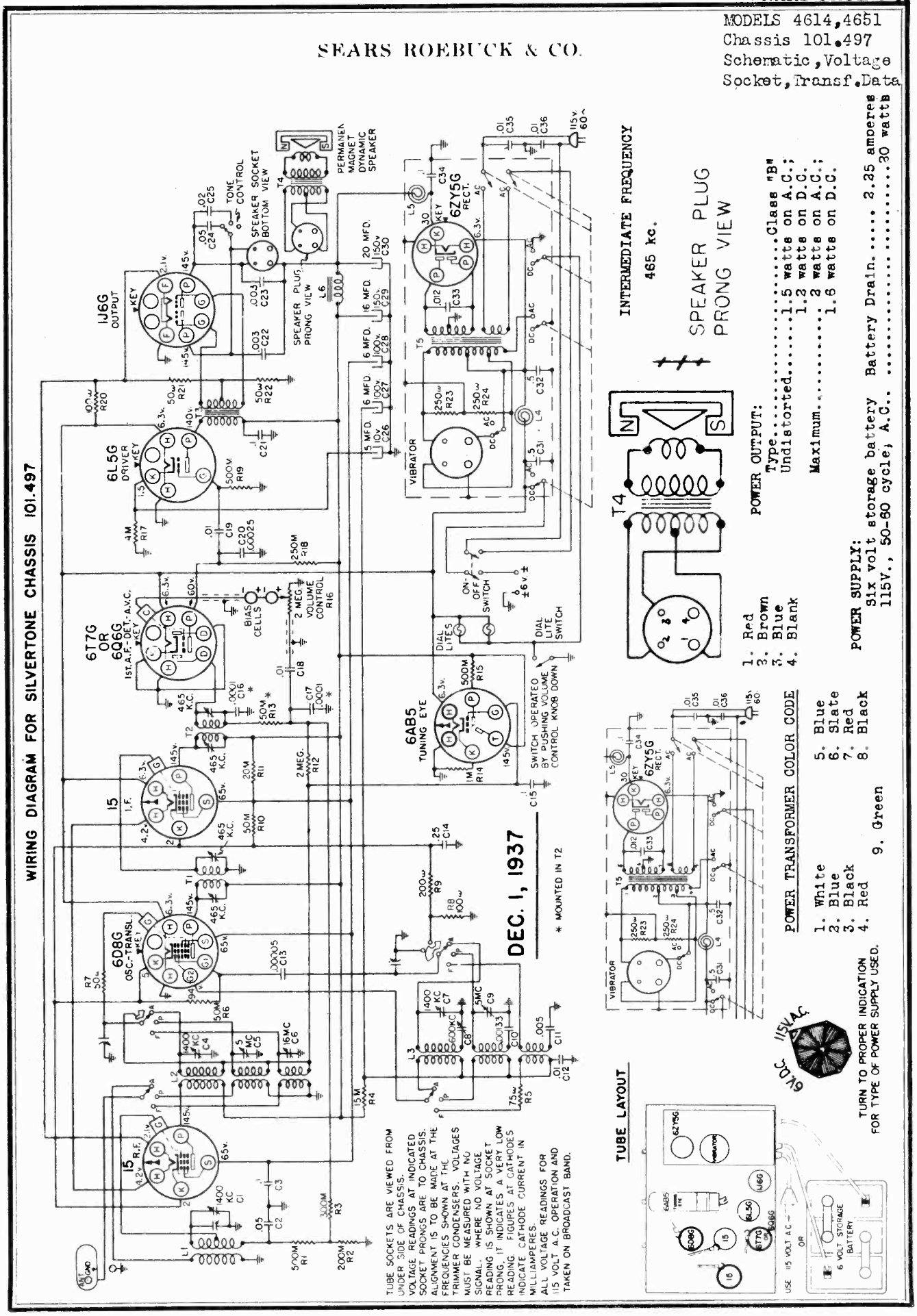
Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned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

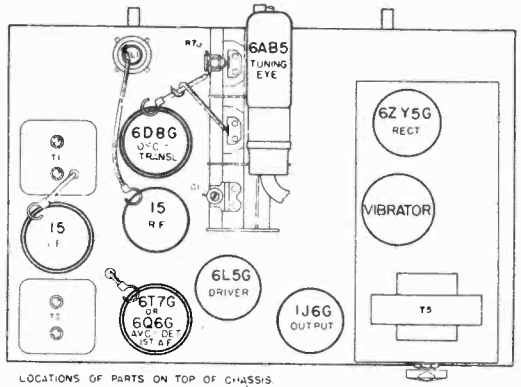
POWER TRANSFORMER:

An auto-transformer is used. Therefore, under certain conditions, the chassis may be above ground potential. Do not allow any grounded object to come into contact with the chassis while the line cord is plugged in. Also, be careful when working on the chassis out of its cabinet, to avoid shocks.

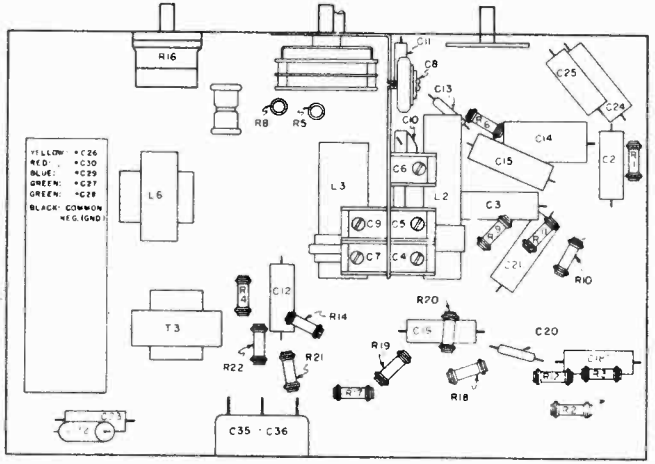
SEARS ROEBUCK & CO.

MODELS 4614,4651
Chassis 101.497
Schematic, Voltage
Socket, Transf. Data

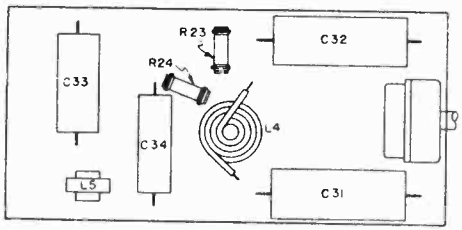




LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.



LOCATIONS OF PARTS UNDER POWER PACK.

FREQUENCY RANGES:

Band "A".....540-1800 kc.
Band "P".....1760-6200 kc.
Band "F".....5975-18,500 kc.

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc.	1400 kc.	600 kc
Band "P"	6 mc.	5 mc.	Fixed
Band "F"	-	18 mc.	Fixed

ALIGNMENT PROCEDURE

PRELIMINARY:

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

Output meter reading to indicate 50 milliwatts . . . . . 0.38 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

Position of volume control . . . . . All the way on

Position of tone control . . . . . Fully clockwise

Position of dial pointer with variable fully closed . . . . To fall on end line at low frequency end of the AMERICAN scale.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	1.8 mc	485 kc	.1 mfd.	6D8G Grid	T3,T1	IF	--
"A"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	C7,C4,C1	Osc.-Transl. Antenna	8
"A"	600 kc (rock)	600 kc	.0003 mfd.	Ant. Term.	C8	Padder	15
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C9	Osc.	15
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C5	Transl.	15
"P"	2 mc	2 mc	400 ohms	Ant. Term.	-	-	45
"F"	18 mc (rock)	18 mc	400 ohms	Ant. Term.	C6	Translator	15
"F"	7 mc	7 mc	400 ohms	Ant. Term.	-	-	60

IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the adjustment, where indicated by the word, "Rock", in the alignment chart.

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.

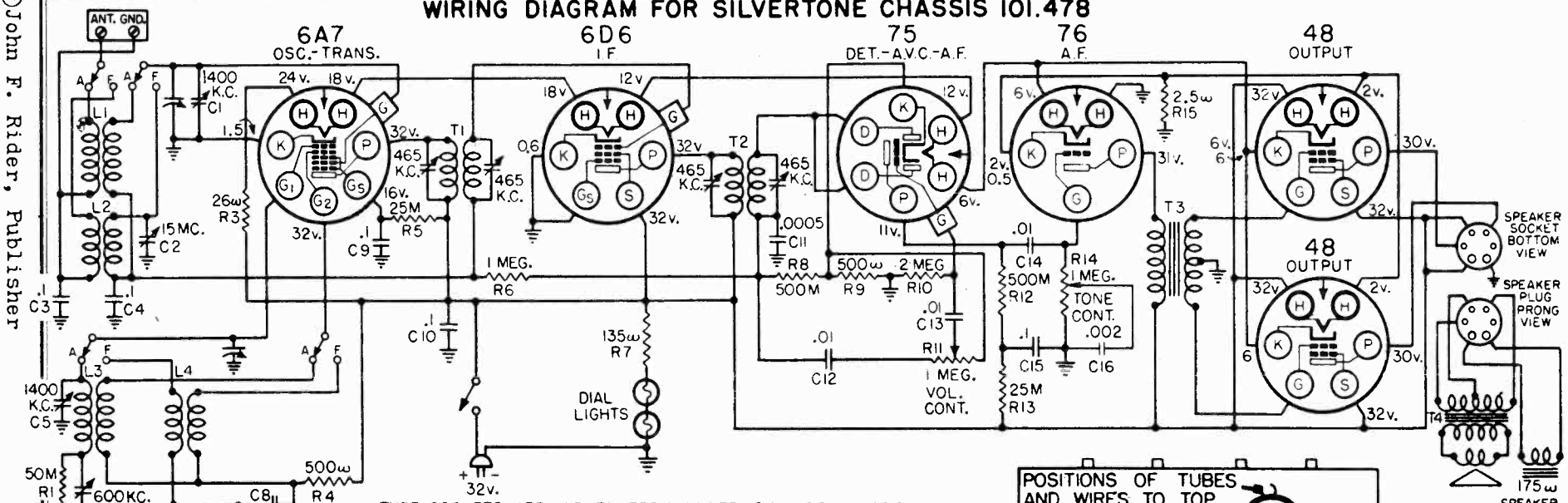
The sensitivities indicated are for 115 volt operation. For 8 volt operation, these figures should be multiplied by 1.8.

ELIMINATING WHISTLE AT 930 KC:

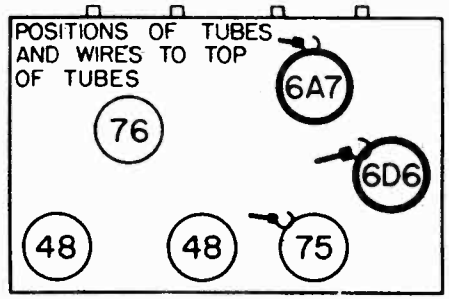
A whistle, due to a beat between the second harmonic (930 kc) of the 485 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This 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 915/3 or 457.5 kc. Try to select the new IF frequency as close to 485 kc as possible.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.478

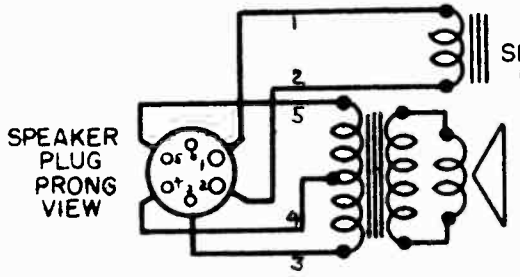


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
READINGS TO BE MADE WITH NO SIGNAL. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE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



SPEAKER CABLE COLOR CODE

1. Black	4. Red
2. Yellow	5. Brown
3. Green	6. Blank



LOUD SPEAKER:

Type	Dynamic
Size	6"
Field Coil Resistance	175 ohms

POWER OUTPUT:

Type	Push-Pull
Undistorted	0.15 watts
Maximum	0.32 watts

POWER SUPPLY:

All models available . . . . . 32 Volts, DC; 46 Watts

FREQUENCY RANGES:

Band "A"	540-1750 kc
Band "F"	5475-16500 kc

ALIGNMENT FREQUENCIES:

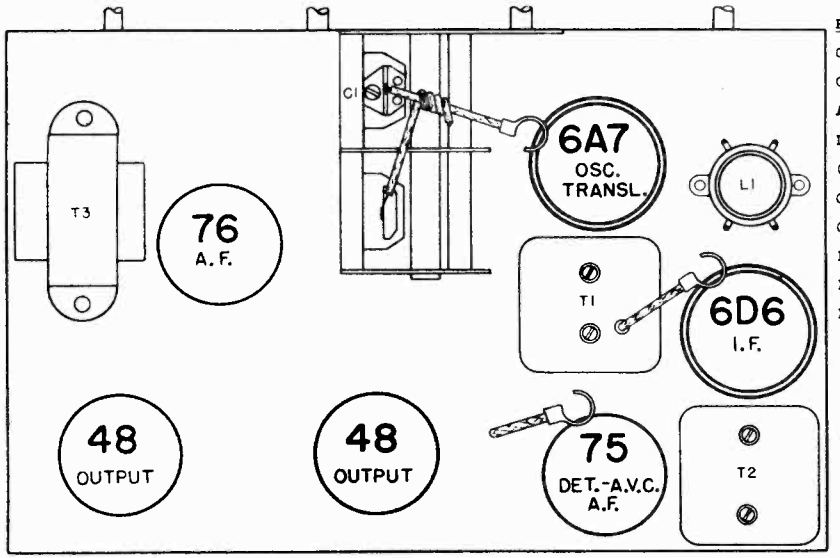
	Ant.-Transl. Trimmer	Oscil. Trimmer	Oscil. Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	15 mc	-	Fixed

INTERMEDIATE FREQUENCY . . . . . 465 kc

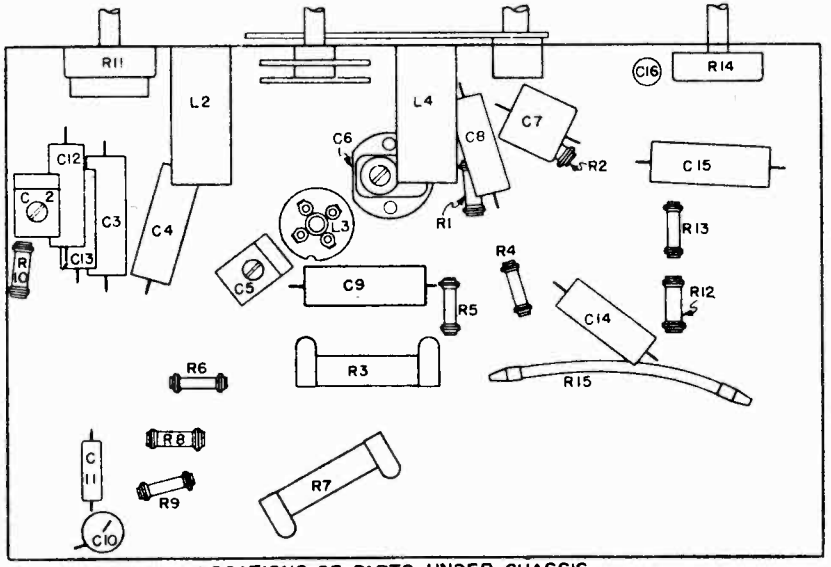
SEPT. 1, 1937

SEARS ROEBUCK & CO.

MODEL 4619
Chassis 101.478
Schematic, Voltage
Socket, Specs, Speaker



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS.

ALIGNMENT PROCEDURE

PRELIMINARY

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

Output meter reading to indicate 50 milliwatts output . . . . . 0.45 volts

Approximate average sensitivity in microvolts for 50 milliwatts 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 ground lead connection . . . . . To receiver chassis

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

Position of volume control . . . . . Fully clockwise

Position of tone control . . . . . Fully clockwise

Position of dial pointer with condenser fully meshed . . To fall in center of small raised block which is about 1/4" to the left of the letters, "MC", which are at the low frequency end of the FOREIGN scale.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	465 kc	.1 mfd.	6A7 Grid	T2,T1	IF	35
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C5,C1	Oscillator Translator	18
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C6	Padder	12
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C2	Translator	20
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	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.

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.

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 select the new IF frequency as close as possible to 465 kc.

THE NOISE SUPPRESSION EQUIPMENT:

Two condensers and a suppressor are supplied for eliminating the electrical interference created by the gasoline engine that drives the 32 volt lighting plant generator.

In single cylinder installations, cut the high tension wire going to the spark plug and screw the suppressor onto the two ends of the wire. In multi-cylinder installations, cut the high tension wire going to the center terminal of the distributor cap and screw the suppressor onto the two ends of the wire.

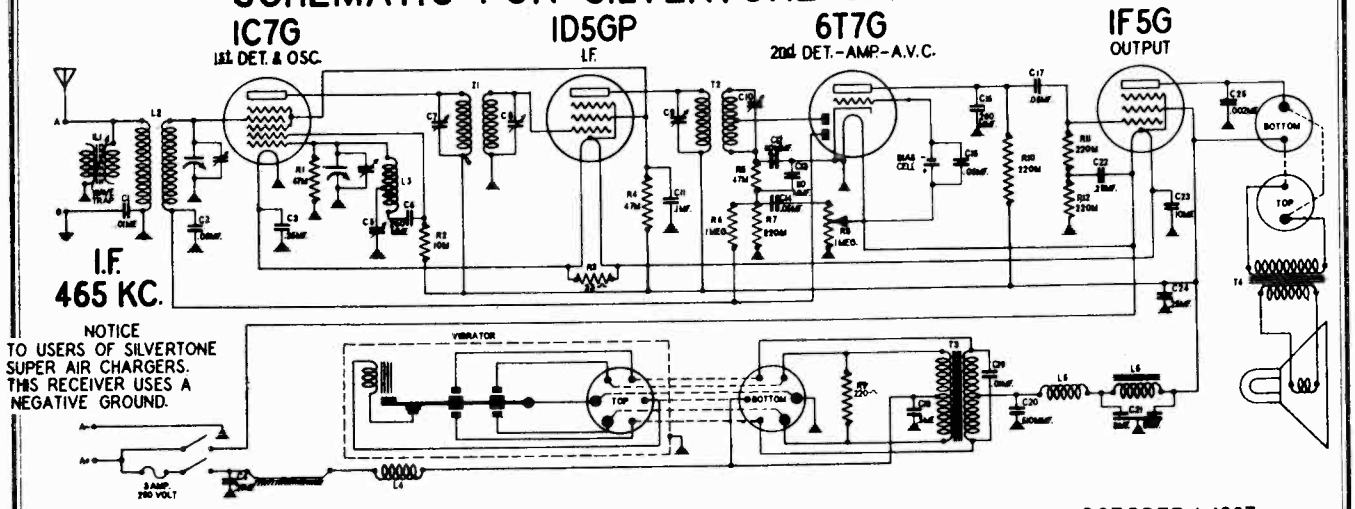
Connect one of the condensers between the two generator brushes. Ground the generator frame. Connect the other condenser from the battery side of the ignition coil to ground.

Schematic, Voltage Socket, Specs.

SEARS ROEBUCK & CO.

MODELS 4622, 4722
Chassis 100.179

SCHEMATIC FOR SILVERTONE CHASSIS 100.179



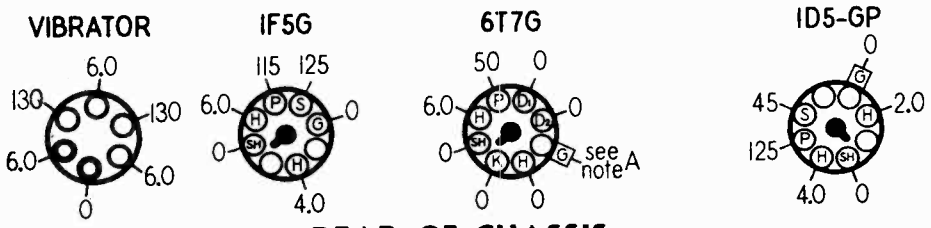
OCTOBER 1, 1937

SOCKET VOLTAGES

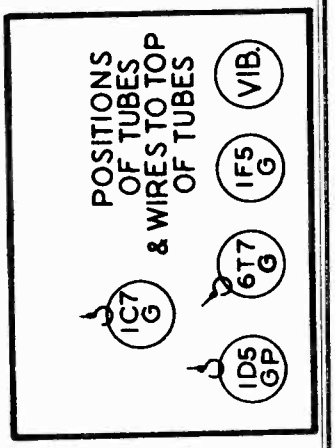
NEW BATTERIES — DIAL TUNED TO 530 KC.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
A BATTERY DRAIN: 1.12 AMPS.
B SUPPLY DRAIN: 17 MILS.



REAR OF CHASSIS



REAR OF CHASSIS

Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6T7-G tube is -1.0 volt supplied by a bias cell. Due to the high resistance of the cell the voltmeter will indicate only a fraction of a volt.

IMPORTANT: The bias for the control grid of the 1D5-GP tube is -2.0 volts measured across the filament of the 1C7-G tube. The bias for the control grid of the 1F5-G tube is -4.0 volts measured from the low side of the 1F5-G tube filament to ground.

POWER SUPPLY
All models available. .....6 volt - 1.12 amp.
"B" supply vibrator.. Synchronous; plug-in type

FREQUENCY RANGE	ALIGNMENT FREQUENCY
530 to 1740 KC.	1500 KC.; 600 KC.

INTERMEDIATE FREQUENCY .....465 KC.

POWER OUTPUT
Type.....Pentode
Undistorted.....0.3 Watts
Maximum.....0.55 Watts

LOUD SPEAKER
Type.....Perm. Magnet Dynamic
Size.....6"

MODELS 4622,4722
Chassis 100.179
Socket,Trimmers
Chassis,Alignment

SEARS ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections.....Across voice coil leads
Output meter reading to indicate 0.05 watt output.....0.65 volts
Average sensitivity in microvolts for 0.05 watt output.....See chart below
Generator ground connection.....Receiver Chassis
Dummy antenna 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.....Maximum clockwise

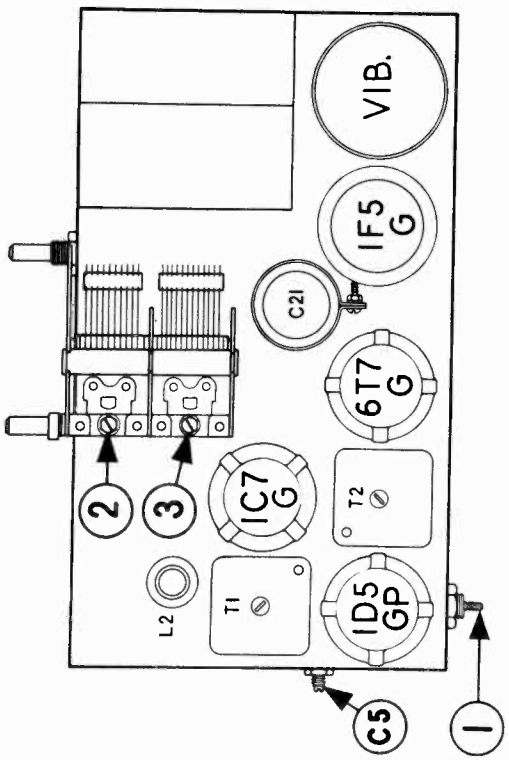
ORDER OF ALIGN.	* DIAL POINTER POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTION	TRIMMER NUMBER	SENSITIVITY (MICROVOLTS)
A	ANY POINT WHICH DOES NOT AFFECT SIGNAL	465 KC.	.1 MFD.	1C7-G CONTROL GRID	C7,C8 C9,C10	150
B	ANY POINT WHICH DOES NOT AFFECT SIGNAL	465 KC.	250 MMFD.	ANTENNA TERMINAL	1 MINIMUM OUTPUT	
C	1500 KC.	1500 KC.	250 MMFD.	ANTENNA TERMINAL	2, 3	35
D	** TUNE TO 600 KC. GEN.SIG.	600 KC.	250 MMFD.	ANTENNA TERMINAL	C5	20

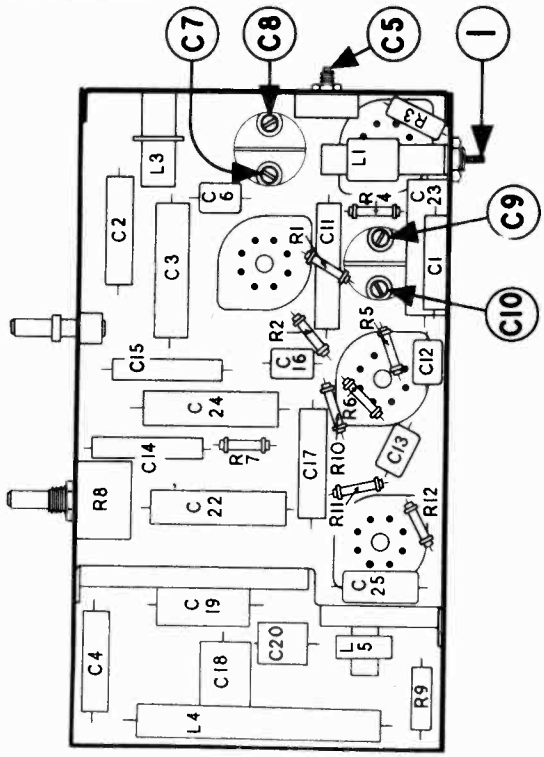
IMPORTANT ALIGNMENT NOTES

* Before attempting to align the receiver check to see that the dial pointer is in a horizontal position at the low frequency end of the dial scale when the gang condenser is in full mesh.

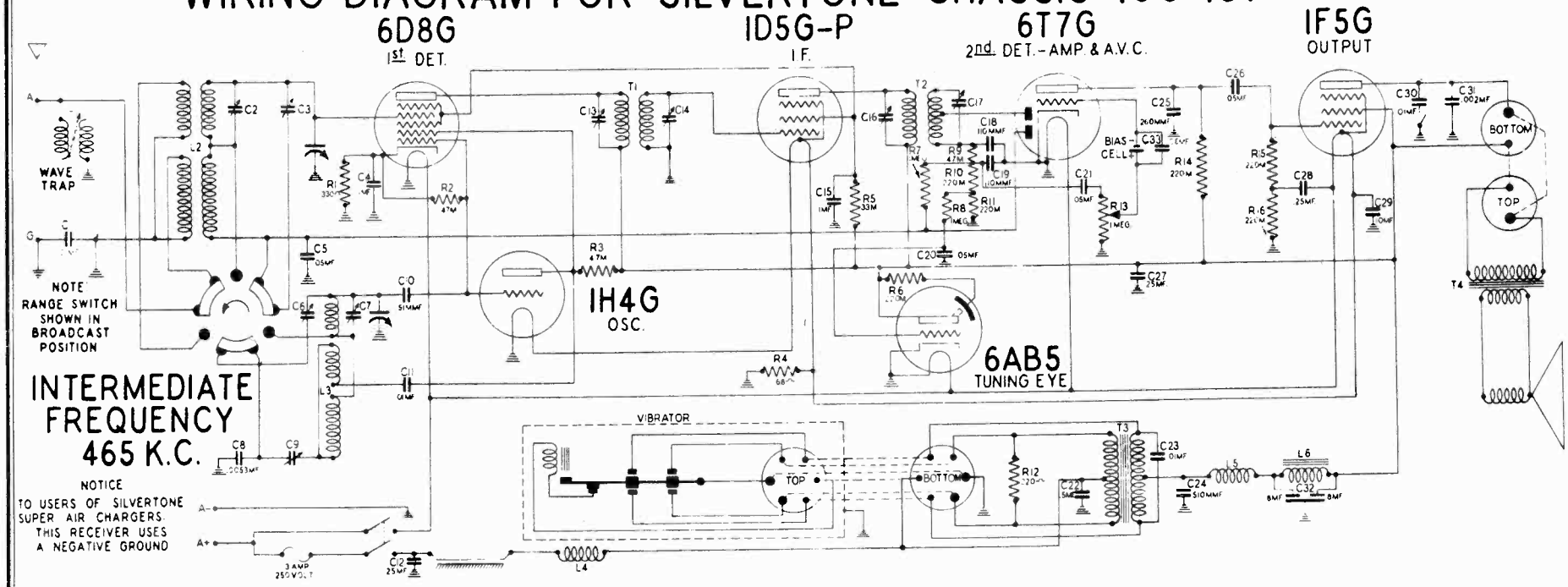
After adjusting the I.F. trimmers C7, C8, C9 and C10, go back and repeat the adjustment, since the setting of each trimmer will have some effect on others. When adjusting L1, antenna trap trimmer, increase generator output to obtain clearly defined trimmer setting for a minimum.

** When aligning the broadcast band padder C5 at 600 KC. it is necessary to adjust the trimmer while slowly rocking the gang condenser through a small distance. Rocking the gang is essential if maximum sensitivity is to be obtained.





WIRING DIAGRAM FOR SILVERTONE CHASSIS 100.157



SOCKET VOLTAGES

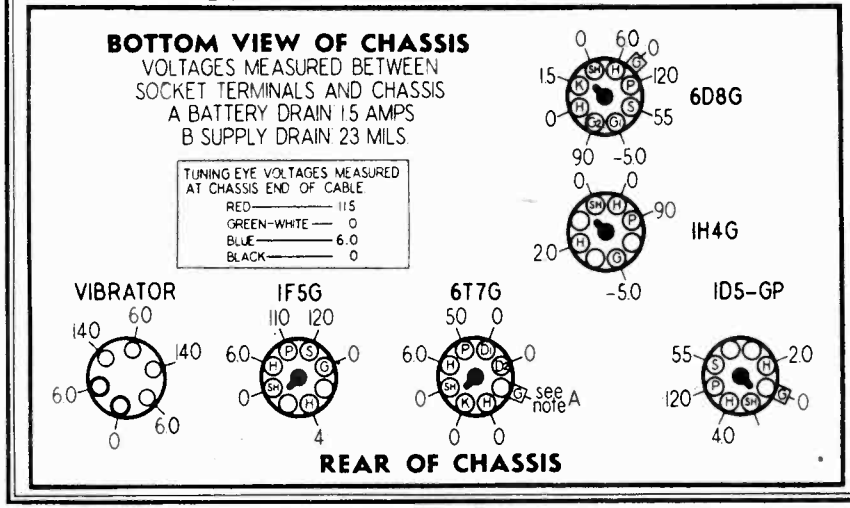
BATTERY VOLTAGE 6.0 — DIAL TUNED TO 540 KC

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
A BATTERY DRAIN 1.5 AMPS
B SUPPLY DRAIN 23 MILS

TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE

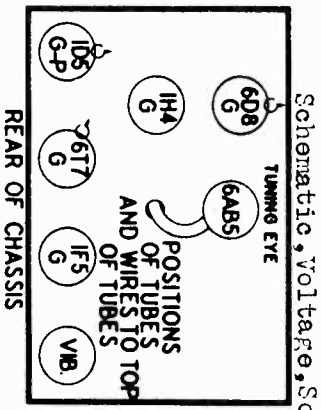
RED	115
GREEN-WHITE	0
BLUE	6.0
BLACK	0



OCT. 25, 1937

USE A HIGH RESISTANCE VOLTMETER OF 1000 OHMS PER VOLT.

NOTE A:- THE BIAS FOR THE CONTROL GRID OF THE 6T7-G TUBE IS -1.0 VOLT SUPPLIED BY THE BIAS CELL. DUE TO THE HIGH RESISTANCE OF THE CELL THE VOLTMETER WILL ONLY INDICATE ONLY A FRACTION OF A VOLT.



SEARS ROEBUCK & CO. MODELS 4623, 4643, 4743
4613, 4723
Chassis 100.157
Schematic, Voltage, Socket

MODELS 4623,4643,4743
4613,4743
Chassis 100.157

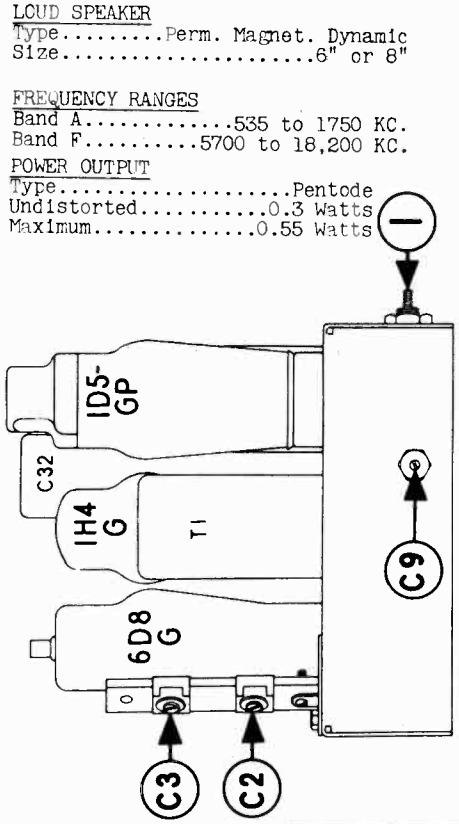
SEARS-ROEBUCK & CO.

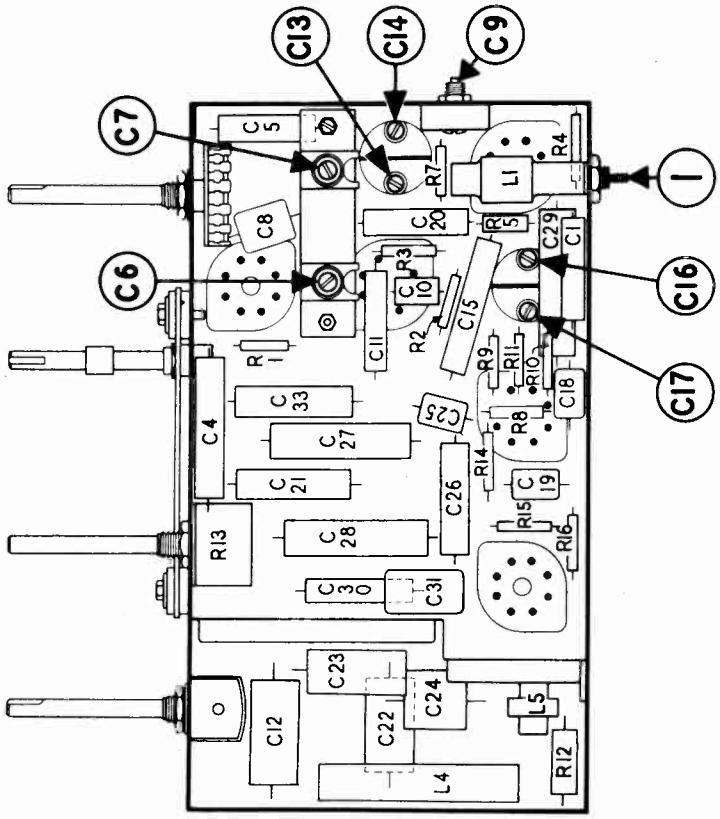
Trimmers, Chassis, Specs. Alignment, Sensitivity

LOUD SPEAKER
Type.....Perm. Magnet. Dynamic
Size.....6" or 8"

FREQUENCY RANGES
Band A.....535 to 1750 KC.
Band F.....5700 to 18,200 KC.

POWER OUTPUT
Type.....Pentode
Undistorted.....0.3 Watts
Maximum.....0.55 Watts





PRELIMINARY ALIGNMENT PROCEDURE

Output meter connections.....Across voice coil leads
Output meter reading to indicate 0.05 watt output.....0.65 volts
Average sensitivity in microvolts for 0.05 watt output.....See chart below

Generator ground connection.....Receiver Chassis
Dummy antenna 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.....Maximum clockwise
Position of tone control.....Right hand (clockwise) position

ORDER OF ALIGN.	* DIAL POINTER POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTION	TRIMMER NUMBER	SENSITIVITY (MICROVOLTS)	BAND SWITCH POSITION
A	ANY POINT WHICH DOES NOT AFFECT SIGNAL	465 KC.	.1 MFD.	6D8G CONTROL GRID	C13,C14 C16,C17	150	BAND A (Counter-clock-wise)
B	ANY POINT WHICH DOES NOT AFFECT SIGNAL	465 KC.	250 MMFD.	ANTENNA TERMINAL	1 MINIMUM OUTPUT		BAND A (Counter-clock-wise)
C	1500 KC.	1500 KC.	250 MMFD.	ANTENNA TERMINAL	C6, C3	30	BAND A (Counter-clock-wise)
D	** TUNE TO 600 KC. GEN.SIG.	600 KC.	250 MMFD.	ANTENNA TERMINAL	C9	20	BAND A (Counter-clock-wise)
E	*** 16 MC.	16 MC.	400 OHM.	ANTENNA TERMINAL	C7, C2	65	BAND F (Clock-wise)

IMPORTANT ALIGNMENT NOTES

* Before attempting to align the receiver check to see that the dial pointer is in a horizontal position at the low frequency end of the dial when the gang condenser is in full mesh.

After adjusting the I.F. trimmers C13, C14, C16 and C17, go back and repeat the adjustment, since the setting of each trimmer will have some effect on others. When adjusting L1, antenna trap trimmer, increase generator output to obtain clearly defined trimmer setting for a minimum.

** When aligning the broadcast band padder C9 at 600 KC. and the short wave detector trimmer C2, it is necessary to adjust the trimmers 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 taken in adjusting trimmer C7, since two possible adjustments of this trimmer will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.

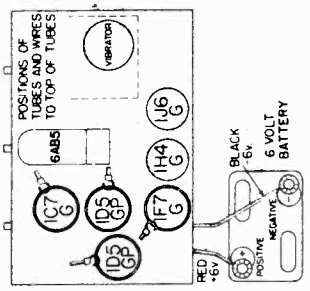
SEARS-ROEBUCK & CO.

MODELS 4640,4650,4740,4750
Chassis 101.476
Schematic,Voltage,Socket
Specs.,Transf. Speaker

AUGUST 13, 1937

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.476

POWER SUPPLY:
Six volt storage battery **Battery drain . . . . . 1.35 amperes**



ALIGNMENT FREQUENCIES:

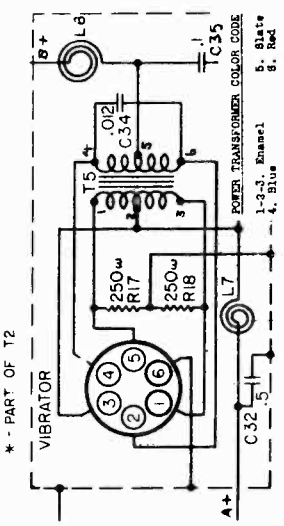
	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "B"	5 mc	5 mc	Fixed
Band "F"	-	15 mc	Fixed

FREQUENCY RANGES:

Band "A" . . .	540-1760 kc
Band "B" . . .	1760-6300 kc
Band "F" . . .	5975-18,500 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. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES.
* - PART OF T2

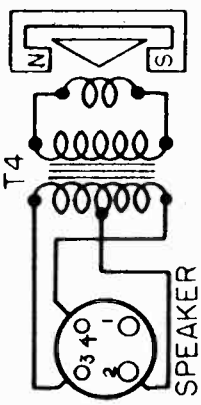
TO USERS OF THE SILVERTONE SUPER AIR-CHARGERS:
THIS RECEIVER USES A NEGATIVE GROUND.



INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Class "B"
Undistorted . . . . . 1.2 watts
Maximum . . . . . 1.6 watts

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6" and 8"



MODELS 4640,4650,
4740,4750
Chassis 101.476

SEARS ROEBUCK & CO.

Socket,Trimmers
Chassis,Alignment
Sensitivity,Notes

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . . 0.39 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
Position of volume control . . . . . All the way on
Position of tone control . . . . . Fully clockwise
Position of dial pointer with variable fully closed . . . To fall on end line at low frequency end of the AMERICAN scale.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	1.8 mc	485 kc	.1 mfd.	1G7G Grid	T2,T1	IF	75
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8,C5, C1	Osc.-Transl. Antenna	15
"A"	800 kc (rock)	800 kc	.0002 mfd.	Ant. Term.	C9	Padder	15
"P"	5 mc	5 mc	400 ohms	Ant. Term.	C10,C8	Osc.-Transl.	55
"P"	1.8 mc	1.8 mc	400 ohms	Ant. Term.	-	-	125
"F"	16 mc (rock)	15 mc	400 ohms	Ant. Term.	C7	Translator	85
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	200

IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the adjustment, where indicated by the word, "Rock", in the alignment chart.

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.

GENERAL INFORMATION

ELIMINATING WHISTLE AT 930 KC:

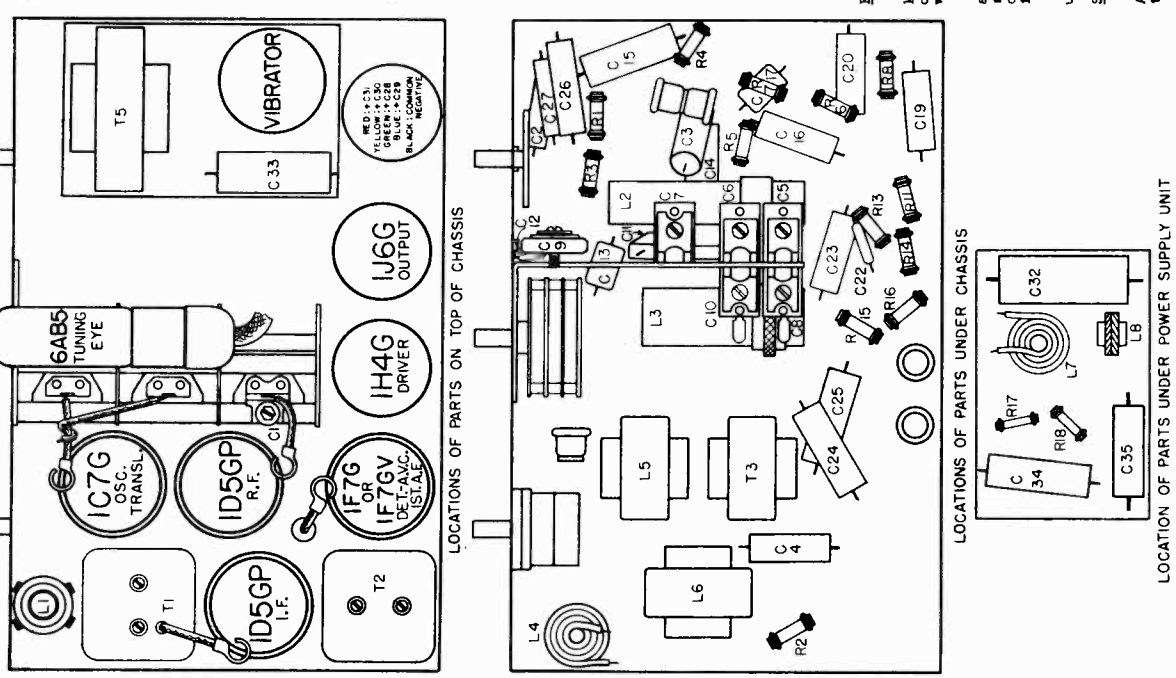
A whistle, due to a beat between the second harmonic (930 kc) of the 485 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 980 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 select the new IF frequency as close to 485 kc as possible.

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

SILVERTONE BATTERY CHARGERS AVAILABLE:

The customer should be told about the SILVERTONE GAS-O-POWER and the SILVERTONE SUPER AIR-CHARGER. Either of these units provides an economical means of keeping the storage battery charged.

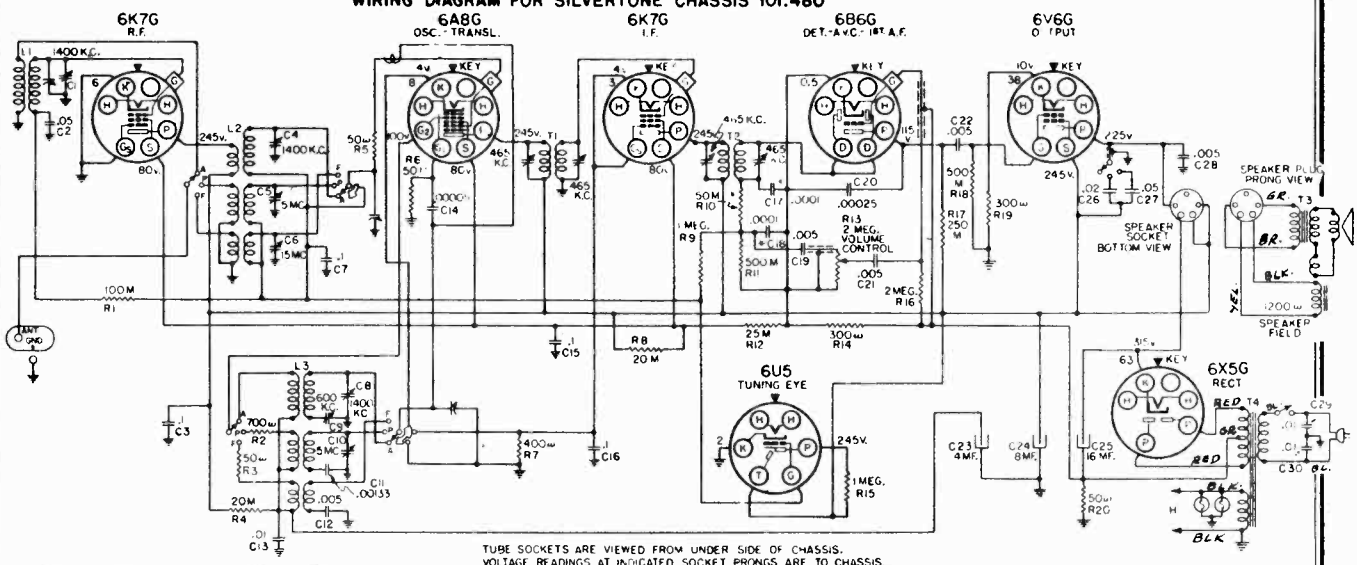


Schematic, Voltage
Phono. Installation

SEARS ROEBUCK & CO.

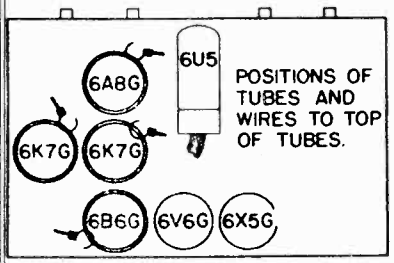
MODELS 4664, 4764, 4784
Chassis 101.480

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.480



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. VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
* - PART OF T2

INTERMEDIATE FREQUENCY
465 kc



POSITIONS OF TUBES AND WIRES TO TOP OF TUBES.

POWER SUPPLY:

All models available 105-125 volts, 50-60 cycle, 50 watts
All models available . 105-125 volts, 25 cycle, 55 watts

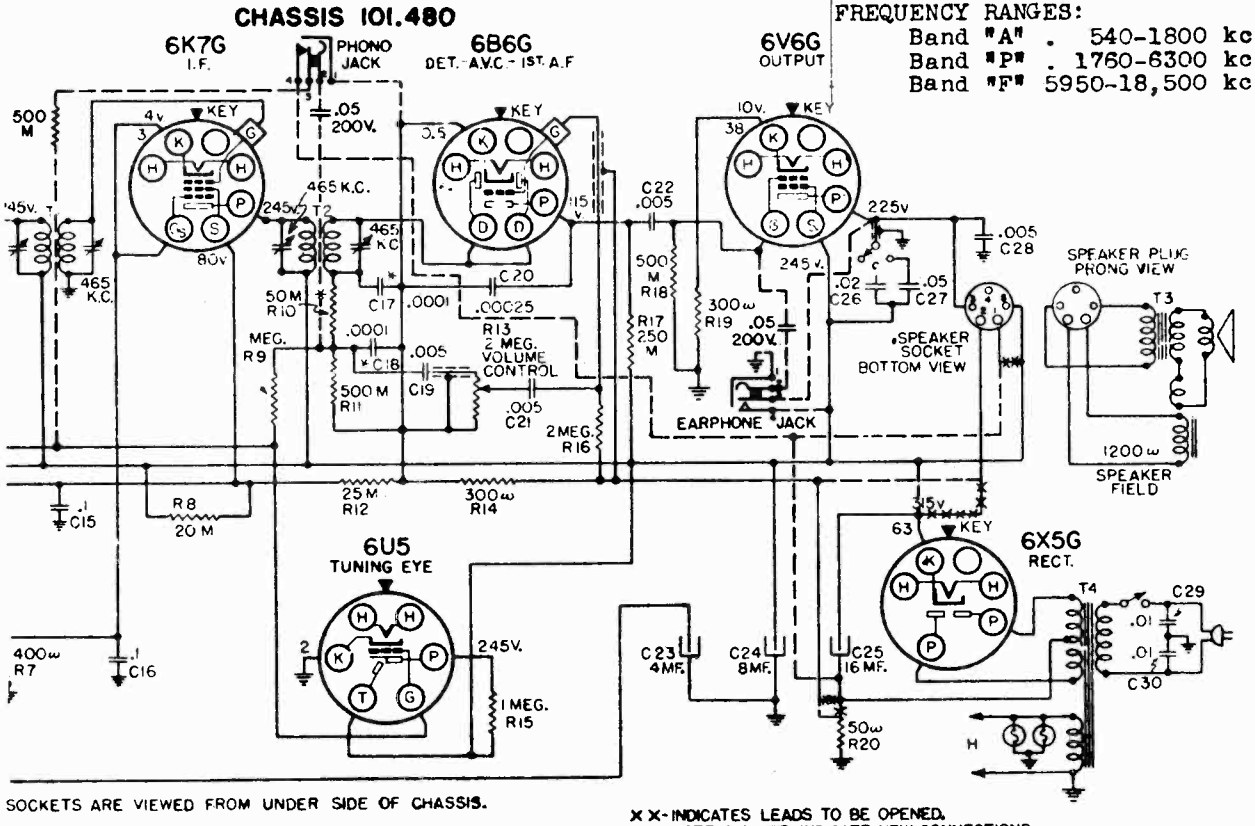
POWER OUTPUT:

Type . . . . . Single Pentode (Beam)
Undistorted . . . . . 2 watts
Maximum . . . . . 3.3 watts

SEPT. 3, 1937

INSTALLING PHONOGRAPH PICK-UP OR EARPHONE JACK:

CHASSIS 101.480



FREQUENCY RANGES:
Band "A" . 540-1800 kc
Band "P" . 1760-6300 kc
Band "F" 5950-18,500 kc

SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.

X X - INDICATES LEADS TO BE OPENED.
DOTTED LINES INDICATE NEW CONNECTIONS.

MODELS 4664,4764,4784
Chassis 101.480
Socket,Trimmers,Chassis
Phono. Notes,Alignment

SEARS-ROEBUCK & CO.

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 select the new IF frequency as close as possible to 465 kc.

LOCATIONS OF PARTS ON TOP OF CHASSIS.

LOCATIONS OF PARTS UNDER CHASSIS

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert the mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack. In addition, changes must be made in the wiring to the speaker socket and the electrolytic condenser. As the Schematic Section shows, these wiring changes and the connections to the jack are as follows:

Disconnect the jumper between prongs 1 and 5 of the speaker socket.

Disconnect the jumper prong #3 of the speaker socket and the anode (center terminal) of the wet electrolytic.

There is a lead running from the 40 ohm resistor, mounted on the terminal board near the power transformer, to the cathode (can terminal)of the wet electrolytic. Disdonnect this lead from the electrolytic and connect it to terminal #2 of the speaker socket.

Run a lead from terminal #1 of the speaker socket to the cathode (can terminal) of the electrolytic.

Run a lead from terminal #1 of the jack to the cathode prong of the 6B6G tube.

Connect the .05 condenser from terminal #3 of the jack to the junction of R10 and C19. This junction is at the end lug of the terminal board mounted under the IF output transformer.

Connect the 500M ohm resistor from terminal #3 of the jack to the end of R14 that is connected to the blank prong of the 6B6G socket.

Connect prong #4 of the jack to prong #1 of the speaker socket.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal #3 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #3 of the speaker socket.

Connect terminal #4 of the jack to terminal #5 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, 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 terminals 3 and 4 of the jack should be omitted.

PRELIMINARY: ALIGNMENT PROCEDURE

Output meter connections . . . . . Across voice coil leads

Output meter reading to indicate .5 watts output . . . . . 1.04 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

Connection of generator ground lead . . . . . To chassis

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

Position of volume control . . . . . Fully clockwise

Position of tone control . . . . . Fully clockwise

Position of dial pointer with variable fully meshed . . . . . To fall along horizontal line of the dial.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	1.8 mc	465 kc	.1 mfd.	6A8G Grid	T2,T1	IF	60
"A"	1400 ko	1400 ko	.0002 mfd.	Ant. Term.	C8,C4,C1	Osc.-Transl.30 Antenna	
"A"	600 kc (rock)	600 kc	.0003 mfd.	Ant. Term.	C9	Padder	60
"B"	5 mc	5 mc	400 ohms	Ant. Term.	C10	Oscillator	-
"B"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C5	Translator	45
"B"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C6	Translator	60

IMPORTANT ALIGNMENT NOTES

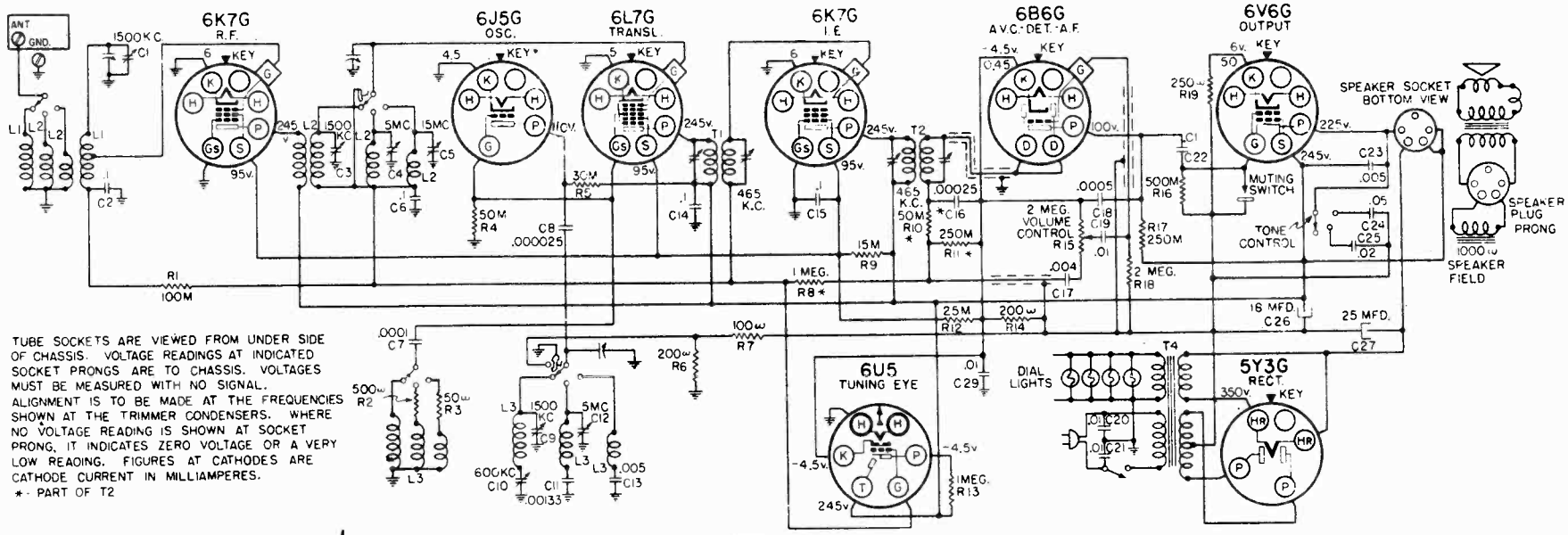
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

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

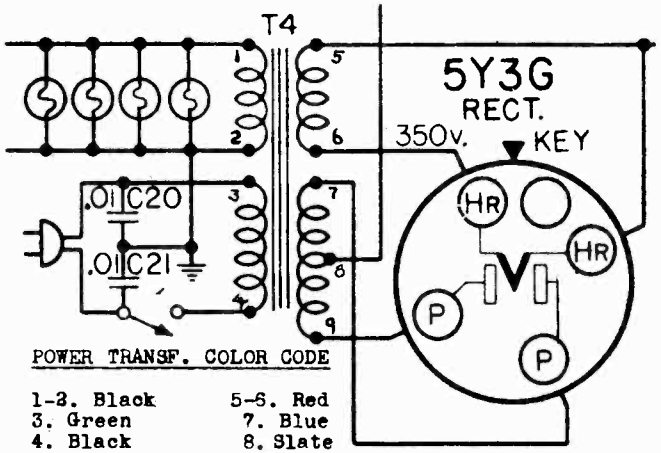
Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

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

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.482

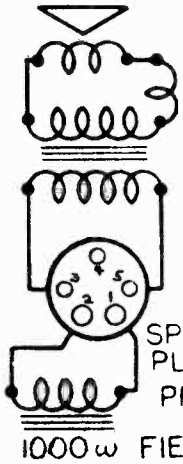


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
*- PART OF T2



POWER TRANSF. COLOR CODE

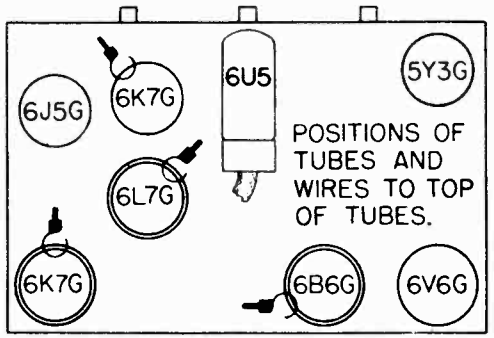
1-2. Black	5-6. Red
3. Green	7. Blue
4. Black	8. Slate
9. Red	



SPEAKER PLUG COLOR CODE

1. Black
2. Yellow
3. Brown
4. Blank
5. Green

TUBE LAYOUT



POWER SUPPLY:

All models available	105-125 volts, 50-60 cycle, 75 watts
All models available	105-125 volts, 25 cycle, 75 watts

FREQUENCY RANGES:

Band "A"	540-1840 kc
Band "P"	1780-6050 kc
Band "F"	5.9-18.5 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "A"	1500 kc	1500 kc	600 kc
Band "P"	5 mc	5 mc	Fixed
Band "F"	16 mc	16 mc	Fixed

POWER OUTPUT:

Type	Beam tube
Undistorted	3 watts
Maximum	6 watts

INTERMEDIATE FREQUENCY . . . 465 kc

SEPTEMBER 28, 1937

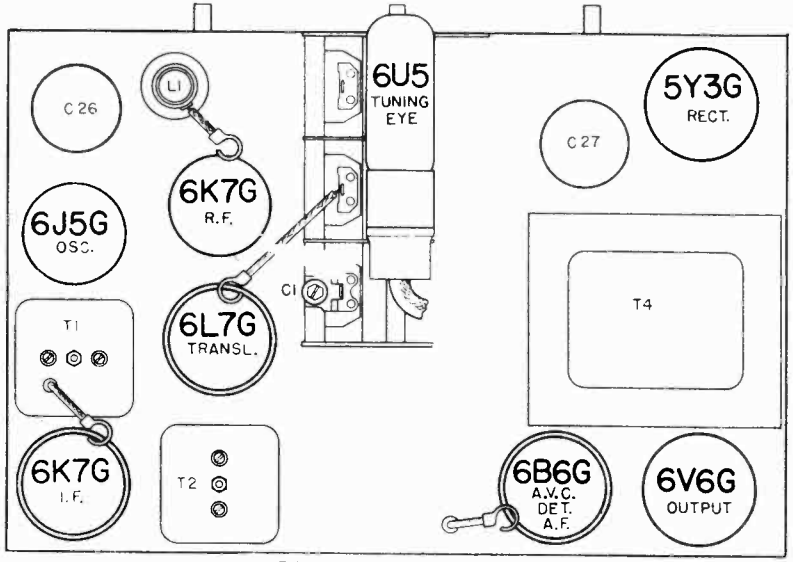
SEARS ROEBUCK & CO.

MODELS 4610, 4669, 4769
4789 Chassis 101.482
Schematic, Voltage
Socket, Specs. Transf.

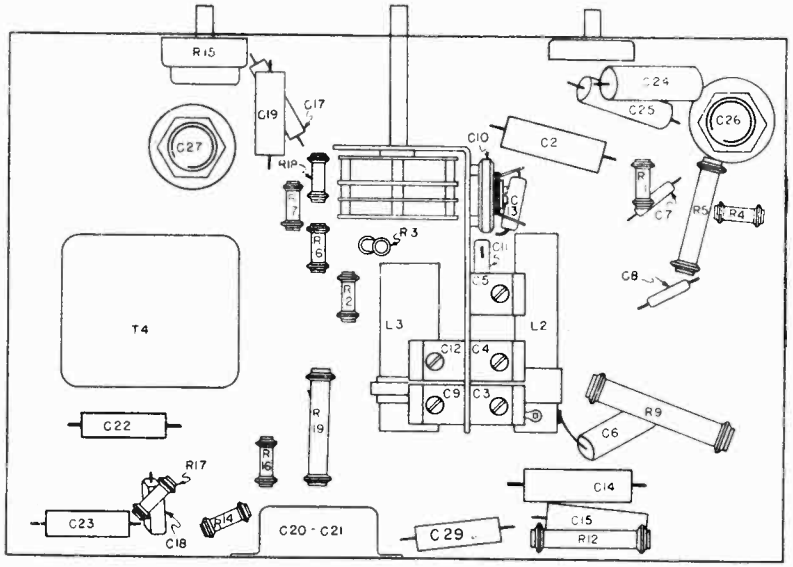
MODELS 4610,4669,4769
4789. Chassis 101.482

SEARS ROEBUCK & CO.

Socket, Trimmers, Chassis Alignment, Sensitivity

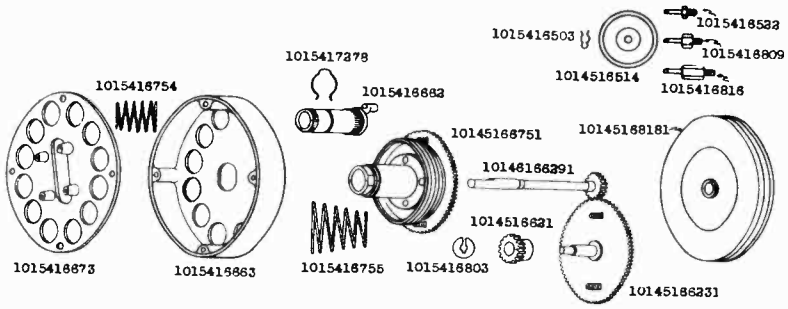


LOCATION OF PARTS TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

Dial Drive System



ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across voice coil leads

Output meter reading to indicate .5 watts output . . . . . 1.04 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

Connection of generator ground lead . . . . . To chassis

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

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . Fully clockwise

Position of Dial Pointer when variable is fully meshed . . . . . To fall on center of large square block at 550 kc end of dial.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	1.8 mc	465 kc	.1 mfd.	6L7G Grid	T2,T1	IF Output IF Input	115
"A"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C9,C3,C1	Osc.Transl. RF	35
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C10	Padder	35
"P"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C12,C4	Oscillator Translator	115
"F"	16 mc (rock)	16 mc	400 ohms	Ant. Term.	C5	Translator	90

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.

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

Phono. Installation
Wave-trap Data

SEARS ROEBUCK & CO.

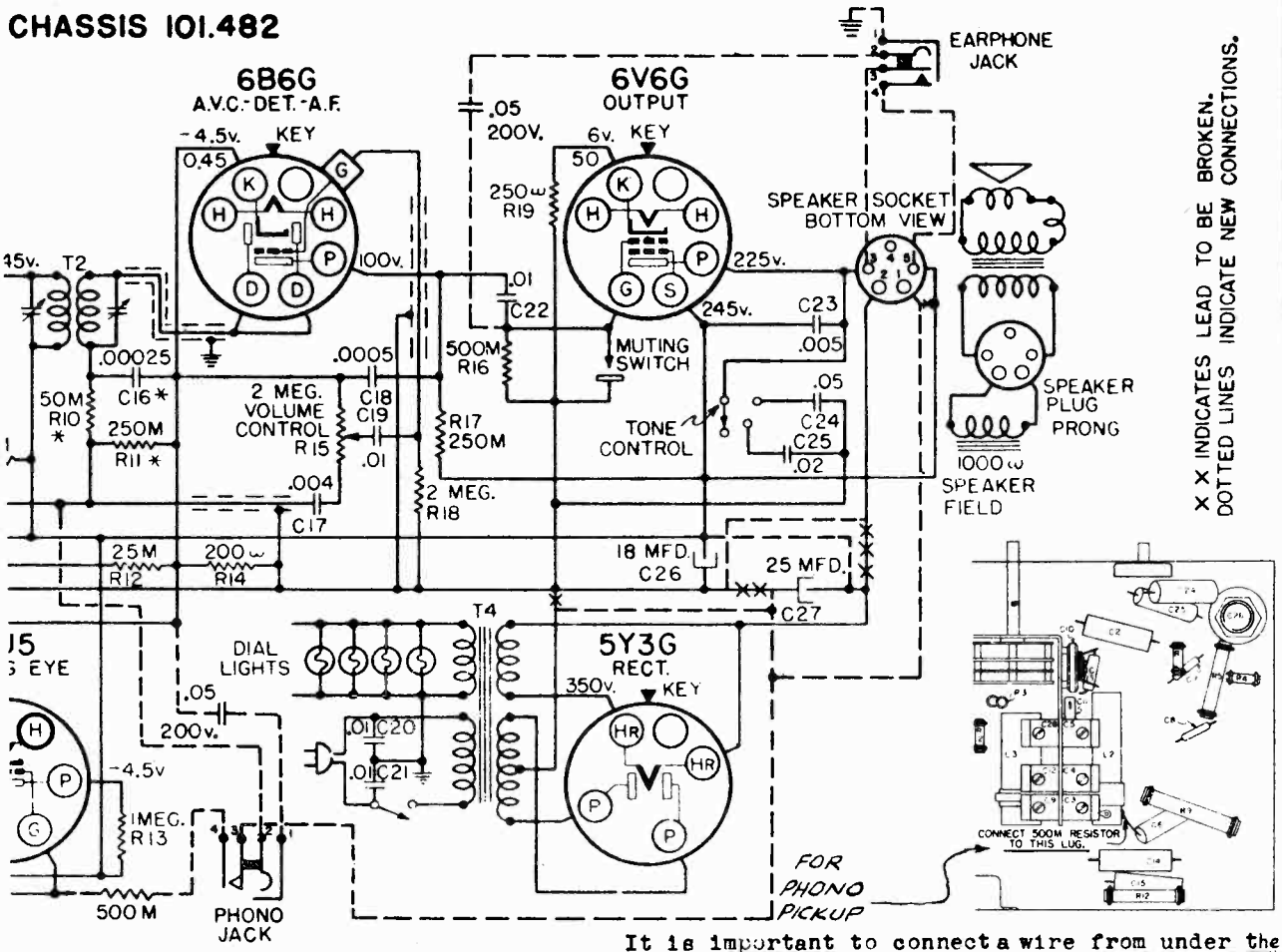
MODELS 4610,4669,4769
4789. Chassis 101.482

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack. In addition, changes must be made in the wiring to the speaker socket and the electrolytic condenser.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

CHASSIS 101.482



It is important to connect a wire from under the head of one of the wood screws to the chassis so that the wave trap shield becomes grounded to the chassis.

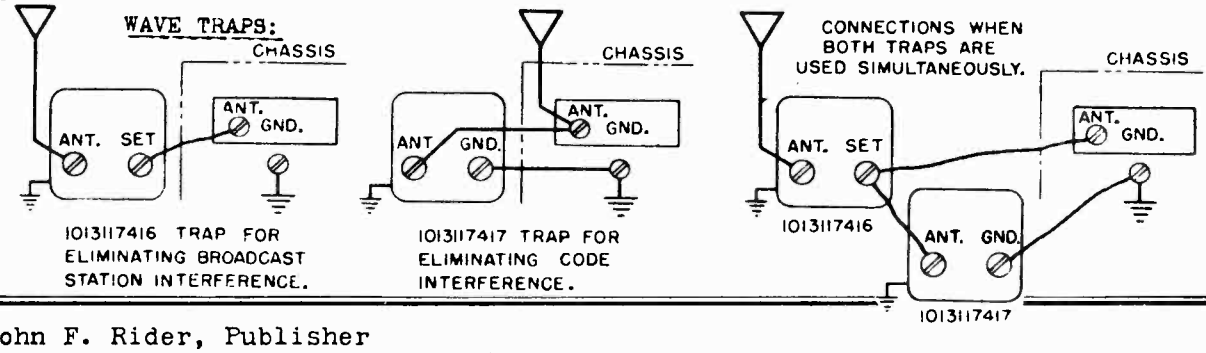
The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, 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 terminals 3 and 4 of the jack should be omitted.

ADDING A .01 MFD. CONDENSER TO ELIMINATE DISTORTION AT LOW VOLUME:

Distortion at low volume can be corrected by adding a .01 mfd. - 300 volt condenser from the cathode of the 6B6G tube to ground. This condenser is C39 in the wiring diagram. Chassis marked with the letter, "B", or a subsequent letter have had this change incorporated in production.

WAVE TRAPS:



IMPROPER OPERATION OF THE LO-NOISE CONTROL CIRCUIT:

Insufficient difference between the "break-in" and "drop out" points can be corrected by changing the 6Q7G Whisper Tuning tube. The 6A8G IF tube also has an effect. Try interchanging the 6Q7G "Lo-Noise" control tube with the 6Q7G Second Detector tube.

Another change that will improve the action of the "Lo-Noise" control circuit is replacement of the 700 ohm resistor, R17, with a 300 ohm one. This change has been incorporated in production in chassis stamped with the letter, "F", or a subsequent letter.

If further improvement is required, the 150 ohm resistor, R2, may be shorted out. This change will also increase the sensitivity of the AMERICAN band and the minimum sensitivity of the Tuning Eye about ten times.

Hum, occurring when the front control knob is in the "Lo-Noise" position, can be corrected by changing the 6Q7G "Lo-Noise" control tube. Sometimes, shifting the position of the heater leads to this tube will also minimize hum.

INCREASING THE SENSITIVITY OF THE TUNING EYE:

The minimum sensitivity of the Tuning Eye can be increased about ten times by shorting out the 150 ohm resistor, R2, as mentioned in the preceding paragraphs. Another change that will increase the sensitivity of the Tuning Eye without changing the sensitivity of the set or the action of the "Lo-Noise" control is to replace the 1 megohm resistor, R11, with a 250M ohm resistor. This resistor is incorporated in the Tuning Eye cable socket. This change has been incorporated in production in chassis stamped with the letter, "C", or a subsequent letter.

CORRECTING AF OSCILLATION:

Audio oscillation sometimes occurs due to the 6Q7G Second Detector grid lead being close to the adjacent 6V7G output tube. It can be corrected by moving the 6Q7G grid lead.

INSTRUCTIONS FOR INSTALLING PHONOGRAPH PICK-UP OR EARPHONE JACK:

If both phonograph pick-up connections and earphone connections are wanted, it will be necessary to use two kits. It will also be necessary to drill an additional hole in the back of the chassis for the additional jack.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack.

Connect the .05 condenser between lug #1 of the jack and the plate prong of the 6Q7 tube socket that is just above the LO-NOISE control rheostat.

Connect lug #2 of the jack to ground.

There is a terminal board mounted under the IF Input transformer. Connect the terminal on this board nearest the back of the chassis to lug #3 of the jack.

Connect lug #4 of the jack to the LO-NOISE control rheostat.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal #3 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #5 of the speaker socket.

Connect terminal #4 of the jack to terminal #3 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, 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 terminals 3 and 4 of the jack should be omitted.

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 915/3 or 457.5 kc. Try to select the new IF frequency as close as possible to 465 kc.

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

THE LO-NOISE CONTROL - HOW TO SET IT UP:

When properly adjusted, the "Lo-Noise" control will make it possible to tune between favorite selected stations, of sufficient strength to insure good daylight reception, without inter-station noise while tuning. With the front control knob in the "Lo-Noise" position the receiver is insensitive until a sufficiently strong station is received. An important difference between this circuit and the ordinary variable sensitivity control circuit is that once the signal has "broken-in" the receiver sensitivity can increase considerably beyond the "break-in" point before the station "drops out". This makes it possible to hold a station that is fading moderately without having the station keep "breaking in" and "dropping out". When the front knob is turned to the "Normal" position the receiver acts as a conventional one.

To make the "Lo-Noise" adjustment, turn the control at the rear of the receiver all the way to the right (as you face the rear of the receiver). Turn the front control knob to the "Lo-Noise" position. Tune in your favorite strong stations that give satisfactory reception during the day and night and set the Volume Control to the desired level. Leave the Volume Control at this setting. Now tune from station to station and at the same time turn the rear control to the left until the noise between stations is reduced sufficiently to be not objectionable, and yet permits reception of the selected stations. Turning the rear control too far to the left may result in failure to receive some of the selected stations. If the selected stations are not very strong, a compromise may have to be made between the amount of noise and the number and distance of stations that can be tuned in with the knob in the "Lo-Noise" position.

The knob should always be in the "Normal" position when tuning for distant broadcast and short wave stations or for any station that cannot be heard when the control is in the "Lo-Noise" position. If a station "breaks-in" and then "drops out" with the knob in the "Lo-Noise" position, it indicates that the station is fading too badly for proper reception with the knob in the "Lo-Noise" position and should be listened to with the knob in the "Normal" position.

THE LO-NOISE CONTROL - HOW IT WORKS:

The following is intended as an understandable explanation of the "Lo-Noise" circuit without involving the details of the circuit.

The "Lo-Noise" circuit makes use of a 6Q7G tube. The effective plate voltage applied to this tube (and therefore the plate current) is adjustable by means of a potentiometer, which is the "Lo-Noise" control at the rear of the receiver. The plate current of this tube creates a voltage drop that is used to put a negative bias on the control grids of the RF, translator and IF tubes, reducing their gain. This negative voltage is also applied to the diodes of the Second Detector, preventing detector action and quieting the set.

A portion of the IF signal is fed to the diode of the 6Q7G "Lo-Noise" control tube. The resulting diode current creates a voltage that is applied to the grid of the tube to provide negative bias. When a sufficiently strong signal is tuned in, the negative bias applied to the grid of the 6Q7G tube will be enough to decrease the plate current of the tube. The voltage drop due to this plate current is biasing off the receiver, as explained in the previous paragraph. Therefore, the decrease in bias will increase the sensitivity of the RF, translator and IF stages. This increased sensitivity will permit more diode current flow in the "Lo-Noise" control tube thereby decreasing the plate current still further until the plate current is practically cut off. This action takes place in a fraction of a second so that the station seems to "break-in" instead of gradually building up in volume.

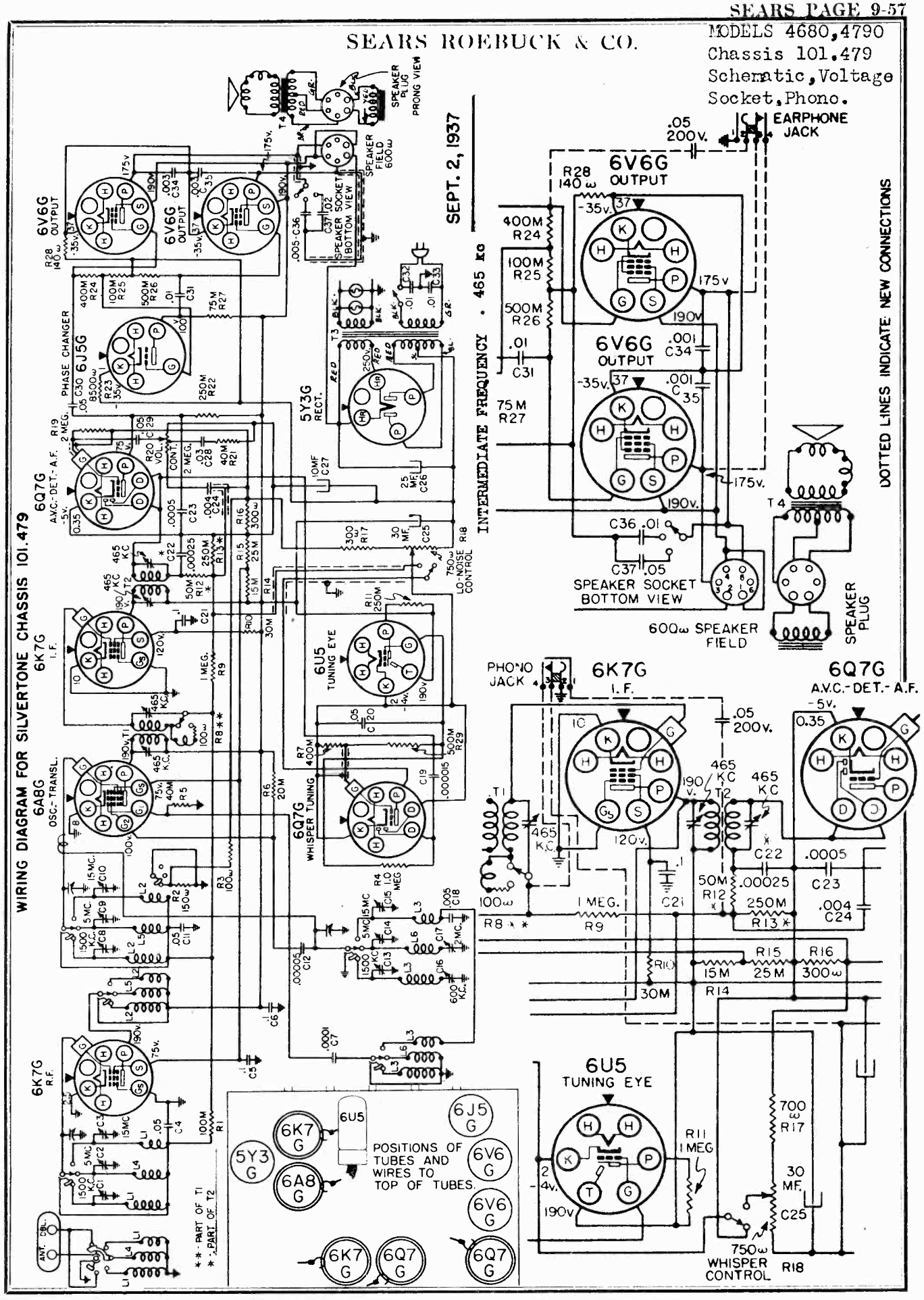
The strength of the signal necessary to create sufficient negative grid voltage on the "Lo-Noise" control tube to cut off the plate current depends upon the plate voltage of the tube which in turn is determined by the setting of the potentiometer. Therefore, this setting determines the "break-in" point of the receiver. The "drop out" point depends upon the plate current - grid voltage characteristic of the tube. This differs from the "break-in" point because at the "drop out" point the plate current of the tube is at a maximum; at the "break-in" it is at a minimum; and the plate current - grid voltage characteristic of the tube is different at these two extremes. When the front control knob is turned to the "Normal" position the plate circuit of the 6Q7G "Lo-Noise" control tube is opened so that it cannot put any negative bias on the other tubes.

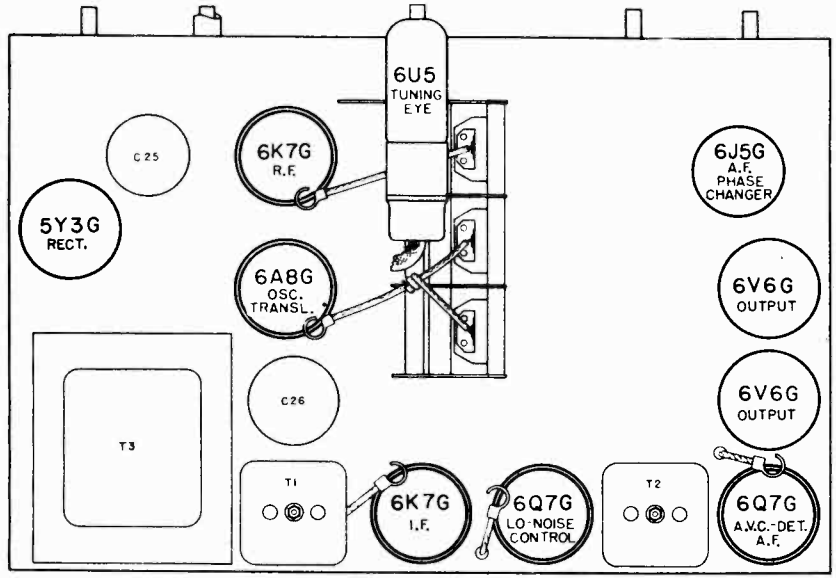
SEARS ROEBUCK & CO.

MODELS 4680,4790
Chassis 101.479
Schematic, Voltage
Socket, Phono.

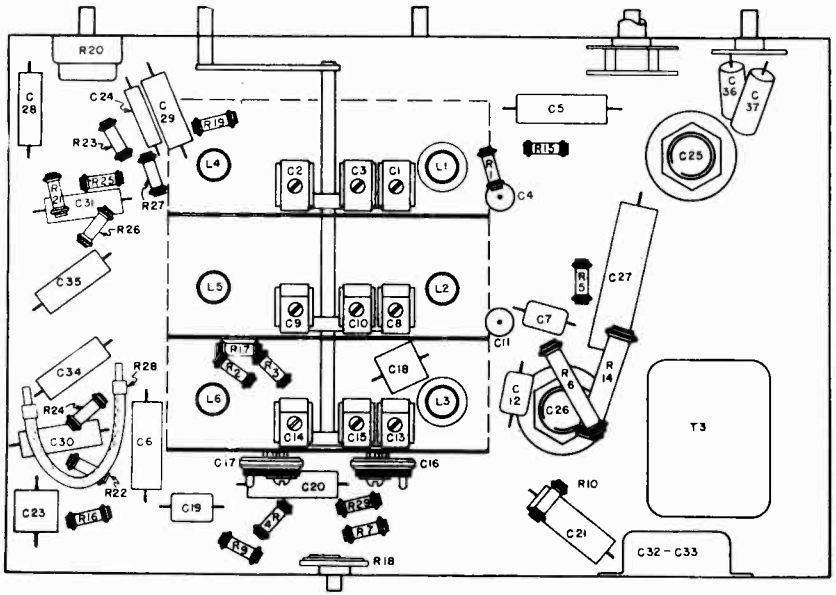
SEPT. 2, 1937

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.479





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	1.31 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
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of volume control	Fully clockwise
Position of tone control	Fully clockwise
Position of selectivity control	Sharp
Position of Lo-Noise control	Normal
Position of dial pointer with variable fully closed	To fall on last calibration mark at 550 kc end of AMERICAN band.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"INT"	1.8 mc	465 kc	.1 mfd.	6A8G Grid	T2,T1	IF	5200
"AM"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C13,C8,C1	Oscillator, Transl.,RF	35
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C16	Padder	20
"INT"	5 mc	5 mc	400 ohms	Ant. Term.	C14	Oscillator	-
"INT"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C9,C2	Translator, RF	3
"INT"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C17	Padder	6
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C15	Oscillator	-
"FOR"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C10,C3	Translator, RF	10

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.

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.

No connection should be made to the doublet terminal on the antenna connection block.

POWER OUTPUT:
- Type . . . . . Push-Pull (Beam Tubes)
- Undistorted . . . . . 8 watts
- Maximum . . . . . 10 watts

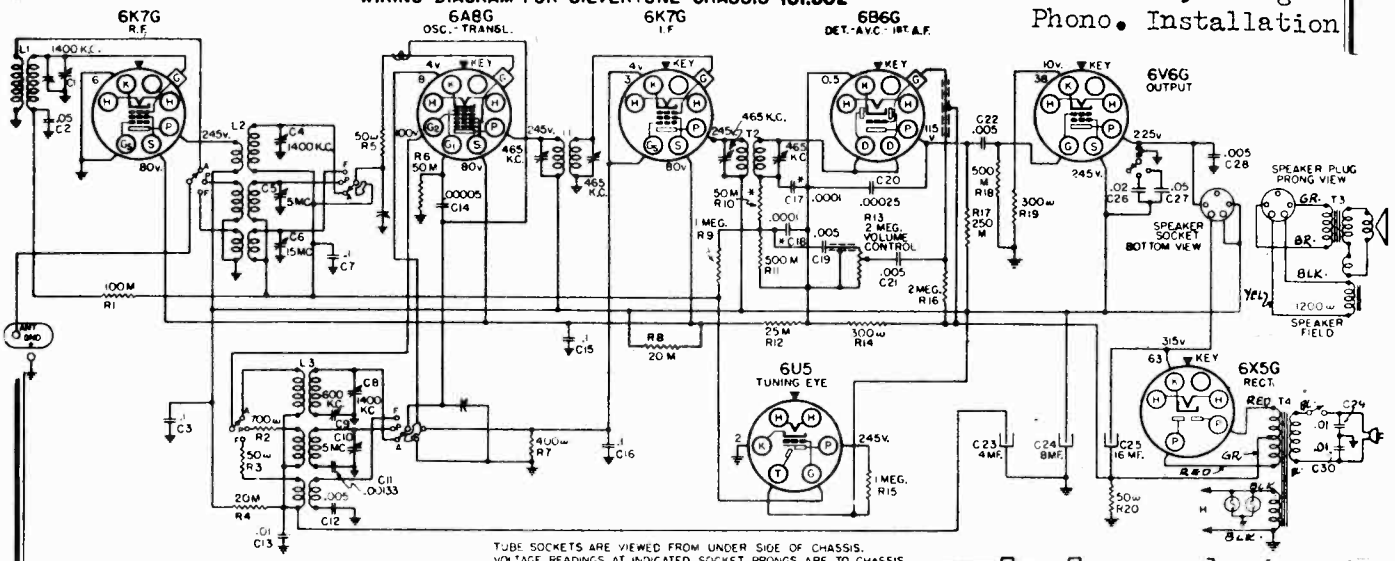
LOUD SPEAKER:
- Type . . . . . Dynamic
- Size . . . . . 10" and 12"
- Field coil resistance . . . . 600 ohms
- App. field coil voltage drop . . . 60 volts

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

SEARS ROEBUCK & CO.

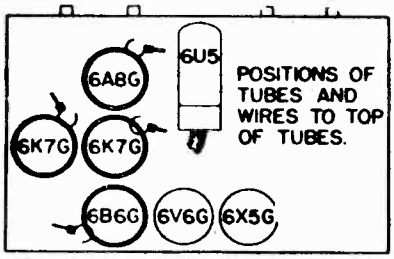
MODEL 4684
Chassis 101.502
Schematic, Voltage
Phono. Installation

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.502



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. VOLTAGES MUST BE MEASURED WITH NO SIGNAL WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES. * - PART OF T2

INTERMEDIATE FREQUENCY
465 kc



POSITIONS OF TUBES AND WIRES TO TOP OF TUBES.

POWER OUTPUT:

Type	Beam
Undistorted	2 watts
Maximum	3.3 watts

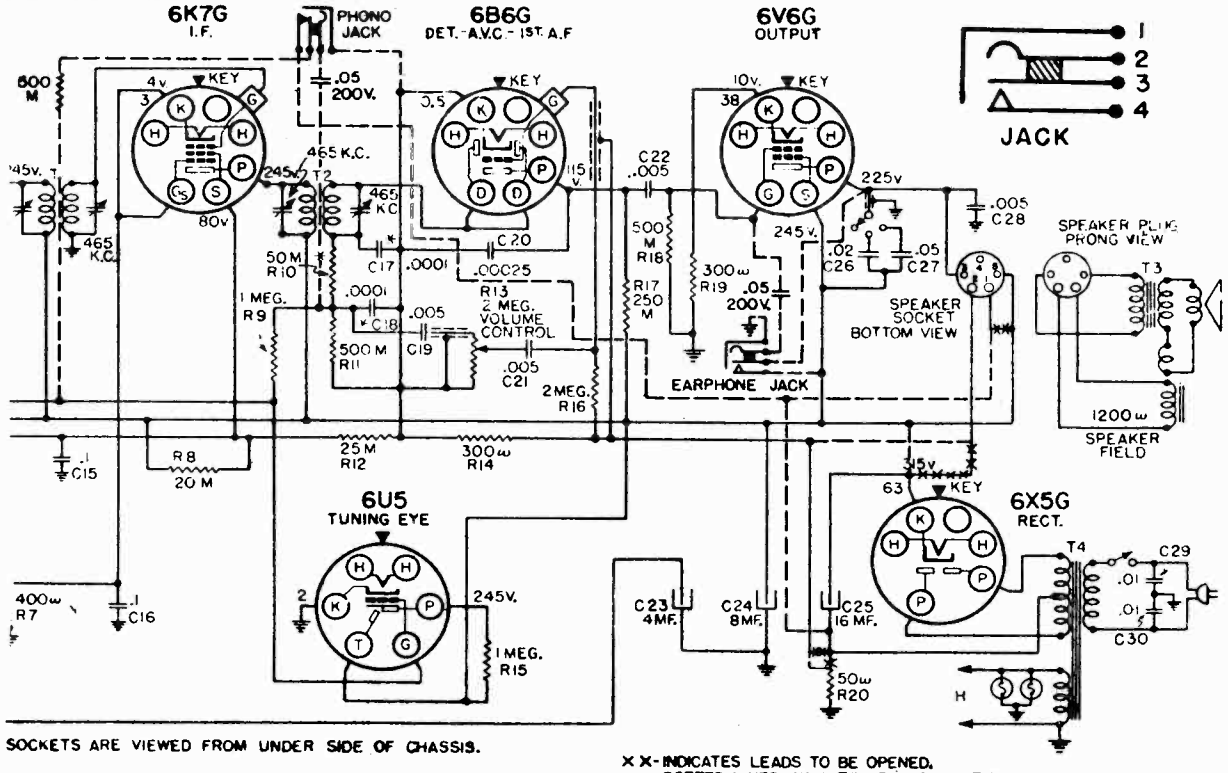
POWER SUPPLY:

All models available . . . 105-135 volts, 50-60 cycle, 50 watts
All models available . . . . 105-135 volts, 25 cycle, 55 watts

INSTALLING PHONOGRAPH PICK-UP OR EARPHONE JACK:

DEC. 1, 1937

CHASSIS 101.502



SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.

XX-INDICATES LEADS TO BE OPENED.
DOTTED LINES INDICATE NEW CONNECTIONS.

MODEL 4684
Chassis 101.502

SEARS ROEBUCK & CO.

Socket, Trimmers
Chassis, Alignment
Sensitivity, Notes

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across voice coil leads
Output meter reading to indicate .5 watts output . . . . . 1.04 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
Connection of generator ground lead . . . . . To chassis
Generator modulation . . . . . 30%, 400 cycles
Position of volume control . . . . . Fully clockwise
Position of tone control . . . . . Fully clockwise
Position of dial pointer with variable fully meshed . . . . . To fall along horizontal line of the dial.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	1.8 mc	465 kc	.1 mfd.	6A8G Grid	T2,T1	IF	60
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8,C4,C1	Oscil.-Transl. Antenna	30
"A"	600 kc (rock)	600 kc	.0003 mfd.	Ant. Term.	C9	Padder	80
"P"	5 mc	5 mc	400 ohms	Ant. Term.	C10	Oscillator	-
"P"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C5	Translator	45
"P"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C6	Translator	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.

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.

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

ELIMINATING WHISTLE AT 930 KC:

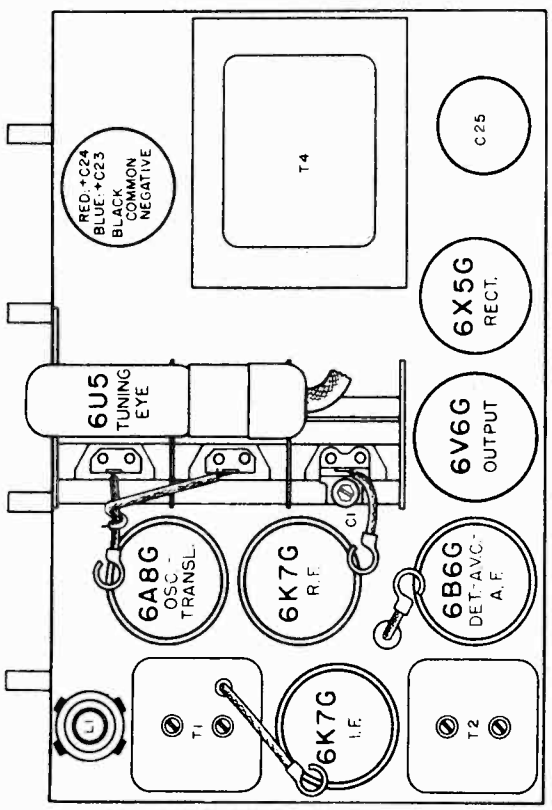
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This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

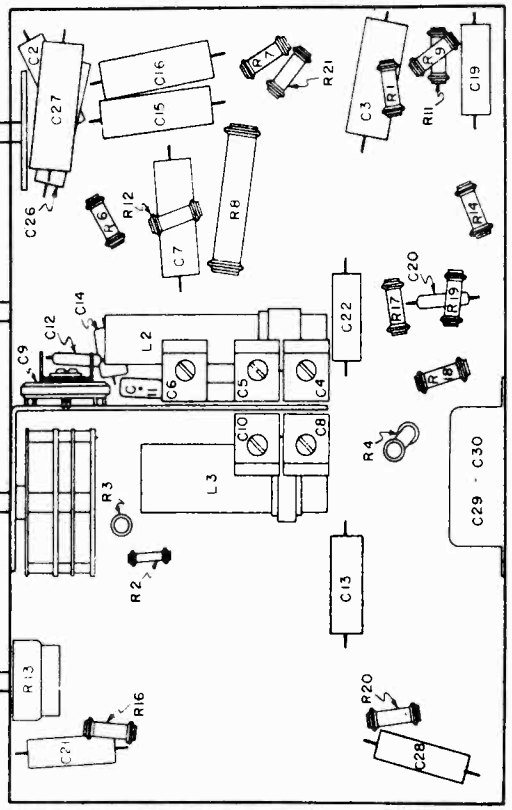
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 8" and 8"
Field coil resistance . . . 1200 ohms
App. field coil voltage drop . . . 70 volts

FREQUENCY RANGES:
Band "A" . . . . . 540-1800 kc
Band "P" . . . . . 1750-6300 kc
Band "F" . . . . . 5950-18,500 kc



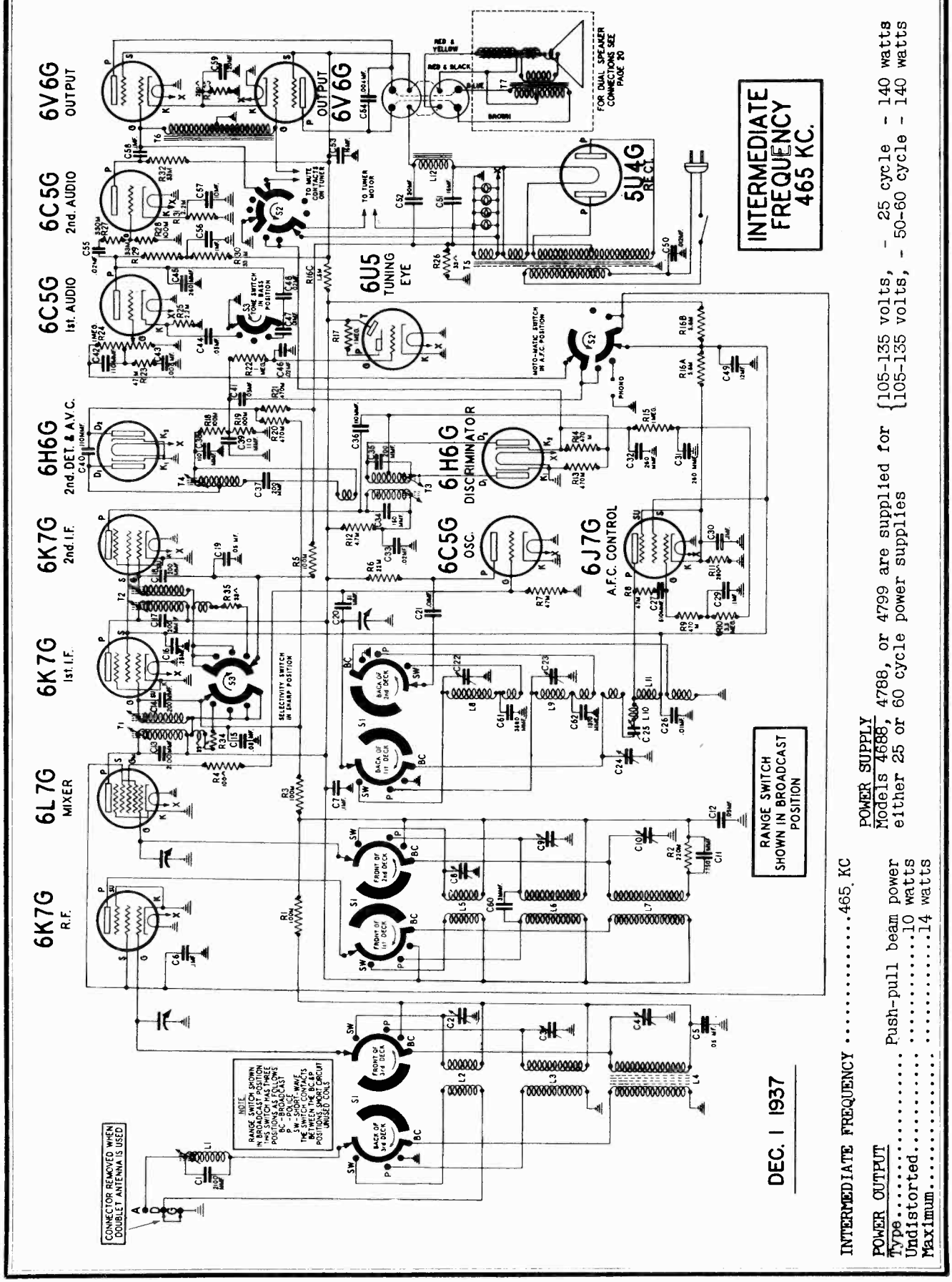
LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

SEARS ROEBUCK & CO.

MODELS 4688,4788,4799
Chassis 100.159
Schematic



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INTERMEDIATE FREQUENCY .....465 KC

POWER OUTPUT
Type..... Push-pull beam power
Undistorted..... .....10 watts
Maximum..... .....14 watts

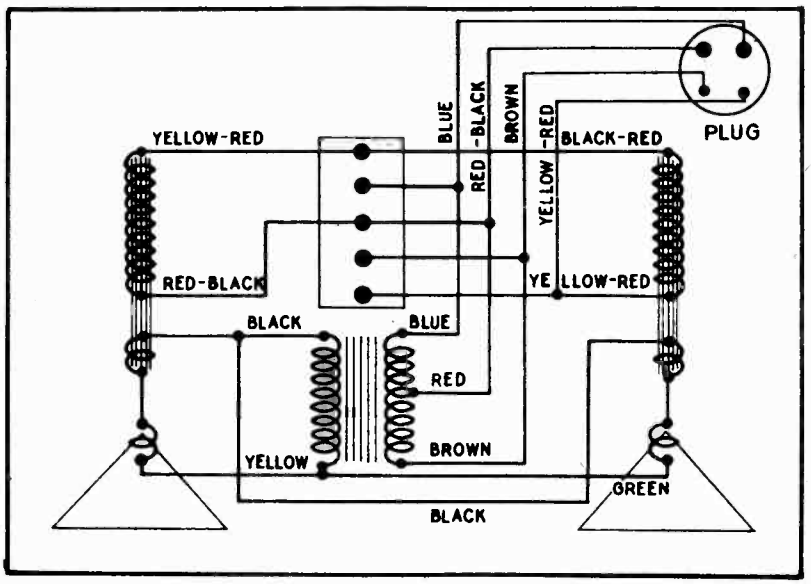
POWER SUPPLY
Models 4688, 4788, or 4799 are supplied for either 25 or 60 cycle power supplies

{105-135 volts, - 25 cycle - 140 watts
105-135 volts, - 50-60 cycle - 140 watts

MODELS 4688,4788,4799
Chassis 100.159
Socket,Trimmers
Speaker Connections

SEARS ROEBUCK & CO.

SPEAKER CONNECTIONS FOR DUAL SPEAKER MODELS



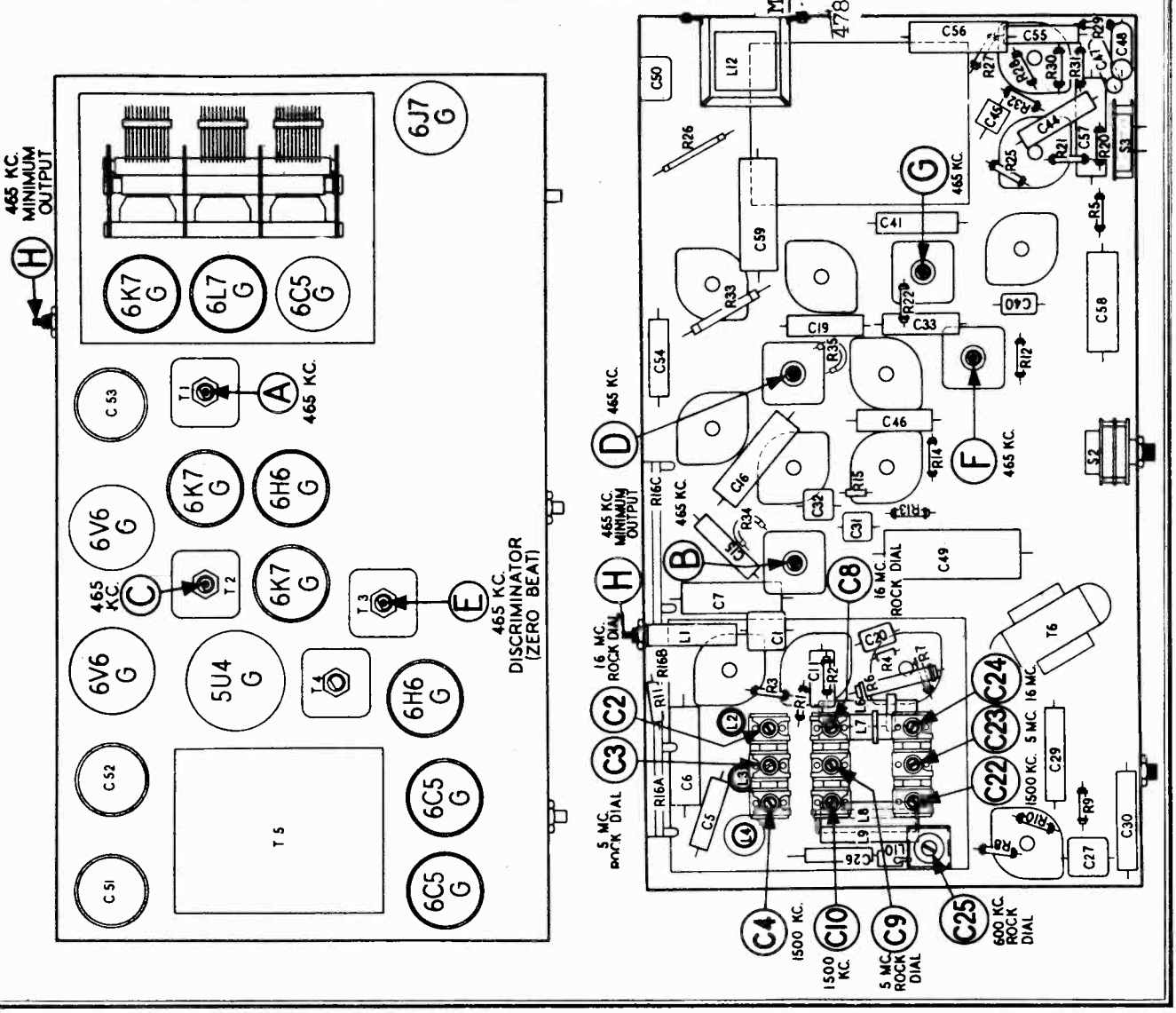
LOUD SPEAKERS

Model	Field Res. (Hot)	Field Coil Voltage
4688	400	60 volts
4788	185	28 volts
4788-4799	175	27 volts
4799	185	28 volts

ALIGNMENT FREQUENCIES
1500 KC.; 600 KC.
5000 KC.
16,000 KC.

FREQUENCY RANGES

Band A	525 to 1680 KC.
Band P	1655 to 5600 KC.
Band F	5540 to 18,100 KC.



ALIGNMENT PROCEDURE

PRELIMINARY

Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial when the gang condenser is in full mesh. Also when the gang condenser is in full mesh the stop pin on the left side of the tuner should be resting against the forward stop. If after examination it is found that the gang is in full mesh and the stop pin is against the forward stop, but the pointer is set to the wrong position, it will only be necessary to loosen the set screw on the dial drive gear at the left side of the mechanism. Then grasp the large drum on the same side of the tuner and turn it until the pointer is set correctly. Now retighten the set screw in the gear being careful to see that the gear is meshing properly.

On the other hand if the stop pin does not rest against the forward stop with the gang condenser in full mesh, loosen the set screw on the gang condenser side of the flexible coupler. Then turn the tuning knob until the stop pin rests against the forward stop on the tuner. Now tighten the set screw in the flexible coupler and proceed to set the pointer to its correct position by the method described in the previous paragraph.

Output meter connections.....Across voice coil leads

Output meter reading to indicate 0.5 watt output.....1.0 volts

Average sensitivity in microvolts for 0.5 watt output.....See chart below

Generator ground connection.....Receiver Chassis

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

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

Position of volume control.....Maximum clockwise

-IMPORTANT-

1.-TONE CONTROL MUST BE IN SHARP POSITION.

2.-ALLOW RECEIVER TO WARM UP 15 MINUTES BEFORE ALIGNING.

3.-A.F.C.-ON-OFF SWITCH MUST BE IN THE CENTER NON-A.F.C. POSITION EXCEPT WHERE OTHER POSITION IS SPECIFIED.

ORDER OF ALIGN.	DIAL POINTER POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTION	TRIMMER NUMBER	SENSITIVITY (MICROVOLTS)	BAND SWITCH POSITION
A	ANY POINT WHICH DOES NOT AFFECT SIGNAL	465 KC.	.1 MFD.	6L7-G CONTROL GRID	A-B-C-D-F-G	85	BAND A (Counter-clockwise)
B	ANY POINT WHICH DOES NOT AFFECT SIGNAL	465 KC.	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	H MINIMUM OUTPUT		BAND A (Counter-clockwise)
C	1500 KC.	1500 KC.	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	C22-C10 C4	7	BAND A (Counter-clockwise)
D	* TUNE TO 600 KC. GEN.SIG.	600 KC.	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	C25	6	BAND A (Counter-clockwise)
E	THE A.F.C. SYSTEM MUST NOW BE ALIGNED. SEE "A.F.C. ALIGNMENT" AT TOP OF NEXT PAGE FOR PROCEDURE.						
F	** 5 MC.	5 MC.	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	C23-C9 C3	7	BAND P (Center)
G	* ** 16 MC.	16 MC.	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	C24-C8 C2	8	BAND F (clockwise)

* When aligning the American band padder C25 at 600 KC. and the short wave detector trimmer C8 at 16 MC. it is necessary to adjust the trimmers 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 or police bands, care should be taken in adjusting trimmers C23 or C24, since two possible adjustments of this trimmer will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.

IMPORTANT:- The following adjustment must be made after every re-adjustment of the I.F. and broadcast band trimmers.

The A.F.C. discriminator should now be adjusted as follows:

1. Place the A.F.C. (Moto-Matic) switch in the center (non A.F.C.) position
2. Loosely couple the output of the signal generator output lead to the insulation on the control grid wire. Set the signal generator to about 465 KC. Then carefully adjust signal generator to resonance with I.F. system by tuning the signal generator dial for maximum output meter deflection.
3. When doing this be sure that the receiver dial is at some point where it has no tuning effect on the generator signal. Switch off the modulation of the signal generator.
4. With the signal generator connected and operating as in #2, connect an antenna to the "A" terminal lug on the back of the chassis and manually tune in a powerful local station in region of 1000 KC. or lower. (Avoid stations around 930 KC. which might beat with second harmonic of the test oscillator.)
5. Adjust the receiver tuning dial to obtain "zero beat" between the test oscillator and the incoming signal. (A very slight adjustment is all that is required. Be careful not to tune off signal.)
6. Turn the A.F.C. (Moto-Matic) switch to the extreme clockwise position (Motor).
7. Adjust the secondary of the discriminator transformer using trimmer E to restore zero beat. NOTE: This trimmer should be adjusted to the point where the frequency of the beat note increases rapidly if the trimmer is turned in either direction. Other zero beat points may be found with the trimmer all the way out or all the way in, but these settings are incorrect!

If the above operation has been performed correctly, turning the A.F.C. switch from center to clockwise position (Regular to Motor) should not change the beat note by more than a slight rumble.

Note: Where a second signal generator is available step #4 above may be varied as follows:

Connect second signal generator (set at about 1000 KC.) to antenna and tune in its signal. Switch off modulation and proceed as before.

This method is somewhat preferable to the first as the zero beat setting is more easily determined when both signals are unmodulated.

HOW TO TEST THE A.F.C. SYSTEM

Connect the antenna and tune in a powerful local station. See that the A.F.C. switch is in the center position. (A.F.C. off)

Next, detune the receiver dial until the music or speech becomes somewhat distorted. Throw the A.F.C. switch into the A.F.C.-on (clockwise) position. This should improve the quality of the program being received.

Similarly detune the receiver in the opposite direction, with A.F.C. switch in center position. Place A.F.C. switch in clockwise position and again check for improved quality of reception.

It will be noted that the correction for mis-tuning afforded by the A.F.C. system is not as marked at stations near the low frequency end of the dial scale as it is at the higher broadcast frequencies. This is characteristic of A.F.C. systems. However, if throwing the A.F.C. switch into the extreme clockwise position has no effect on the signal, or is effective for mistuning in one direction only, check the receiver as follows:

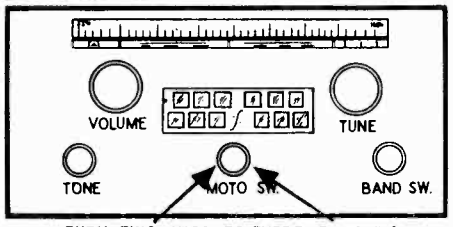
1. Re-align I.F., broadcast band, and discriminator trimmers.
2. Check all tubes in the receiver. Defective 6H6 and 6J7 tubes, also the R.F., 1st Detector and I.F. tubes may cause poor A.F.C. action.
3. If the above procedure fails to remedy the defect in A.F.C. action, check the entire A.F.C. circuit itself for possible troubles.

THE MOTO-MATIC TUNER

HOW TO SET UP STATIONS ON THE TUNER:-

1. Before setting up the "automatic tuner" it is necessary that the receiver be operated for about 20 minutes in order that all internal parts reach a constant temperature and all operating conditions are fully stabilized.

2. Turn the MOTO-MATIC SWITCH knob (lower center control) to the extreme right hand position. When the knob is in this position the word "MOTOR" will appear illuminated in tne indicator just below the dial scale.



Turn tne tone knob (lower-left-hand control) to the extreme left until pointer is pointing to "Sharp" on the indicator and leave this control set to this position during the entire following procedure of setting up the "Moto-Matic Electric Tuner."

3. Remove the large knob on the station selector shaft which is the control in the upper right hand corner of the receiver panel. (see fig. 6) This knob may be removed by simply pulling it away from the panel. As this knob is removed another small knob on the same shaft, partly hidden behind the panel face, will appear.

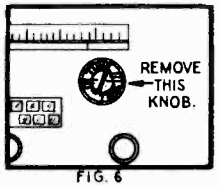


FIG. 6

4. Grasp this knob and pull it out as far as it will go and at the same time "rock" it so that the gears in the mechanism at the rear will mesh properly (see fig. 7).

5. The knob should now be rotated to the right (clockwise) as far as it will go. Keep turning the knob to the right even though it becomes harder to turn as it nears the end of its rotation. The knob will turn rather stiffly and the dial pointer will travel over to the left side of the dial scale. After the pointer reaches the end of the scale continue to turn the knob clockwise about 3/4 of a turn until it reaches a definite stop. This last twist releases the mechanism controling the tuner. THE KNOB MUST BE TURNED AS FAR AS IT WILL POSSIBLY GO OTHERWISE THE MECHANISM WILL NOT BE RELEASED AND IT WILL BE IMPOSSIBLE TO SET THE TUNER TO STATIONS.

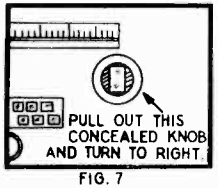


FIG. 7

6. Push any button which you wish to set to a particular station. Be sure the button is pushed all the way in (see fig. 8).

7. Set "Moto-Matic" switch to "Manual", grasp the small station selector knob again and tune the receiver to the desired station. Tune carefully, making use of the tuning eye to be sure that you are correctly tuned to the station in question.

8. The depressed button is set to the station as soon as it is released in either of the two following ways depending on whether you wish to set up more buttons or whether only the one button is to be set up.

A. IF NO MORE BUTTONS ARE TO BE SET UP. Proceed as described under No. 11, 12 and 13.

B. IF ADDITIONAL BUTTONS ARE TO BE SET UP. Turn the "Moto-Matic" switch to "Motor". Release the first button by pushing in the next button you wish to set up and proceed as follows:

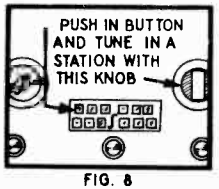


FIG. 8

9. Set "Moto-Matic" switch to "Manual", tune in the station that you wish to receive with the button that is now depressed, again making use of the tuning eye to be sure that you are correctly tuned to the station.

10. Continue to set up as many other buttons as desired in the same manner, that is, push in the button, set the "Moto-Matic" switch to "Manual", tune in the station, set the "Moto-Matic" switch to "Motor", then push the next button.

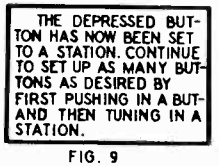


FIG. 9

11. In order to release the last button which now remains depressed, grasp the knob on the station selector shaft and push it back into the cabinet as far as it will go and then pull it out again. Do not forget to "rock" the control when pulling it out in order that its gears may mesh properly (see fig. 10).

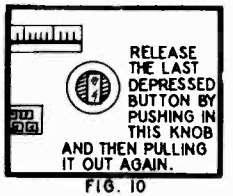


FIG. 10

12. Turn the knob to the LEFT until you reach a definite stop. A firm pressure must be applied otherwise you will not lock all of the internal controls (see fig. 11) The knob will turn rather stiffly and the dial pointer will travel over to the right side of the scale. Continue to turn the knob to the left even after the pointer reaches the end of the dial scale. APPLY A FIRM PRESSURE UNTIL THE KNOB REACHES A DEFINITE STOP.

13. Push the small station selector knob back into the cabinet again and put on the large knob that was originally pulled off of this shaft at the start of operations (see fig. 11).

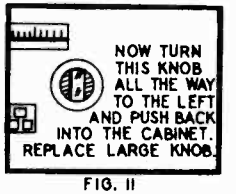


FIG. 11

14. Your "automatic tuner" is now ready for operation. Labels bearing the names of all stations are supplied for use in labeling the push buttons. To label the push buttons you must first remove the cap of the push button. The cap is pulled off by pulling on the top end which has a small hump that holds the cap. Remove the white cardboard tab and insert the label for the station to which the button was set. In replacing the cap start at the bottom and press on the top.

15. YOU DO NOT NEED TO ADJUST THE AUTOMATIC TUNER AGAIN UNLESS YOU DESIRE TO SET ANY ONE OR MORE OF THE BUTTONS TO DIFFERENT STATIONS.

In order to reset one or more buttons of the "automatic tuner" to different stations, it is only necessary to repeat operations No. 3, 4 and 5; then push in the button that you wish to reset and tune in the new station. Repeat this operation with any other buttons to be changed and then "lock up" the mechanism as explained in operations No. 11, 12 and 13. THE REMAINING BUTTONS WHICH YOU HAVE NOT DISTURBED WILL REMAIN "SET-UP" TO THEIR ORIGINAL STATIONS.

16. It is not advisable to set up the "automatic tuner" for operation on short wave or police band. However, the "tuner" may be set up for stations on the police band but extremely accurate tuning such as is obtainable on the broadcast band cannot be expected. In this case the automatic tuner will only serve to give the approximate location of the station.

HOW THE TUNER OPERATES:-

The "Moto-Matic Tuner" is a mechanical device which has for its prime purpose the accurate noiseless and speedy tuning of a station, by the push of a button. This function is performed in the following manner.

As the push button on the keyboard is depressed, a pawl arm at the rear of the tuner comes forward and rests against a circular cam. It will be noted that these cams have two different heights (that is, a high and a low side). The purpose of the two different levels will be self-evident as this explanation progresses.

Projecting from the rear of the unit is a set of switches which are motivated by a Bakelite switch operating cam and arm. This arm is in turn operated by the movement of the pawls. Therefore, it is readily seen that the position of the pawl arm will control the setting of the electrical contacts of the switches in question.

Since the contacts of this switch are frequently referred to, it is advisable that we designate each set of contacts by name as follows: Reading from the front of the switch to the rear:-

1. REVERSING CONTACTS:- For reversing the direction of motor rotation.
2. STARTING CONTACTS:- For opening and closing the motor power supply line.
3. MUTE CONTACTS:For silencing the audio system to prevent noise coming through to the speaker during automatic tuning.
4. A.F.C. CONTACTS:- The A. F. C. contacts are closed in order to remove A.F.C. until the station is tuned in, thus eliminating the possibility of "grasping" the wrong station before the tuner comes to rest. (A.F.C. is again restored when the mechanism comes to rest).

Also located directly above the tuning shaft will be found an auxiliary pair of contacts known as the power contacts. These contacts are the last ones to close when the tuner goes into operation thus allowing all switches to reach their proper settings before any power is actually turned on.

Before any button is depressed or with the tuner in the manual tuning position all contact switches are in the position shown in Figure 13.

Now as the button is depressed the corresponding pawl arm will come forward to rest upon either the high or low side of a cam depending upon the cams position. If the pawl arm comes to rest on the high side of a cam, the bakelite arm will come up only a short distance and the reversing contacts will make in the forward position. If it comes to rest on the low side of a cam, the bakelite arm will come up further and the reversing contacts will make in the rear position. These positions are indicated in figures 14 and 15. Thus it can be seen that the position of the pawl arm, whether on high or low side of cam, will determine the direction of rotation of the motor.

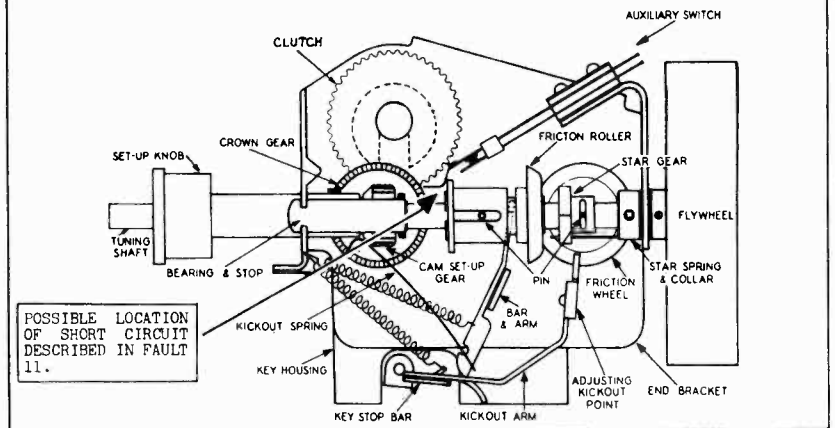
Regardless of whether the pawl is on the high or low side of the cam, the bakelite arm will close the starting contacts, mute contacts, and A.F.C. contacts.

Also after all of the above contacts have been made the power contacts over the tuning shaft will close thus causing the motor to run.

We now have the tuner in operation and the motor proceeds to drive the mechanism to the proper position for the desired station and the following events will occur.

First, the pawl arm will fall into a notch in the circular cam. This in turn causes the Bakelite cam to set the rear contact switches in a new position. The starting contacts then open and the motor stops. Since the pawl is in the notch the mechanism cannot move further. The shock of the sudden stop is taken up by the clutch shown in Figure 12.

FIG. 12 RIGHT SIDE VIEW OF MOTO-MATIC TUNER



The A.F.C. and mute contacts are both open, thus allowing the signal to come through the receiver and also allowing the A. F. C. to function which in turn puts the finishing touches on a perfectly tuned-in program. This position of the switch showing the station tuned-in is shown in Figure 16

Thus we have completed one entire cycle from push button to the completely tuned program, utilizing the Moto-Matic tuner.

We wish to call your attention to the control mechanism on the right side of the tuner, (see Figure 12) which disengages the manual tuning mechanism when automatic tuning is used. The most important features here are the "kickout arm" and the friction roller.

The friction roller must disengage from the friction wheel when the tuner motor is in operation. This is accomplished by a projection on the push button itself which, when pushed in, pushes the "bar and arm" assembly backward. Since the bar and arm assembly rotates on a pivot, it will cause the upper end of the bar to disengage the friction roller from the rubber friction wheel. The lower end will go backward allowing the kickout arm to come up until the adjustable tip touches a valley in the star-wheel. It may now be seen that the motor does not now have to drive the tuning shaft which eliminates the turning of the tuning knob while the motor is running.

Now when you again grasp the tuning knob to tune manually the star wheel, which is touching the adjustable tip of the kickout arm, will rotate and push the kickout arm down. The kickout arm true to its name "kicks out" the push button and releases the pawl which was engaged with a cam. The mechanism is thus again entirely free to turn and the friction roller and rubber friction wheel are again engaged. Thus by turning the tuning knob you can also tune your station manually, provided the A.F.C. knob is placed in the manual position.

GENERAL SWITCH CONTACT ADJUSTMENT

The moto-matic tuner has two sets of switches, "back switch" and "side switch", which are the heart of the automatic control system. The successful operation of the tuner depends to a considerable degree upon the proper operation of these switches.

The following discussion explains in detail the necessary operations for adjustment of the various switch contacts and should be used in conjunction with figures 13, 14, 15 and 16 appearing on the next page. (Please note that two sets of diagrams are given since a change was made in the design of the bakelite switch operating cam and the back switch. To distinguish which set to use on the receiver that you are repairing, it will only be necessary for you to read the notes at the head of the two pages showing these drawings).

(1) - BEFORE MAKING ANY ADJUSTMENTS TURN OFF THE POWER.

(2) - IN ORDER TO PLACE THE MECHANISM IN ANY OF THE POSITIONS SHOWN IN FIGS. 13,14,15, OR 16, IT IS ONLY NECESSARY TO PULL THE SET-UP KNOB OUT, UNLOCK THE CAMS, AND TURN THE SET-UP KNOB TO THE DESIRED POSITION.

ADJUSTMENT OF BACK SWITCH

It is highly important that all contacts of this switch be set in exactly the right position. The contacts should make and break as shown in figures 13, 14, 15 and 16 for any button. Minor adjustments of the switch to secure these settings may be obtained by bending the various blades.

If more than minor adjustments are necessary the following instructions should be carried out in every detail.

1. The back switch should be so positioned as to require a minimum of bending of the switch blade.

2. The contact pressure of all contacts should be such as to cause about 1/64 inch travel of all contacts after they close. This provides adequate wiping action to keep the contact surface clean and insure positive contact.

3. With the back switch in the positions indicated in either figures 13, 14, 15 or 16 the contacts should be adjusted such that:-

(a) The mute contacts should close before the motor contacts do and open after them to provide quiet tuning. To accomplish this the mute contacts should not open as far as the starting contacts do.

(b) Minimum opening of the motor contacts is desirable. This keeps the power on as long as possible and permits the pawl to fall completely into the notch in the cam. On the other hand the contacts must break clean -- far enough apart to prevent excessive arcing.

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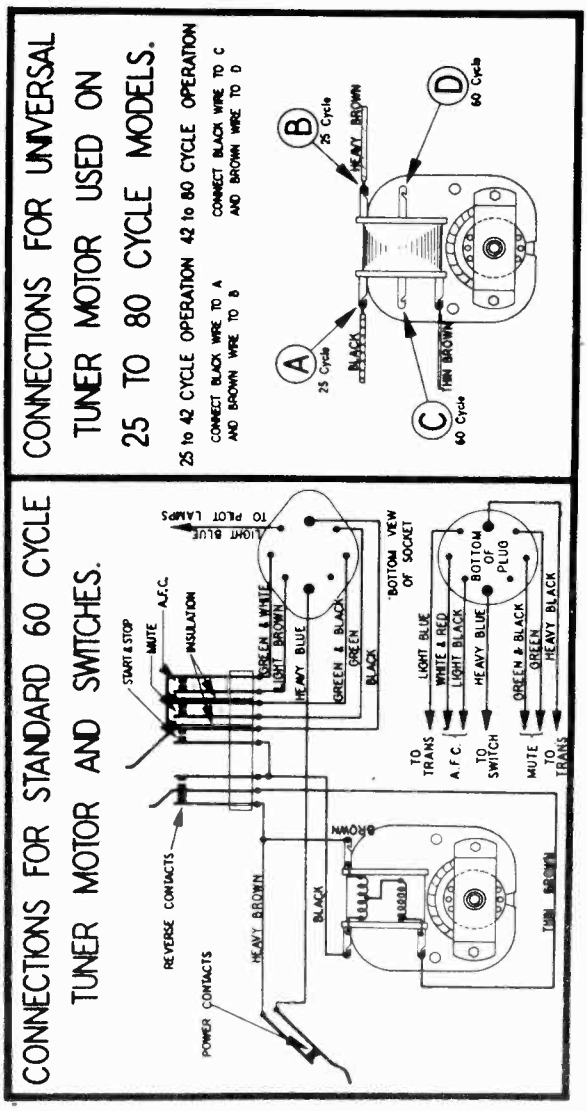
(c) The mute and A.F.C. operating blades should not press against each other or against the switch operating arm, but just barely touch. Otherwise they may cause the bakelite cam to bind or "hang".

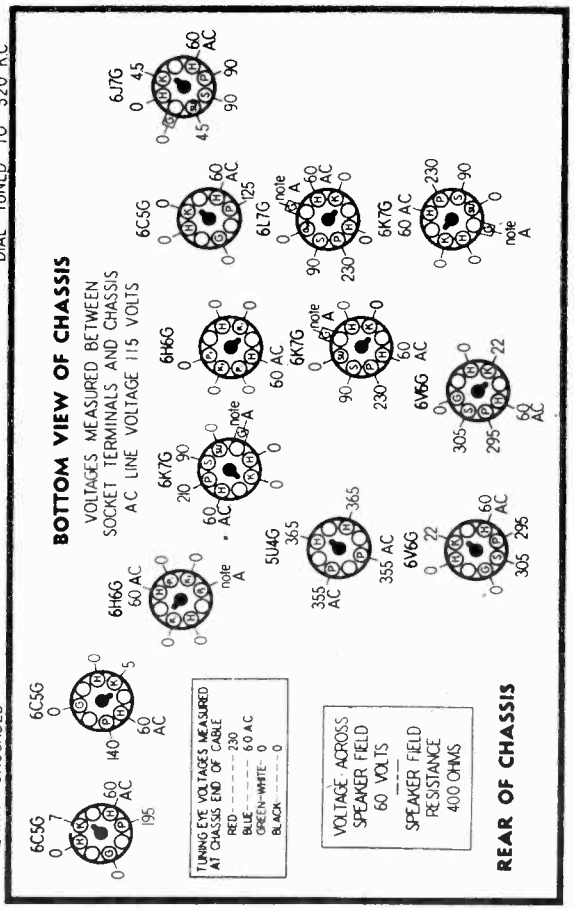
4. If the back switch arms require too much bending for proper adjustment it will be necessary to loosen the two switch bracket mounting screws and reset the entire switch. The switch should then be set with the mechanism in the position shown in figure 16, with the switch operating arm resting just on the top edge of the hump marked check point "X" in figure 16. If the switch is set too high the operating arm will not come up out of the notch on the bakelite cam far enough to cause the contacts to open. If the switch is set too low the operating arm will open the contacts and cut the power off too soon.

Now to further check the proper position of the back switch, push in another button which will cause a pawl to fall on the high side of its station selector cam as shown in figures 14. The tips of the operating arms of the main and reversing contacts should be approximately 1/16 of an inch from the bottom of the valley in the bakelite cam as shown in figure 14 check point "Y". If this distance is less than this amount, an excessive pressure is exerted on the bakelite cam when in the position shown in figures 13 and 16, thus causing it to bind or "hang". If the distance is greater than that shown here, there is insufficient contact movement for good switch adjustment.

Check each button for the settings outlined above, using the set-up knob to turn the cam shaft rather than turning the power on. Due to slight variations in the pawls, it will not be possible to adjust for all buttons so that the switch operating arm rests exactly at the "check points" referred to, but, all buttons must cause the back switch operating arm to come up out of the notch in the bakelite cam when a pawl falls into its notch on the station selector cam.

In order to check the reversing contacts, run the dial pointer to the high frequency end of the dial, and then push each button in, in turn. Check the reversing contacts to see that they take the position shown in figure 15. The two outside blades of this group must not be in contact with the center blade at the same time, otherwise the 6 volt winding of the power transformer may be short circuited. Make such slight adjustments as may be necessary to secure the proper contact settings by bending the switch blades.





Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7-G, 6K7-G, R.F., 6K7-G first I.F., 6K7-G second I.F. and the diode of the 6H8-G 2nd detector tube is -4.5 volts measured across resistor R26.

ADJUSTMENT OF SIDE SWITCH

The purpose of the side switch is to keep the power supply for the motor open until the back switch contacts have all had time to reach their proper positions.

To secure such a sequence of contact closing the bakelite ring on the friction roller assembly should not come forward under the operating arm of the side switch until all of the contacts of the back switch are closed. To make this adjustment bend the switch mtg. bracket in such a manner that the switch operating arm will be carried forward or backward relative to the bakelite ring on the friction roller, as the situation may require. This is done in order that the back switch contacts shall all have had time to make contact.

If this adjustment is not obtained, when a button is pushed in slowly or only part way the motor may start too soon or run the wrong direction.

HOW TO RESTRING THE DIAL CORDS

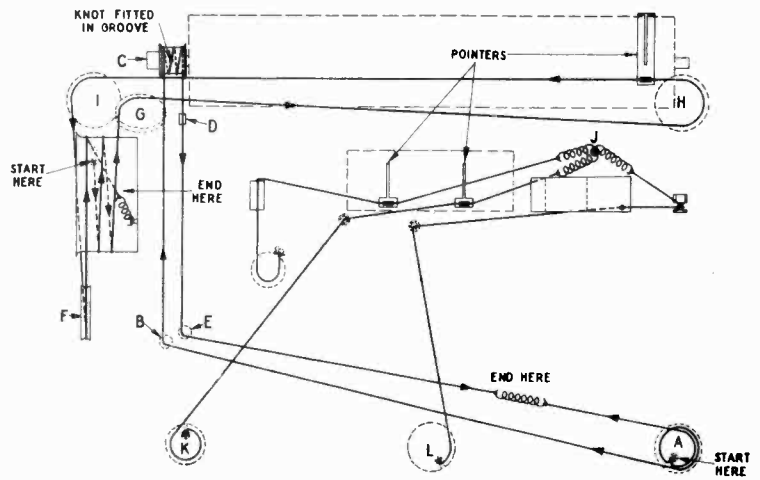
MAIN DIAL POINTER DRIVE CORD

The cord for the main pointer drive system is approximately 65 inches in length. Before attempting to restring this drive cord, the large drum on the left side of the mechanism must be placed in the position shown in the diagram. That is, the two small holes in the drum must be on the back of the drum near the top.

Now put a knot in one end of the cord and thread the cord through the lower of the two holes in the drum, (see point marked "Start Here" in figure 17) leaving the knotted end inside of the hole in the drum. Wind the cord down the back side of the drum in a counter-clockwise direction (when viewed from the left side) until 1-3/4 turns have been made. The cord is now carried up and around pulley G, then across the dial to pulley H. Proceed to carry the cord up around pulley H (see figure 17). After leaving the top of pulley H proceed across to pulley I and then down behind the large drum to pulley F. Carry the cord up around pulley F and back to the front side of the large drum. Wind the cord up over the drum, using the outer (left) edge, until the upper hole in the drum is reached. Thread the cord through the hole and tie the tension spring to its end in such a manner that when the spring is clipped into position the spring will be extended to about 1-1/8 inches.

The main dial pointer should now be clipped on the upper strand of cord that is now stretched between pulleys H and I. The pointer should be clamped in position just opposite the last dial division on the high frequency end of the dial.

(FIG. 17)



RANGE SWITCH AND ROLLER SCALE DRIVE

The cord for restringing the roller scale range indicator drive should be approximately 55 inches long. To restring this drive cord place the range switch in the American (A) position. Tie a knot approximately 6 inches from one end. Then tie a second knot exactly 27-1/2 inches from the first knot.

Now place the first knot in the slot in pulley A allowing the short end of the cord to project to the right. Take the long end of the cord and wind one complete turn around pulley A in a clockwise direction. Then continue across to the bottom of pulley B and up to the front of pulley C. Wind one complete turn around pulley C in a counter-clockwise direction looking at it from the left end of the mechanism. Now rotate the dial drum until the slot in the pulley exactly meets the knot which you previously tied in the cord and which appears at this point in the winding. Place the knot in the slot in pulley C and taking the free end of the cord proceed to wind one more complete turn around pulley C in the same direction (counter-clockwise).

Now take the cord down over pulley D to the bottom of pulley E. Proceed from pulley E to the right and allow the cord to remain loose until you have finished the following steps.

Take small short end of the cord that extends to the right of pulley A and wind it up over the pulley counter-clockwise and tie the tension spring to its end. Then take the cord that is extending from the left side and tie it to the other side of this tension spring so that the spring is extended to about 1-1/8 inches.

You have now completed the cord circuit, but the rotating scale may not be in the correct position. Since the range switch is in the American position the roller dial should present the American scale to the escutcheon face. If it does not loosen the set screw in pulley C and rotate the drum to the desired position. Then retighten the set screw.

MOTOR-REGULAR-PHONO INDICATOR DRIVE CORD

This cord is approximately 22 inches in length. Start to restring by placing the moto-matic switch in the phono (Maximum counter-clockwise) position.

Now tie a knot in one end of the cord. Tie a second knot exactly 15 inches from the first. Then place the first knot in the slot in the pulley on the moto-matic switch shaft. Wind the cord up around the pulley (1/2 turn counter-clockwise) and up to the eyelet hole in the frame (just under the volume indicator). Then carry the cord to the right and thread it through the hole in the movable section of the Motor-Reg.-Phono indicator. The knot in cord should just reach the back of this movable celluloid slider.

Now taking the cord, which extends from the front of the hole in the slider, tie the tension spring to its end so that the spring will be extended to about 1-1/8" when clipped in position on holder J. (see figure 17.)

OFF-ON AND VOLUME INDICATOR DRIVE

The length of this cord should be approximately 18 inches. Put the volume control and off-on switch in the "off position" (maximum counter-clockwise). Tie one end of the cord around the set screw on the collar appearing on this shaft. Then wind the cord clockwise around the shaft and over the pin about 3/4 of a turn. (Do not wind the cord around the pin itself). Then take the cord up through the last remaining hole in the frame and over to the volume indicator. Clamp the pointer, for this indicator, on the cord so that it points to the word "off" on the indicator. Tie the remaining end of the cord to the tension spring so that when the spring is clipped to hole J (see figure 17) it will be extended to a length of 1-1/8 inches.

TONE AND SELECTIVITY DRIVE CORD

The length of this cord should be approximately 20 inches. Start by placing the tone switch in the bass position (maximum counter-clockwise). Place a knot in one end of the cord and put the knot in the slot in the pulley on the tone switch shaft.

Then wind one complete turn around the pulley on the tone shaft in a clockwise direction. Carry the cord up to the hole in the frame (next to the tuning eye). Take the cord to the right until it is under the tone selectivity indicator. Then holding the cord taut clip the pointer, for this indicator, tightly to the cord so that it points to the word bass on the indicator. The remaining cord should be tied to the tension spring which is then clipped to the hole marked J (see figure 17).

MODELS 4688,4788,4799
Chassis 100.159
Switch Data

SEARS ROEBUCK & CO.

THESE ILLUSTRATIONS APPLY ONLY TO RECEIVERS, USING THE NEW BACK SWITCH AND CAM, HAVING SERIAL NUMBERS AS FOLLOWS: MODEL 4688 - ABOVE 934,302 MODEL 4788 - ABOVE 939,000 MODEL 4799 - ALL CHASSIS. For receivers having lower serial numbers see drawings on previous page.

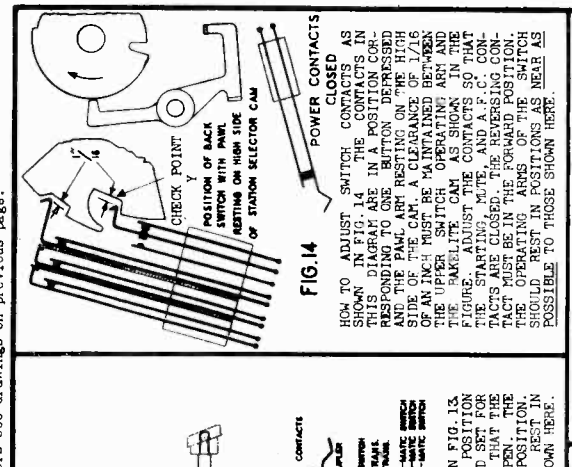


FIG. 13

HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 13. THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO THE MECHANISM AT REST AND SET FOR MANUAL TUNING. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE, AND A.F.C. CONTACTS ARE OPEN. THE REVERSING CONTACT MUST BE IN THE FORWARD POSITION. THE OPERATING ARMS OF THE SWITCH SHOULD REST IN POSITIONS AS NEAR AS POSSIBLE TO THOSE SHOWN HERE.

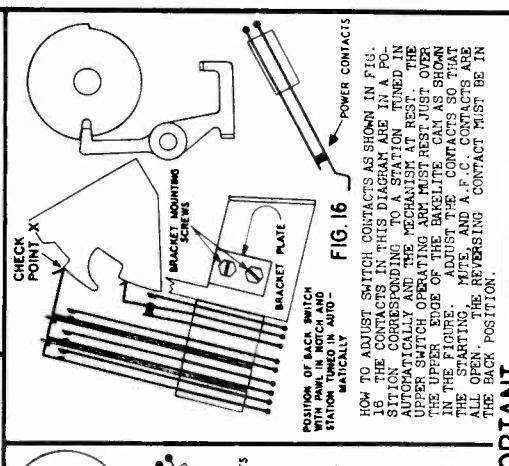


FIG. 14

HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 14. THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO ONE BUTTON DEPRESSED AND THE PAWL ARM RESTING ON THE LOW SIDE OF THE CAM. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE, AND A.F.C. CONTACTS ARE CLOSED. THE REVERSING CONTACT MUST BE IN THE FORWARD POSITION. THE OPERATING ARMS OF THE SWITCH SHOULD REST IN POSITIONS AS NEAR AS POSSIBLE TO THOSE SHOWN HERE.

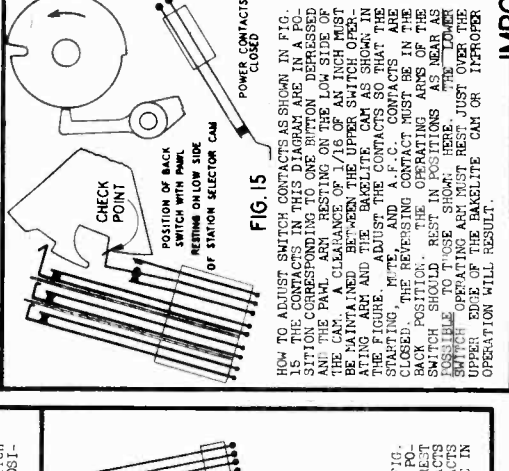


FIG. 15

HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 15 THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO ONE BUTTON DEPRESSED AND THE PAWL ARM RESTING ON THE LOW SIDE OF THE CAM. A CLEARANCE OF 1/16 OF AN INCH MUST BE MAINTAINED BETWEEN THE UPPER SWITCH OPERATING ARM AND THE BAKELITE CAM AS SHOWN IN THE FIGURE. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE, AND A.F.C. CONTACTS ARE CLOSED. THE REVERSING CONTACT MUST BE IN THE BACK POSITION. THE OPERATING ARMS OF THE SWITCH SHOULD REST IN POSITIONS AS NEAR AS POSSIBLE TO THOSE SHOWN HERE.

FIG. 16

HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 16. THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO THE MECHANISM AT REST AND STATION TUNED IN AUTOMATICALLY AND THE MECHANISM AT REST. THE UPPER SWITCH OPERATING ARM MUST REST OVER THE UPPER EDGE OF THE BAKELITE CAM AS SHOWN IN THE FIGURE. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE, AND A.F.C. CONTACTS ARE ALL OPEN. THE REVERSING CONTACT MUST BE IN THE BACK POSITION.

IMPORTANT

IN ADJUSTING ALL SWITCH CONTACTS A DEFINITE CONTACT PRESSURE MUST BE MAINTAINED. YOU CAN DETERMINE THIS CONTACT PRESSURE AS FOLLOWS: AFTER THE CONTACT POINTS TOUCH INITIALLY THERE MUST BE A FURTHER MOVEMENT OF THE CONTACT ARMS OF AT LEAST 1/64 OF AN INCH. THIS TYPE OF "WIPING CONTACT" IS IMPERATIVE FOR GOOD OPERATION OF YOUR "MOTO-MATIC TUNER".

(For receivers having higher serial numbers see drawing on next page.)

MODEL 4688 - BELOW 934,302
MODEL 4788 - BELOW 939,000
MODEL 4799 - ALL CHASSIS

THE ILLUSTRATIONS SHOWN ON THIS PAGE APPLY ONLY TO EARLY PRODUCTION RECEIVERS HAVING SERIAL NUMBERS AS FOLLOWS:

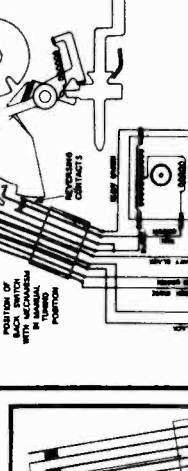


FIG. 13

HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 13 THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO THE MECHANISM AT REST AND SET FOR MANUAL TUNING. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE, AND A.F.C. CONTACTS ARE OPEN. THE REVERSING SWITCH CONTACT MUST BE IN THE FORWARD POSITION. THE TOP OPERATING ARM OF THE SWITCH SHOULD HAVE 1/16" CLEARANCE FROM THE OPERATING CAM.

FIG. 14

HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 14 THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO ONE BUTTON DEPRESSED AND THE PAWL ARM RESTING ON THE HIGH SIDE OF THE CAM. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE AND A.F.C. CONTACTS ARE ALL CLOSED AND MAKE GOOD CONTACT. THE REVERSING SWITCH CONTACT MUST BE IN THE FORWARD POSITION.

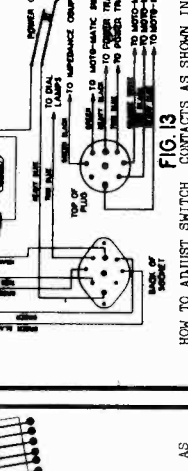


FIG. 15

HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 15 THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO ONE BUTTON DEPRESSED AND THE PAWL ARM RESTING ON THE LOW SIDE OF THE CAM. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE, AND A.F.C. CONTACTS ARE OPEN. THE REVERSING CONTACT MUST BE IN THE BACK POSITION.

FIG. 16

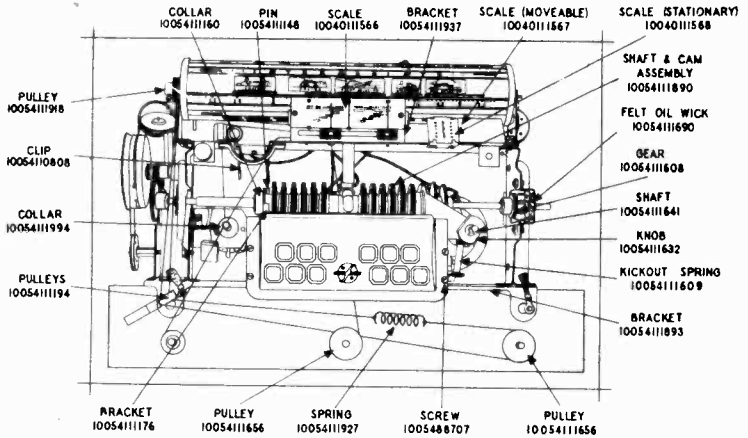
HOW TO ADJUST SWITCH CONTACTS AS SHOWN IN FIG. 16. THE CONTACTS IN THIS DIAGRAM ARE IN A POSITION CORRESPONDING TO THE MECHANISM AT REST AND THE STATION TUNED IN. ADJUST THE CONTACTS SO THAT THE STARTING, MUTE AND A.F.C. CONTACTS ARE OPEN. THE REVERSING CONTACT MUST BE IN THE BACK POSITION.

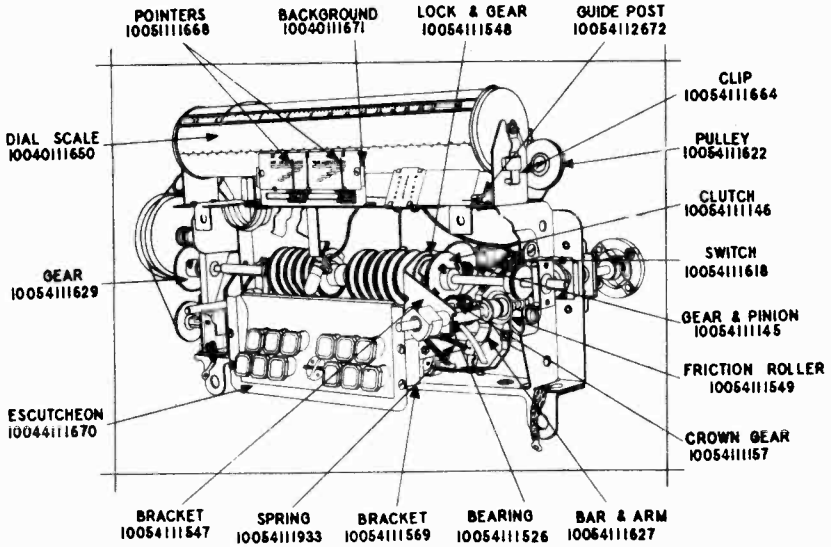
IMPORTANT

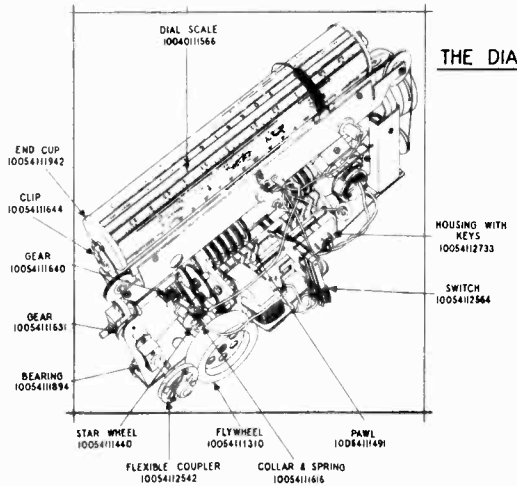
IN ADJUSTING ALL SWITCH CONTACTS A DEFINITE CONTACT PRESSURE MUST BE MAINTAINED. YOU CAN DETERMINE THIS CONTACT PRESSURE AS FOLLOWS: AFTER THE CONTACT POINTS TOUCH INITIALLY THERE MUST BE A FURTHER MOVEMENT OF THE CONTACT ARMS OF AT LEAST 1/64 OF AN INCH. THIS TYPE OF "WIPING CONTACT" IS IMPERATIVE FOR GOOD OPERATION OF YOUR "MOTO-MATIC TUNER".

SEARS ROEBUCK & CO.

MODELS 4688,4788,4799
Chassis 100.159
Dial Mechanism

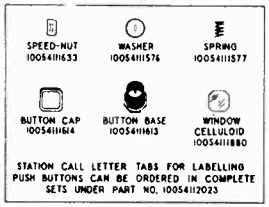




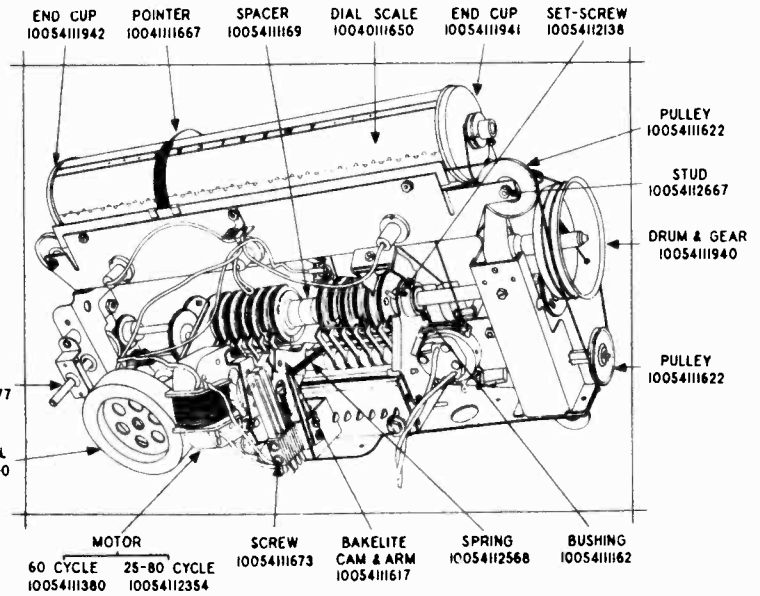


THE DIAL OR TUNER MECHANISM

PUSH BUTTON PARTS



STATION CALL LETTER TABS FOR LABELLING PUSH BUTTONS CAN BE ORDERED IN COMPLETE SETS UNDER PART NO. 100541112023



OPERATING FEATURES

Fidelity Rge. (±10DB)	30-7000 cycle
Tone control	4 position
Resonance indicator	Tuning eye
Volume stabilizer	A.V.C. system
Tuning corrector	A.F.C. system
"Motor-Matic" tuner	Push button control

CHASSIS FEATURES

R. F. stages	one
Number of I.F. stages	two
Number of Cond. in gang	three
Antenna	Conv. or Doublet
Wave trap	465 KC
Combined selectivity & tone control	

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS

1. Upper Left Knob.....Power Sw. & Volume
2. Lower Left Knob.. Tone & Selectivity Control
3. Center Knob.....Mot.-Reg.-Phono
4. Upper Right Knob.....Stat. Selector
5. Lower Right Knob.....Band Switch

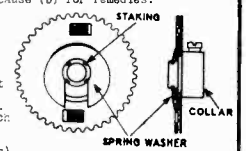
CONTROL OPERATION

Turning right;.....	Power on Vol. Inc.
Turning right.....	Bass to Brilliant
Turning right.....	Phono.-Reg.-Motor
Spinner Tuning.....	
Turning Right to Left.....	F-P-A

FAULTS—CAUSES—REMEDIES:—

POINTER DOES NOT MOVE WHEN BUTTON IS PUSHED IN

FAULT	PROBABLE CAUSE	REMEDY
(1) Motor hums but does not run	(a) Reversing contacts on back switch not closing.	(a) To correct this fault you must make a thorough check of all switch adjustments as explained under "General Switch Adjustment" and check carefully to see that the reversing contacts are set correctly when the mechanism is in the positions shown in figures 14 and 15.
	(b) Motor stalled due to mechanical overload and clutch not slipping.	(b) Such an overload may be caused by any one or a combination of the following: (1) binding of the dial pointer against the dial, dial frame, or cabinet. Also rough, rusty or bent pointer slide rail. (2) pointer drive cable too tight. (3) jammed or stuck guide pulleys (4) crossed dial cord on dial drum. (5) drive drum gear out of mesh. (6) misalignment or tight cam shaft bearings. (7) cam shaft sprung or bent. (8) collar on left end of cam assembly binding against left end bracket. (9) excessive friction between pawl and station selector cam due to rough or burred surfaces. (10) set-up crown gear assembly binding. (11) gang condenser drive gears out of mesh and binding. (12) tight, jammed or sticking gang condenser. The remedy for any of these faults is fairly obvious and no mention will be made here other then stating that a complete write up on how to restring any part of the dial cord drive is included in following pages of this service manual.
	(c) Defective motor.	(c) Replacement of motor necessary.
	(d) Low line voltage or improper frequency.	(d) Proper line voltage is imperative for operation of the tuner. A special universal motor may be obtained where the frequency of the power supply is other than 60 cycles; see the parts list at rear of manual.
(2) Motor runs but pointer does not move.	(a) Clutch slipping.	(a) This may be due to a mechanical overload or a defective clutch. First examine the clutch (see figure 12) to see that the horse shoe shaped spring has not been weakened or broken also see that no oil or grease is present (if grease is present wash surface clean with carbon tetrachloride). If the fault is due to a mechanical overload you should refer to fault (1) cause (b) for remedies. If the remedies given fail, replace the horseshoe shaped clutch spring. (Part No. 100541111138). Clutch Springs now supplied are somewhat heavier than those used on earlier sets. Later type clutch assemblies have the spring staked to the hub (see illustration). If desired such a staked type of Clutch (Part No. 100541111146) can be installed as follows. 1. Remove the L shaped horizontal brace on the back of the Dial Frame. This is the part supported by the brackets screwed to the sides of the chassis. 2. Take the Side Switch Mounting Screws out and swing the switch out of the way. 3. Drive out the pin through the Friction Roller Assembly. Pull out the pin in the Star Wheel. Loosen the set screws in the Star Spring Collar and Flywheel. The Tuning Shaft can now be pulled out. (NOTE that there is a groove around the tuning shaft. The set screw of the Star Spring Collar fits into this groove, thus fixing the lateral position of the shaft with respect to the End Bracket.) 4. Take the Set-up Knob off. Remove the Tuning Shaft Bearing and pull the Sleeve and Set-up Gear out of the End Bracket. 5. Take the Retaining Ring off the Set-up Crown Gear Stud and remove the Crown Gear Assembly. 6. Remove the Right End Bearing and Bracket 7. Take the Knurled Crown Gear off the Extension Shaft 8. Loosen the Clutch Set Screw, disassemble the Clutch and slide the Collar and Gear Sections off the Cam Shaft to the right.
	(b) Pointer drive gear slipping on shaft or out of mesh.	(b) Tighten set screw in gear or remesh gears.
	(c) Pointer loose on cord.	(c) Tighten clips on pointer slider.



FAULT	PROBABLE CAUSE	REMEDY
	(d) Pointer sticking on guide rail due to rust.	(d) Clean guide rail carefully with piece of emery cloth and oil.
(3) Motor does not hum and tuner does not move with button in.	(a) Power contacts on side switch not closing.	(a) Adjust power contact as explained under "General Switch Adjustment", and adjust carefully to see that power contacts are set correctly with the mechanism positions shown in figures 13 and 16.
	(b) Starting contacts on back switch not closing.	(b) Adjust starting contacts on back switch as described in, "General Switch Adjustment", and check carefully to see that starting contacts are set correctly for the mechanism position shown in figures 14 and 15.
	(c) Loose silver contact on switch contact blade.	(c) Replace entire switch.
	(d) Bakelite back switch operating cam binding on contact arms, or out of position.	(d) If the bakelite cam binds against the switch operating arms it will indicate that the cam is either rough or the tension in the spring at its side is insufficient. Cut off several turns of this spring to increase tension and then replace the spring.
(4) Pointer stops at wrong point.	Improper setting up of mechanism. Mechanism not locked up properly.	Set up mechanism again, being careful to tune to stations, using tuning eye to determine exact set-up position. In locking the mechanism be sure to force the set-up knob all the way to the left counter-clockwise until you are positive the knob will not turn further.
(5) Pointer stops at proper point but (a) No signal is heard.	(a) Mute contacts on back switch not opening: (No noise will be heard in this case)	(a) See paragraph on "General Switch Adjustment", and check carefully to see that the mute contacts are set correctly with the mechanism in the positions shown in figures 14 and 15.
	(b) Tuning backlash.	(b) For remedies see fault 12 which covers in detail all possible causes.
	(c) Gang condenser drive gears out of mesh or slipping on shaft.	(c) Re-mesh gears and tighten set screw.
	(d) Flexible coupling slipping on shaft.	(d) Tighten set screw for flexible coupler.
	(e) Station not broadcasting or too weak as in daytime or during period of fading.	(e) Be sure aerial is adequate. Do not attempt to tune this station until reception is suitable.
(b) Signal is not heard clearly.	(a) A.F.C. contact on back switch not opening.	(a) Check A.F.C. contacts with the mechanism in the position shown in figure 16. See that A.F.C. contacts are open in this position.
	(b) A.F.C. not functioning.	(b) Change discriminator or control tube, re-align A.F.C. system, lastly, make check of entire system.
	(c) Weak signal or no aerial.	(c) Do not attempt to set buttons to weak signal stations. Install adequate antenna.
(c) Wrong station comes in.	(a) Desired signal off, weak or faded.	(a) Set up button to another station if desired or wait for next broadcast period of station before attempting to use this button. If the signal is very weak or fading do not attempt to set up button for that station.
	(b) Not set-up properly.	(b) Reset up for the particular station in question.
	(c) Set off calibration.	(c) For incorrect calibration see fault 13 which itemizes in detail the causes for this miscalibration.
(d) Motor continues to run.	(a) Pawl doesn't fall far enough into the station selector cam to cut power off.	(a) It is probable that the starting contacts are not opening properly, i.e. before the pawl has fallen as far into the cam notch as it should. Check switch contact adjustments as described under, "General Switch Adjustment". Burrs on the pawl or cam will also aggravate this condition. Anything that makes the bar carrying the bakelite cam operate stiffly should be corrected also.
	(b) Starting contacts on back switch not adjusted properly.	(b) Check starting contacts with mechanism in position shown in figure 16 to see that starting contacts are open with mechanism at rest. Also, read, "General Switch Contact Adjustments".

SEARS ROEBUCK & CO.

MODELS 4688,4788,4799
Chassis 100.159
Tuner Faults and Remedies
Part 2

FAULT	PROBABLE CAUSE	REMEDY
(6) Pointer stops at different place each time for a certain button. (continued on next page)	(a) Mechanism not locked up tight.	(a) Reset button, being sure to lock mechanism tightly by forcing set-up knob counter-clockwise until you are sure that the knob will not turn further.
	(b) Dial pointer slipping on cord.	(b) Tighten clips holding dial cord to pointer slider
	(c) Left end bracket bearing loose.	(c) Re-tighten bearing bracket mounting bolts.
	(d) Pointer drive gears slipping out of mesh or slipping on shaft.	(d) Re-set pointer drive gears so that they mesh properly and tighten their set screws firmly so they will not slip.
	(e) Loose set screws.	(e) Re-tighten all set screws to insure against slipping.
(7) Pointer stops off station occasionally.	(a) Pointer back-lash, (Note, pointer back-lash will cause apparent rather than actual mis-tuning.)	(a) Check to see that back-lash is at a minimum at the pointer drive gear on the left side of the mechanism. Also, see that bearing bracket is tight, not moving, which would also cause apparent back-lash.
	(b) Pawl does not fall far enough into station selector cam.	(b) Starting contacts opening too soon. Check switch contact adjustments. Check for burrs on pawl or cam.
(8) Pointer goes to end of dial and stalls and hums or continues to run by slipping the clutch.	(a) Station selector cam turned around beyond its normal operating range.	(a) First unlock cams and then turn station selector cam around so that notch faces pawls.
	(b) Reversing contacts on back switch not adjusted properly.	(b) Check switch contact adjustment with mechanism in position shown in figure 16 and also read paragraph on, "General Switch Adjustments".
	(c) Bakelite cam binding on contact arm, or out of position.	(c) Check bakelite cam for rough spots. Increase spring tension of side operating spring for bakelite cam by clipping off several turns.
(9) Motor continues to run after the pointer back and forth over a short distance after tuning to the approximate frequency to which the button is set.	(a) Reversing contacts on switch are not adjusted properly - set too close.	(a) Since the reversing contacts are set too close the slightest movement of the operating arm will cause the motor to reverse, therefore the switch contact arms must be spread slightly in order that small movements of the center arm will not cause motor to reverse or "hunt".
(10) Motor starts before button is pushed in far enough to catch. Motor starts in wrong direction then corrects itself when button is pushed the rest of the way in.	(a) Side switch, power contacts are being closed too soon.	(a) Read paragraph on, "General Switch Adjustment", and check to see that power contacts make contact after all of the rear switch contacts have been made or button has been pushed all the way in.
(11) Intermittent operation of motor, lights, etc.	(a) Insufficient contact pressure or dirty contacts on back or side switch.	(a) Check all switch contacts for proper contact pressure. This may be done by noting that the contact is first made and then there is a continued movement of the contact arm in which the first contact wipes the second and both contacts move backward about 1/64 of an inch.
	(b) Loose silver contact on switch blade.	(b) Repair if possible; or, replace entire switch.

FAULT	PROBABLE CAUSE	REMEDY
(12) Tuning back-lash (Note the high tuning ratio greatly exaggerates the effect of most of these conditions)	(a) Clutch slips	(a) This may be due to mechanical overload or a defective clutch. First examine the clutch, (see figure 12) to see that the horse shoe shaped spring has not been weakened or broken also see that no oil or grease (if grease is present wash surfaces clean with carbon tetrachloride). If fault is due to mechanical overload you should refer to fault 1, cause (b) for remedies.
	(b) Play between gang condenser drive gears due to insufficient compression in thrust spring in flexible coupling.	(b) Release set screw on flexible coupler and push auxiliary shaft forward until drive gears mesh properly. Retighten set screw.
	(c) Play between gears due to improper setting of anti-back-lash spring.	(c) Check to see that separate sections of the gears having anti-backlash spring ar spread against the spring tension before they are meshed in order that backlash will not occur.
	(d) Play between gear and stud.	(d) See that the stud is not shaky or loose in its mounting and see that the gear is mounted on its shaft snugly so that "wobble" does not take place.
	(e) Gang condenser sways.	(e) Mount more securely by tightening gang condenser mounting bolts.
	(f) Loose set screw in coupling or gear.	(f) Retighten all set screws. Check to see that gears are not slipping on shaft.
	(g) Loose or worn bearings.	(g) Tighten bearing mounting plates. Replace worn bearings.
	(h) Friction roller rotates slightly relative to tuner shaft.	(h) Replace the pin holding the friction roller on the shaft using a larger pin.
(13) Calibration incorrect.	(a) Dial pointer or gang condenser drive gears jump teeth, slip on cam shaft or are out of mesh.	(a) Check to see that gang condenser drive gears mesh properly. Also, see that set screws of these gears are tightened properly so that slipping cannot occur.
	(b) Dial pointer slips on dial cord.	(b) Tighten dial cord clips on pointer slider so that slider will not slip along cord.
	(c) Left end bearing bracket loose.	(c) Retighten mounting bolts for bearing bracket.
	(d) Excessive pointer back-lash.	(d) Tighten dial cord by shortening slightly and retying to tension spring inside of drum. Also, check drive gear on left side of mechanism to see that backlash is not occurring.

BUTTON DOES NOT STAY IN OR DOES NOT RELEASE

FAULT	PROBABLE CAUSE	REMEDY
(14) Button will not stay in when pushed in. (continued on next page)	(a) Kickout pointer tip improperly adjusted.	(a) Adjust the tip of the kickout bar so that a key will be held in place when pushed in and the adjustable tip just touches a valley in the star wheel.
	(b) Kickout spring bent out too far.	(b) Adjust kickout spring to position shown in figure 12 with mechanism in manual tuning position.
	(c) Insufficient tension in key stop bar return spring.	(c) Clip off several turns of this spring to increase its tension and replace. See figure 12.

FAULT	PROBABLE CAUSE	REMEDY
	(d) Jammed or stuck key stop bar.	(d) Check to see that the adjustable tip of the key stop bar is not stuck on the side of the star wheel, thus causing it to bind or stick.
	(e) Star wheel stuck or not moving freely on tuning shaft.	(e) The wire spring engaging the star wheel may be broken or severely bent; Replace. Burrs between star wheel and tuning shaft may also cause binding.
	(f) Bent or sprung key stop bar.	(f) In this instance replace the key stop bar.
(15) Depressed button does not release when another button is pushed in.	(a) Kickout tip jams against star wheel.	(a) Check to see that end of kickout tip is not catching on tip of star wheel.
	(b) Stuck or jammed pawl.	(b) A pawl may be jammed so tightly into its slot in a cam that it will not release of its own accord. Release the pawl by pulling it out of the slot and check to see that it will not stick when operated again. If it sticks again use sand paper or an oil stone to remove burrs which have evidently caused sticking.
	(c) Stuck or jammed key.	(c) The key may be bent thus causing jamming.Straighten and align key.
(16) Depressed button will not release when tuning knob is turned.	Kickout tip not engaging star wheel.	Adjust the kickout tip so that it will touch the bottom of the valley of the star wheel when a button is pushed in.

DIFFICULTIES OCCURRING DURING SET UP BUT NOT IN NORMAL OPERATION

FAULT	PROBABLE CAUSE	REMEDY
(17) Button does not release when set up knob is worked in or out.	Kickout spring set too far from kickout arm.	Check to see that kickout spring is in position shown in figure 12 when set is on manual tuning.
(18) Mechanism locks up during setting up of a station.	Defective locking mechanism.	Put some oil between the cams and friction washers. If you are sure that you have forced the set-up knob to a maximum clockwise position, and the mechanism still locks up, it will be necessary to replace parts of the locking mechanism.

MANUAL TUNING DIFFICULTIES

FAULT	PROBABLE CAUSE	REMEDY
(19) Set tunes very broadly.	"Moto" switch in "Motor" position.	"Moto" switch should be turned to "Manual" to cut out AFC action.
(20) Tuning knob sticks and catches in going from "automatic" to "manual" tuning.	(a) Burrs on the tip of kickout arm, or star wheel.	(a) Use piece of emery cloth to carefully clean tip of kickout arm and any burrs which might remain on the teeth of the star wheel.
	(b) Adjustable tip of kickout arm set improperly.	(b) Adjust the tip on the kickout arm so that it will just contact a valley in the star wheel when a button is depressed and when all buttons are released be sure the tip of the star wheel does not contact the adjustable tip on the kickout arm.
(21) Pointer does not move when tuning knob is turned although works OK in automatic position.	(a) Oil or grease on rubber drive ring, on friction wheel.	(a) Clean the rubber drive ring with carbon tetrachloride until it is free from all oil or grease.
	(b) Jammed bar and arm assembly.	(b) If possible straighten the bar and arm,or; if severely bent replacement will be necessary.
	(c) Insufficient tension in bar and arm assembly return spring.	(c) Clip off several turns of the return tension spring of the bar and arm assembly to increase the tension.
	(d) Bent tuning shaft.	(d) Carefully examine tuning shaft to see if it is bent. If found to be bent it will be necessary to replace the tuning shaft.

(continued on next page)

MISCELLANEOUS TUNER TROUBLES

FAULT	PROBABLE CAUSE	REMEDY
(22) Dial and automatic lights go out and set is silenced momentarily when a button is pushed in or released.	(a) Both reversing contacts on back switch close at once and short six volt winding of the power transformer.	(a) Examine reversing contacts to see that arms are not spaced too closely and also to see that when reversing contact breaks in one direction it makes a clean break before making contact in the other direction. If the center arm of the reversing switch is still in contact with the front arm when the rear contact is made a momentary short circuit will result.
	(b) Operating arm of the side switch grounding against friction roller assemly at point indicated by arrow and note in figure 12. This will cause momentary short circuit each time a button is pushed.	(b) Bend the tip of the switch operating arm upward slightly so that it will not contact the metal on the friction roller assembly which is probably causing the short circuit.
(23) Gears noisy during automatic tuning.	(a) Motor pinion and first reduction gear not meshing properly.	(a) Check to see that gears are meshed properly.
	(b) Too much compression in the anti-backlash springs in gears.	(b) Unmesh the gear, and rotate one of the gear sections with respect to the other so that the compression in the anti-backlash spring between the gears is reduced slightly. Then remesh the gears.
	(c) Burrs, bent teeth, and other irregularities on gears, especially those that operate at higher speeds.	(c) Inspect gears for such irregularities and if necessary, replace.
(24) Black ground lead near 6H6 tube under chassis heats up and smokes.	(a) Operating arm of side switch grounded against friction roller at point indicated by note in figure 12.	(a) Repair the fault which is causing the ground at the point indicated.
	(b) Tuning shaft bearing stop out of place and grounding power blade of side switch.	(b) Check to see that bearing stop is not out of its clip and sliding back on the tuning shaft thus causing a short. If this is true pull the bearing stop forward and clip it into its socket in the mounting bracket.
	(c) Any short from the 6 volt power line on the tuner mechanism to ground.	(c) Locate short.
(25) Slight hum is heard when matomatic switch is in the "Motor" position.	Unbalance in A.F.C. control circuits due to 6H6-G discriminator tube.	Replace 6HG-G discriminator tube which is causing difficulty.
(26) Signals are heard when tuning from one station to another automatically.	Mute contacts on back switch not closing making poor contact.	Check mute contacts with mechanism in positions shown in figure 14 and 15.
(27) Set noisy electrically in starting and stopping during automatic tuning.	Set used with insufficient antenna or mute contacts on back of switch closing too late and opening too soon.	Read paragraph on "General Switch Adjustments" and install adequate antenna.
(28) Mechanism reaches a definite stop before pointer reaches end of dial.	Cam assembly stop pin and the gang condenser stop are not set so they will reach their respective stop at approximately the same time.	Release the set screw on the flexible coupler, close the gang condenser then proceed to turn tuning knob clockwise until cam assembly stop in on left side of the mechanism is touching its front stop, then retighten set screw being sure that the gears at the end of the auxiliary shaft are properly meshed.

PARTS LIST-SOURCE NO. 100

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MOTO-MATIC TUNER PARTS

Part Number	Description	Selling Price Each
10054111700	Automatic tuning unit only less dial and drive mechanism	35.00
10054112734	Automatic tuning unit complete with dial and drive mechanism	56.00
10054111627	Bar and arm assembly	.60
10054111526	Bearing - on tuning shaft	.50
10054111176	Bracket - left side of cam shaft	.20
10054111547	Bracket - with studs (right side)	.90
10054111569	Bracket - push button escutcheon mtg.	.15
10054111162	Bushing - left end of cam shaft	.18
10054111576	Button washer - in push button	.005
10054111577	Button spring - in push button	.005
10054111613	Button - push button base	.10
10054111614	Button cap - for push button	.08
10064111880	Button window - celluloid per dz.	.07
10054111633	Button speed - nut - inside push button	.02
10054112023	Call letter tabs - for labelling push buttons	.60
10054111168	Cams - station selector	.50
10054111617	Cam - bakelite for master switch operation (with arm)	.62
10054112563	Cam - bakelite, less operating arm, used on Model 4788-with serial Nos. above 939,000 Model 4688-with serial Nos. above 934,302 Model 4799-all chassis.	.10
10054111146	Clutch - bushing, spring and gear	.55
10054111160	Collar - retaining, (less set screw) left side of cam shaft	.15
10054111161	Collar - retainer for pawls	.10
10054111616	Collar & spring - for star wheel	.36
10054111882	Collar - for spring locking cam	.08
10054111137	Drive ring - rubber	.05
10044111565	Escutcheon - around push buttons(on cabinet)	1.76
10044111670	Escutcheon - push buttons (metal)	1.20
10054111310	Flywheel - with set screws	1.25
10054111549	Friction roller - on rear end of tuning shaft	.30
10054111402	Friction wheel - with rubber ring	.66
10054111145	Gear - and pinion (reduction)	.45
10054111157	Gear - crown & pinion for "setting up"	.75
10054111640	Gear - for releasing & setting up (on tuning shaft	.35
10054112733	Housing - with keys	5.00
10054112522	Key stop - kickout assembly	.50
10054111632	Knob - for setting-up	.31
10054111408	Lock - saw tooth (adjacent to cam)	.40
10054111548	Lock - saw tooth with gear	.70
10054111380	Motor - 6 volt - 60 cycles	6.15
10054112354	Motor - 6 volt, 25 to 80 cycles	6.75
10054111491	Pawl and bushing - single unit	.20
10054111887	Pawls & shaft - assembly	3.00
10054111148	Pin - cam shaft, left side	.05
10054111409	Pin - for friction roller	.04
10054111410	Pin - in star wheel	.04
10054111411	Pin - cam shaft - right side	.04
10054111883	Pin - inside or lock	.03
10054111152	Retaining ring - for idler gear	.02
10054111153	Retaining ring - for crown gear	.02
10054111557	Retainer - for left side of pawl shaft(brass)	.03
1005475032	Screw - #4 for kickout tip per C	.50
1005485040	Screw - #6 hex. head for mtg. frame per C	.35
1005488707	Screw - binder head for mtg. push button escutcheon per dz.	.06
10054111673	Screws - (through master switch)	.01
1005485827	Set screws - 8/32 sq. hd. on clutch collar	.02
10054111403	Set screw - 8/32, fluted, head	.12
10054111554	Set screw - #4 headless (for pawl collar)	.01
10054111588	Set screw - for collar & spring mtg. (6/32)	.11
10054112138	Set screw - 8/32 round head	.03
10054111166	Shaft - for pawls	.20
10054111405	Shaft - for key stop bar	.18
10054111406	Shaft - for bar and arm assembly	.18
10054111641	Shaft - tuning	.35
10054111890	Shaft & cam - assem. (with right end bracket)	12.50
10054112630	Socket & bracket - for electrical connections to mechanism	.75
10054111169	Spacer - between cams	.11
10054111440	Star wheel - on tuning shaft	.25
1005485815	Spring - between reduction gear sections (next to motor)	.02
1005489086	Spring - between sections of dial drive gear on left side of mechanism	.01
10054111138	Spring - horseshoe shaped (on clutch)	.02
10054111151	Spring - key stop shaft retainer	.01
10054111528	Spring - coil (inside of lock)	.01
10054111552	Spring - flat, with tongue, on lock	.04
10054111555	Spring - for key and pawls	.06
10054111609	Spring - kickout	.05
10054111933	Spring - coil, keystop return	.03
10054112465	Spring - between reduction gear sections (next to cam shaft)	.01
10054112568	Spring - bakelite cam return	.05
10054111618	Switch - side; two contact	.37
10054111644	Switch - at rear; used on Model 4688 with serial Nos. below 934,302 Model 4788 with serial Nos. below 939,000	1.30
10054112564	Switch - at rear; used on Model 4688 with serial Nos. above 934,302 Model 4788 with serial Nos. above 939,000 Model 4799 all chassis	1.25
10054112521	Tip - adjustable for key stop & kickout arm	.06
1005476999	Washer - lock; for kickout tip per C	.50
1005477113	Washer - flat for kickout tip per C	.50
10054111553	Washer - spring retainer	.02
10054112483	Wrench - for fluted hd. set screws #6	.07
10054112484	Wrench - for fluted hd. set screws #8	.07
10054117468	Spring bender - for sw. adj.	.75

DIAL DRIVE AND MISCELLANEOUS PARTS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part Number	Description	Selling Price Each
10040111671	Background - (white) vol. & tone indicator	.07
10054111601	Bearing - self aligning	.12
10054111692	Bearing retainer - plate; copper	.06
10054111694	Bearing assembly - self aligning; supports gang extension shaft	.40
10054111939	Bearing plate and stud - for left side drive and gear support	.56
10054112629	Belt - metal; for range switch drive	.05
1005475153	Bolt - chassis mtg. (10-32 x 3/4")	.005
1005477969	Bolt - chassis mtg. (1/4-20 x 1-3/8")	.06
1005488831	Bracket - range switch shaft support(under chassis)	.02
10054111669	Bracket - for escutcheon mtg.	.15
10054111684	Bracket - for motor-Reg.-Phono mtg. strip	.07
10054111893	Bracket and mounting plate - for tuner mechanism	3.10
10054111937	Bracket - for mtg. vol. & tone indicator	.50
10054111892	Bushing - hard rubber; tuner mechanism mtg. to chassis	.02
10055111908	Cable & plug - tuning eye	1.10
1005489912	Clip - grounding for tube base	.02
10054110808	Clip - for tuning eye support	.14
10054111664	Clip - right hand end cup retaining	.10
10054111658	Clip - for pulley retaining	.01
10054111944	Collar & Pin - on vol. cont. shaft	.12
10054110782	Cord - for band ind. Sup- 55 in. reg. for Band indic. plied 18 in. reg. for vol. indic. in 20 in. reg. for tone indic. 6Ft. 22 in. reg. for motor indic. Lgths per ft.	.04
10054111302	Cord - dial drive (6 ft. lengths)	.30
10054111973	Cushion - rubber mtg.	.08
10054111940	Drum & gear - dial cord drive	.52
10054111941	End cup - left side of dial scale	.22
10054111942	End cup - right side of dial scale	.22
10044111558	Escutcheon - dial	4.90
10054111890	Felt - oil wick for bearing	.05
10054112542	Flexible coupler - for gang to unit cplg.	.75
10054111608	Gear - knurled (right side of cam shaft)	.20

MODELS 4688,4788,4799
Chassis 100.159
Parts List

SEARS ROEBUCK & CO.

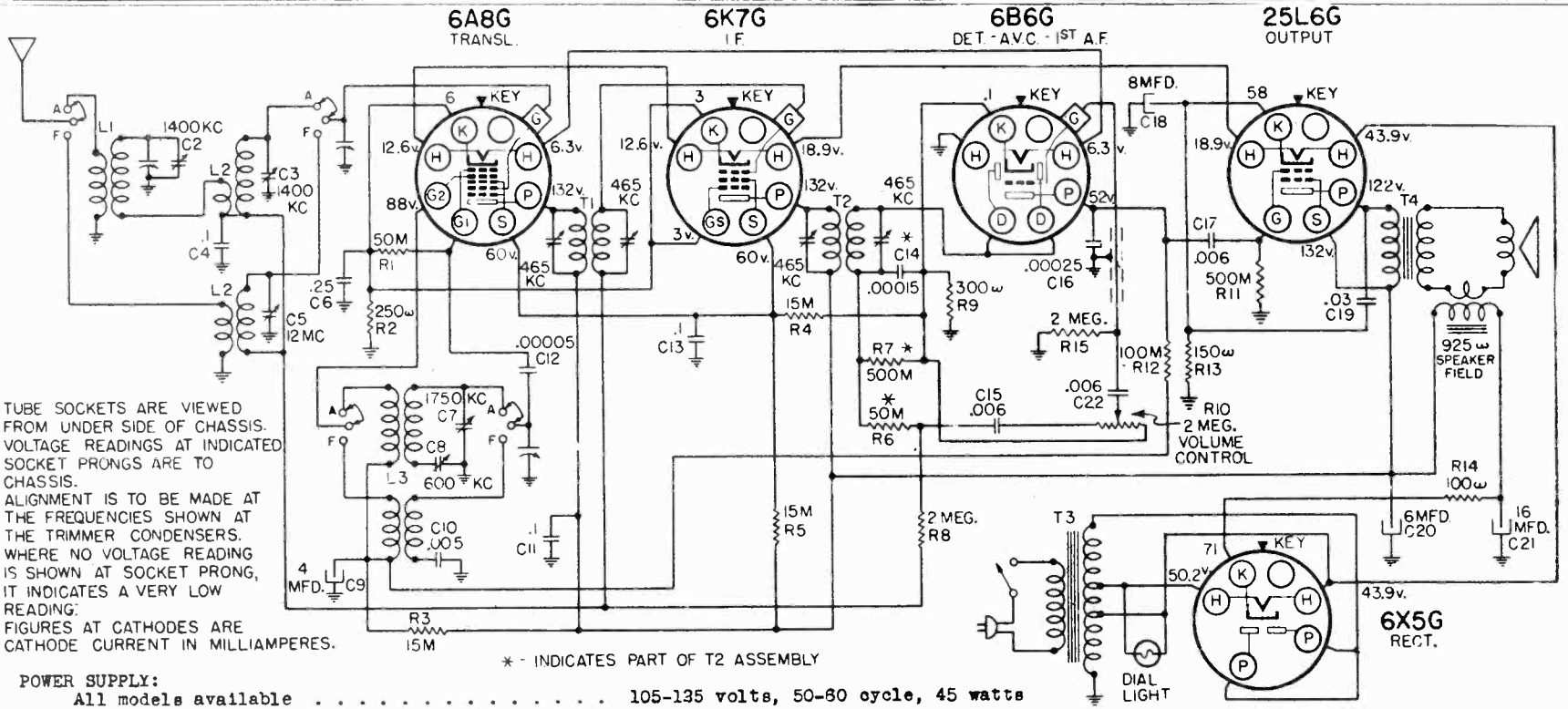
Part Number	Description	Selling Price Each
1005111629	Gear - dial drive (left side of cam shaft)	.32
1005111631	Gear - crown; knurled on extension gang shaft	.36
1003911560	Knob - tuning	.24
1003911561	Knob - volume	.24
1003911562	Knob - tone	.24
1003911563	Knob - motor - phono - regular	.17
1003911564	Knob - band switch	.17
1004111667	Pointer - main dial	.19
1004111668	Pointer - volume indicator or tone indicator	.12
1005411413	Plug button - chrome plate	.08
1005410496	Plug - speaker (4 prong)	.12
1005412833	Plug - for mechanism connecting (8 prong)	.20
1005411622	Pulley - dial cord drive	.35
1005411656	Pulley - on range switch or motor-phono shafts	.37
1005411918	Pulley - on left end of dial drum	.24
1005411943	Pulley, idler - for band indicator drive	.12
1005412628	Pulley - for range swith (under chassis)	.20
1005404214	Retaining ring - for shafts or dial drum	.02
1004011566	Scale - for vol. & tone indicator	.16
1004011567	Scale - motor, regular, phono (movable)	.10
1004011568	Scale - motor, regular, phono (stationary)	.27
1004011650	Scale - dial (celluloid roll)	1.80
1005468707	Screw - binder hd. for mtg. push button escutcheon	.06 per dz.
1005411116	Screw - #5 x 5/8; mechanism mtg. (tuner)	.02
1005485827	Set screw - for range switch pulley mtg.	.02
1005412138	Set screw - 8/32 slotted head	.03
1005411677	Shaft - extension(between gang cond. & unit)	.10
1005368161	Shield - tube (short section)	.08
1005368164	Shield cap - tube, grid type	.06
1005368165	Shield cap - for tubes (plain)	.06
1005369911	Shield - tube base	.04
1005411085	Sleeve - (felt) for tuning eye	.03
1001865427	Socket - octal base	.15
1005411008	Socket - push button lamp	.12
1001810501	Socket - 4 prong (for spkr.)	.16
1005411985	Socket - lamp	.26
1005411090	Spacer - steel; mechanism mtg. to chassis	.02
1005411570	Spacer - hard rubber; for tuner mechanism mtg. to chassis	.02
1005411882	Spring - drive cord tension	.03
1005411927	Spring - indicator drive tension	.06
1005412544	Spring - between flexible coupler	.01
1005412672	String guide - post	.05
1005412696	Stud - pulley mtg. (right side or dial)	.06
1005412667	Stud - for pulley mtg. (left side)	.10
1005485066	Terminal strip - G.D.A.	.20
1005411581	Terminal strip - phono	.13
1005457568	Washer - embossed (for mtg. electrolytic)	.06
1005489027	Washer - spring type (for range shaft)	.01
1005489747	Washer - paper, behind knobs	.01
1005411262	Washer - flat steel mtg. (15/16" O.D.)	.02
1005411672	Washer - flat steel mtg. (7/8" O.D.)	.01
1005411972	Washer - extension and top (for mtg.)	.06
1004211559	Window - celluloid for dial escutcheon	1.50

ELECTRICAL PARTS

Part Number		Description	Selling Price Each
1003111079	L1	Coil - wave trap	1.20
1002811062	L2	Coil - antenna (short-wave)	.90
1002811068	L3	Coil - antenna (police)	.80
1002811103	L4	Coil - antenna (broadcast)	1.82
1002811083	L5	Coil - R.F. (short-wave)	.90
1002811059	L6	Coil - R.F. (police)	1.00
1002811056	L7	Coil - R.F. (broadcast)	1.25
1002811064	L8	Coil - Oscillator (short-wave)	.85
1002811060	L9	Coil - oscillator (police)	1.00
1002811488	L10	Coil - compensating inductance	.38
1002811057	L11	Coil - oscillator (broadcast)	1.05
1001411418	L12	Choke - filter	1.90
1001968205	C1	Condenser - mica, 2100 mmfd.	.35
1001711078	C2-C3-C4	Condenser - trimmer (3 section) for R.F. or antenna (all bands)	.75
1001911117	C5	Condenser - lowloss .05 mfd. 150 volt	.35
	C6	Condenser - paper .1 mfd. 300 volt	.25
	C7	Condenser - paper .1 mfd. 400 volt	.25
1001711078	C8-C9-C10	Condenser - trimmer (3 section) for R.F. or antenna (all bands	.75
1001911123	C11	Condenser - mica, 7750 mmfd. (5%)	.85
1001911117	C12	Condenser - lowloss .05 mfd. 150 volt	.35
1001911342	C13-C14	Condenser - mica, 200 mmfd. (5%)	.16
1001911342	C15	Condenser - paper .05 mfd. 150 volt	.25
	C16	Condenser - paper .25 mfd. 200 volt	.32
1001911342	C17-C18	Condenser - mica, 200 mmfd. (5%)	.18
	C19	Condenser - paper .05 mfd. 150 volt	.25
1001985061	C20	Condenser - mica 51 mmfd.	.15
	C21	Condenser - paper .01 mfd. 400 volt	.25
1001711089	C22-C23-C24	Condenser - trimmer (3 section) for oscillator (all bands)	.75
1001711115	C25	Condenser - pad (single section)	.63
	C26	Condenser - paper .01 mfd. 400 volt	.25
1001985394	C27	Condenser - mica 510 mmf.	.25
	C29-C30	Condenser - paper .1 mfd. 150 volt	.25
1001983539	C31-C32	Condenser - mica 260 mmfd. 400 volt	.20
	C33	Condenser - paper .02 mfd. 400 volt	.25
1001911910	C34	Condenser - mica, 150 mmfd. (5%)	.18
1001911342	C35	Condenser - mica, 200 mmfd. (5%)	.18
1001983783	C36	Condenser - mica, 110 mmf.	.20
1001911342	C37	Condenser - mica, 200 mmfd. (5%)	.18
1001983783	C38-C39-C40	Condenser - mica, 110 mmf.	.20
	C41	Condenser - paper .05 mfd. 200 volt	.25
	C42	Condenser - paper .02 mfd. 400 volt	.25
	C43	Condenser - .007 mfd. 600 volts	.25
	C44	Condenser - paper .05 mfd. 200 volt	.25
1001983539	C45	Condenser - mica 260 mmfd.	.20
	C46	Condenser - paper .02 mfd. 400 volt	.25
	C47	Condenser - paper .01 mfd. 400 volt	.25
	C48	Condenser - paper .02 mfd. 400 volt	.25
1002011652	C49	Condenser - electrolytic 12 mfd. 150 volt	1.36
1001983976	C50	Condenser - shielded .012 mfd. 1000 volt	.40
1002098679	C51	Condenser - electrolytic 16 mfd. 450 volt	1.10
1002089937	C52	Condenser - electrolytic 30 mfd. 450 volt	1.60
1002011469	C53	Condenser - electrolytic 16 mfd. 450 volt	1.30
	C54	Condenser - paper .004 mfd. 750 volt	.24
	C55	Condenser - paper .02 mfd. 400 volt	.25
	C56	Condenser - paper .1 mfd. 400 volt	.25
1002011377	C57	Condenser - electrolytic 10 mfd. 25 volt	.80
	C58	Condenser - paper .1 mfd. 400 volt	.25
1002011689	C59	Condenser - electrolytic 20 mfd. 25 volt	1.20
1001911080	C60	Condenser - 3 mmfd. (wire)	.10
1001911122	C61	Condenser - mica 3580 mmfd. (3%)	.48
1001985467	C62	Condenser - mica 1370 mmfd. (3%)	.30
1001811073		Condenser - variable gang	6.25
1005485321		Connector - ground	.01
1004965296		Lamp - dial 6 to 8 volt .25 amps.	.16
1004911062		Lamp - 6.3 volt - .25 amps.(over push buttons)	.15
1002110629	R1	Resistor - carbon 100,000 ohm 1/4 watt (20%)	.12
1002110553	R2	Resistor - carbon 220,000 ohm 1/4 watt (20%)	.12
	R3	Resistor - carbon 100,000 ohm 1/4 watt (20%)	.12
	R4	Resistor - carbon 100 ohm 1/4 watt	.12
	R5	Resistor - carbon 100,000 ohm 1/4 watt (20%)	.12
	R6	Resistor - carbon 22,000 ohm 1 watt	.12
	R7-R8	Resistor - carbon 47,000 ohms 1/4 watt	.12
	R9	Resistor - carbon 470,000 ohms 1/4 watt	.12
	R10	Resistor - carbon 3.3 megohm 1/4 watt	.12
1002211665	R11	Resistor - wire wound 280 ohms 1/2 watt (5%)	.15
	R12	Resistor - carbon 4700 ohm 1/4 watt	.12
	R13-R14	Resistor - carbon 470,000 ohms 1/4 watt	.12
	R15	Resistor - carbon 1 megohm 1/4 watt	.12
1002111417	R16A	Resistor - bleeder: Section A 5600 ohms	1.15
	R16B	Section B 5600 ohms	
	R16C	Section C 1500 ohms	
	R17	Resistor - carbon 1 megohm 1/4 watt	.12
	R18-R19	Resistor - carbon 100,000 ohm 1/4 watt (10%)	.12
	R20-R21	Resistor - carbon 470,000 ohms 1/4 watt	.12
	R22	Resistor - carbon 1 megohm 1/4 watt	.12
	R23	Resistor - carbon 47,000 ohms 1/4 watt	.12
1002411533	R24	Volume Control - 1 megohm(with on-off switch)	1.45
	R25	Resistor - carbon 2,200 1/4 watt	.12
	R26	Resistor - wire wound 33 ohm 1 watt	.12
	R27	Resistor - carbon 330,000 ohm 1/4 watt (10%)	.12
	R28	Resistor - carbon 100,000 ohm 1/4 watt (20%)	.12
	R29-R30	Resistor - carbon 33,000 ohm 1/4 watt	.12
	R31	Resistor - carbon 2,200 ohm 1/4 watt	.12
	R32	Resistor - carbon 33,000 ohm 1/4 watt	.12
1002211686	R33	Resistor - wire wound 250 ohm 2 watt	.20
	R34-R35	Resistor - 33 ohm 1/2 watt	.12
1005411111		R.F. unit - coils, range switch, gang and trimmers - complete	25.00
1005811290		Speaker - dynamic (12") (Model 4688 only)	11.60
1005811291		Speaker - dynamic (12") (Model 4788 only)	11.60
1005811292		Speaker - dynamic (10") (Models 4799 or 4788 only)	10.50

SEARS ROEBUCK & CO

MODELS 4761, 4771
Chassis 101.490
Schematic, Voltage
Socket, Specs., Notes



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 ARE CATHODE CURRENT IN MILLIAMPERES.

* - INDICATES PART OF T2 ASSEMBLY

POWER SUPPLY:
All models available . . . . . 105-135 volts, 50-60 cycle, 45 watts

FREQUENCY RANGES:

American	540-1750 kc
Foreign	3800-13,300 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
American	1750 kc	1400 kc	600 kc
Foreign	-	12 mc	-

INTERMEDIATE FREQUENCY . . . . . 485 kc

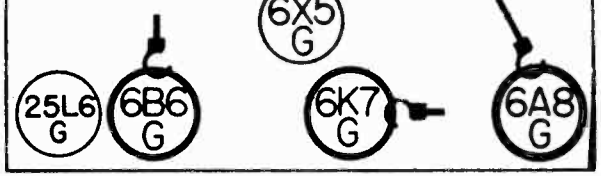
POWER OUTPUT:

Type	Beam tube
Undistorted	1.8 watts
Maximum	2.5 watts

LOUD SPEAKER:

Type	Dynamic
Size	6 inch
Field coil resistance (App.)	935 ohms

POSITIONS OF TUBES AND WIRES TO TOP OF TUBES.

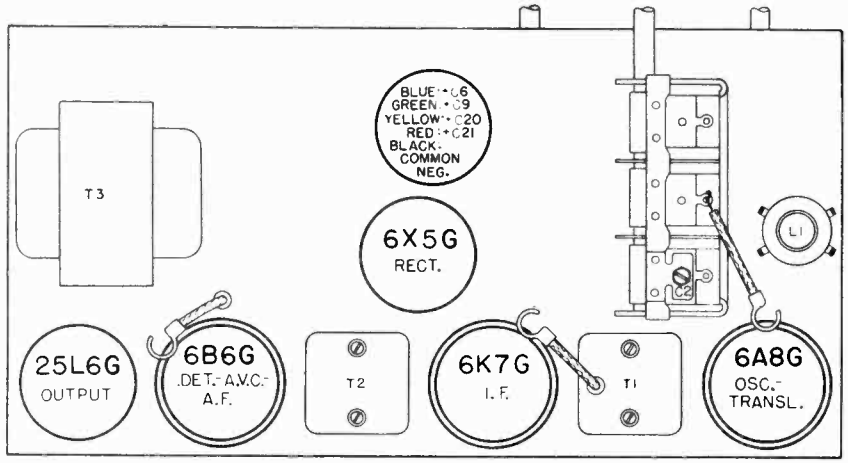


ELIMINATING WHISTLE AT 930 KC:

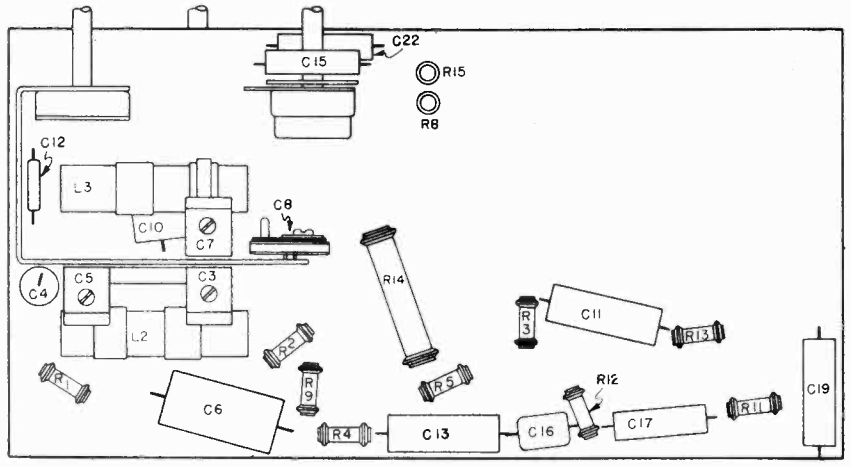
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This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

OCTOBER 13, 1937



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 50 milliwatts output	0.38 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	To external ground
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Dial Pointer	To coincide with horizontal center line of dial when variable is fully closed.

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.	6A8G grid	T2,T1	IF	75
"AM"	Fully open	1750 kc	.0002 mfd.	*	C7	Oscillator Trimmer	150
"AM"	1400 kc	1400 kc	.0002 mfd.	*	C2,C3	Antenna Translator	100
"AM"	600 kc (rock)	600 kc	.0002 mfd.	*	C8	Padder	50
"FM"	12 mc (rock)	12 mc	400 ohms	*	C5	Translator Trimmer	70

IMPORTANT ALIGNMENT NOTES

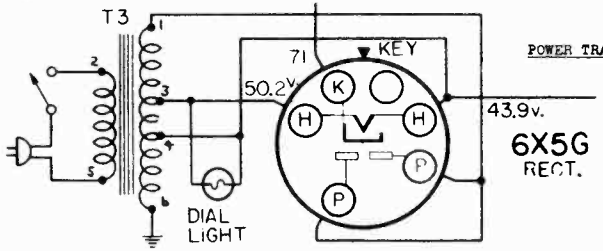
* Push a pin through the attached antenna wire at a point near where it comes out of the chassis so that the pin makes contact with the antenna wire inside the insulation. Connect the generator output lead to the pin. The generator output connection should not be made to the free end of the attached antenna wire.

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.



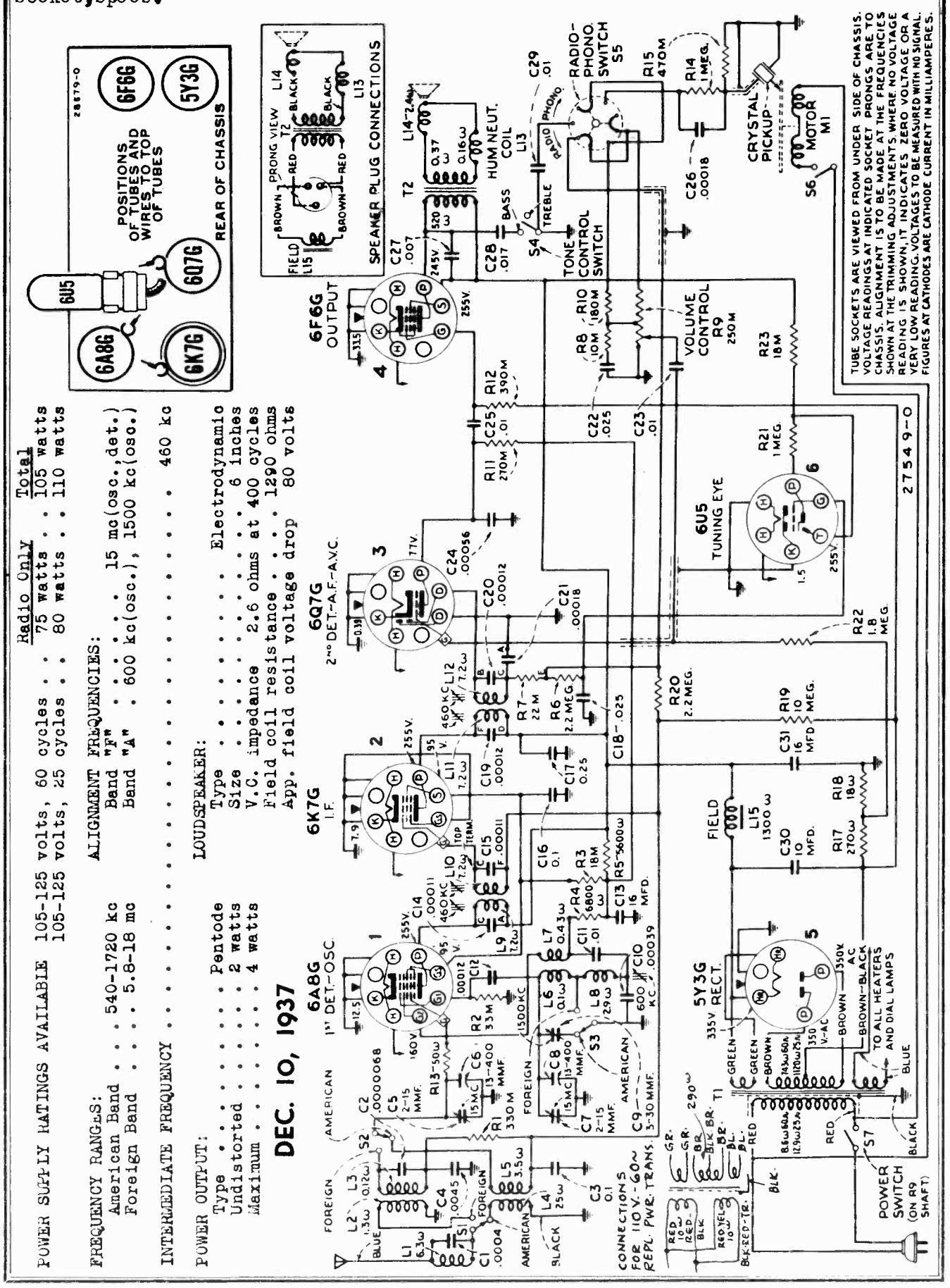
POWER TRANSFORMER COLOR CODE

1. RED
2. GREEN
3. YELLOW
4. BLUE
5. BLACK
6. SLATE

Schematic, Voltage
Socket, Specs.

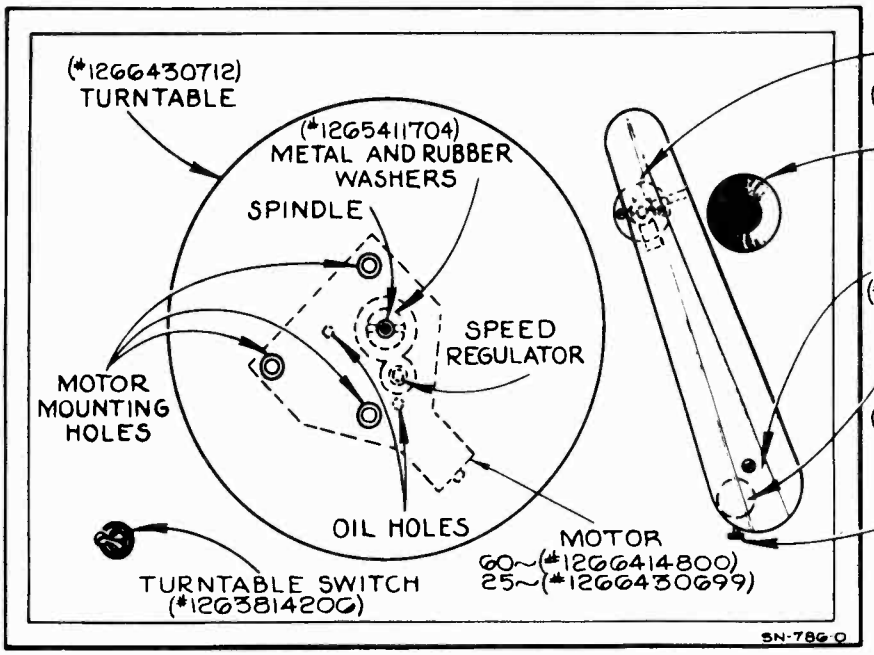
SEARS ROEBUCK & CO.

MODEL 4776
Chassis 126.200

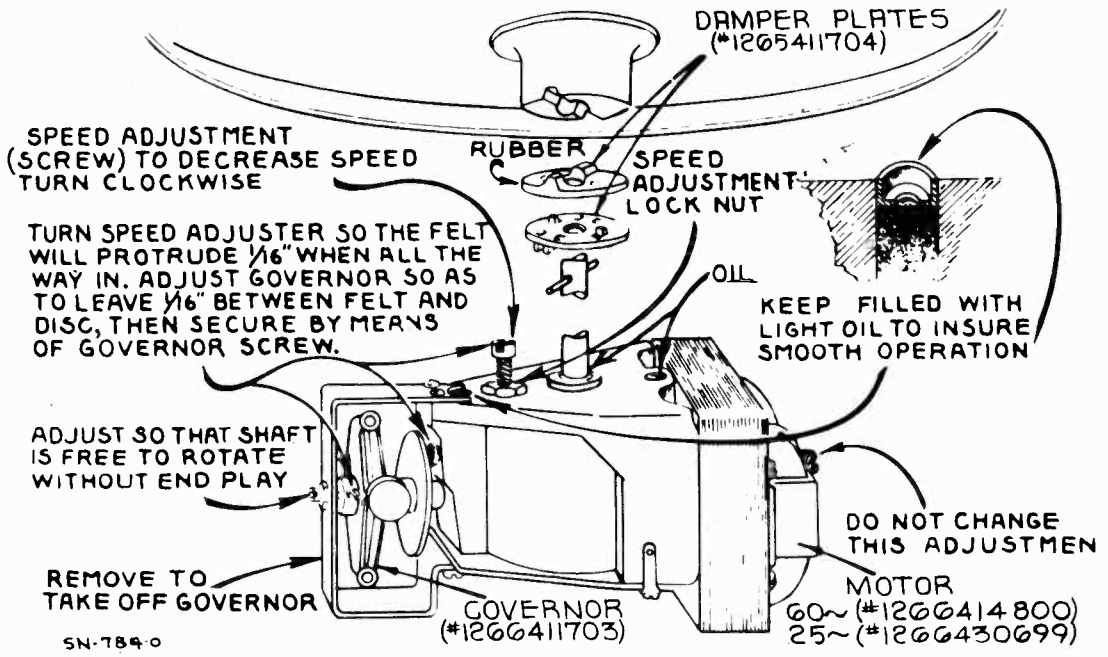


MODEL 4776
Chassis 126.200
Phono. Data

SEARS ROEBUCK & CO.



DETAILS OF MOTORBOARD



DETAILS OF MOTOR

MOTOR ADJUSTMENTS:

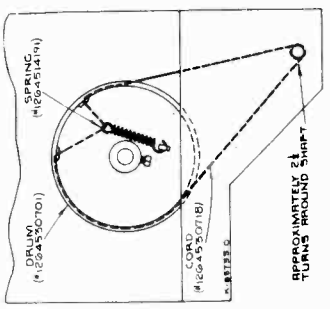
The phonograph motor is of the governor induction type and is designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are shown and explained in the illustration. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

LOUDSPEAKER:

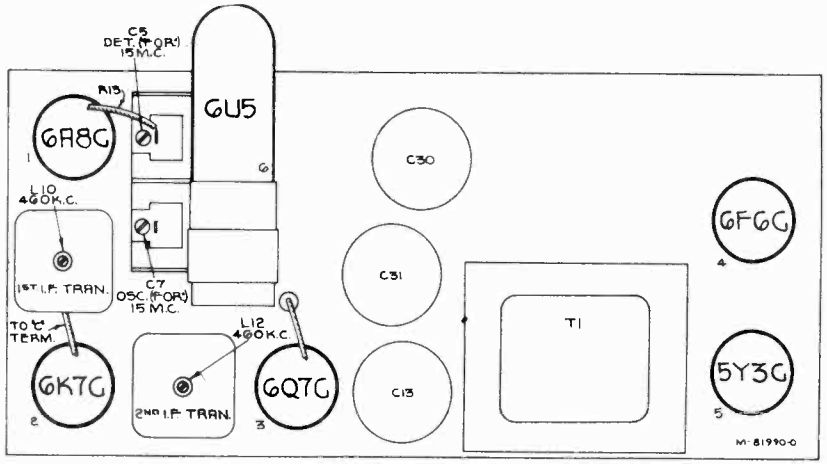
Centering of the loudspeaker is made in the usual manner with three, narrow-paper feelers, after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

DIAL POINTER AND CONDENSER DRIVE HOOK-UP:

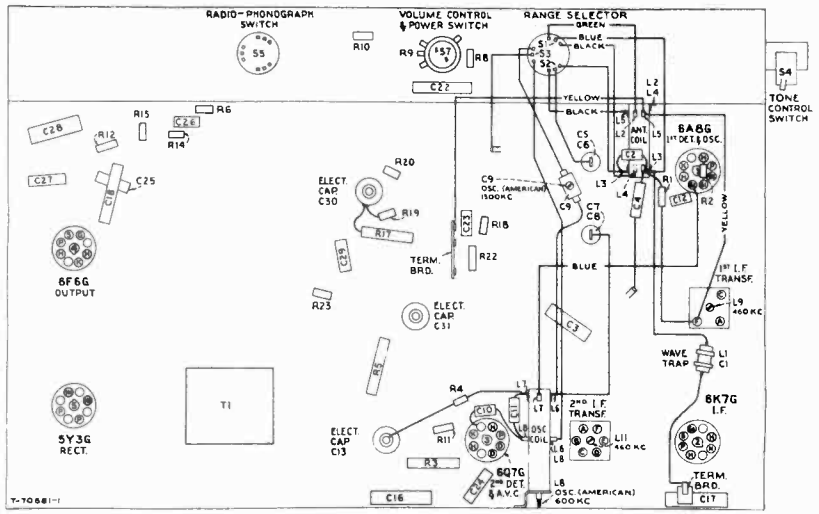
The drive hook-up for the dial pointer and the variable condenser is illustrated.



DIAL DRIVE HOOKUP



LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS TOP OF CHASSIS



LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS BOTTOM OF CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across speaker voice coil

Output meter reading to indicate 1.0 watt output . . . . . 1.61 volts

Approximate average sensitivity in microvolts for 1.0 watt output . . . . . See chart below

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

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

Connection of generator ground lead . . . . . To chassis

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

Position of Radio-Phono. switch . . . . . Counter-clockwise

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . Fully clockwise

Position of Dial Pointer with variable tuning condenser fully closed . . . . To fall on last calibration mark at 540 kc end of "American" band.

WAVE-BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	No signal 550-750 kc	460 kc	.001 mfd.	6K7-G Grid	L11,L12	2nd I-F Trans.	15,000
"AM"	No signal 550-750 kc	460 kc	.001 mfd.	6A8-G Grid	L9,L10	1st I-F Trans.	200
"FOR"	15 mc	15 mc	300 ohms	Ant. Lead (blue)	C7**	"FOR" Osc.	-
"FOR"	15 mc (rock)	15 mc	300 ohms	Ant. Lead (blue)	C5*	"FOR" Det.	60
"AM"	1500 kc (rock)	1500 kc	.0002 mfd.	Ant. Lead (blue)	C9	"AM" Osc.	-
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Lead (blue)	L8	"AM" Osc.	29
"AM"	1500 kc (rock)	1500 kc	.0002 mfd.	Ant. Lead (blue)	C9	"AM" Osc.	97

IMPORTANT ALIGNMENT NOTES

**Use maximum capacity peak if two peaks can be obtained.

*Use minimum capacity peak if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this 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 a-v-c action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

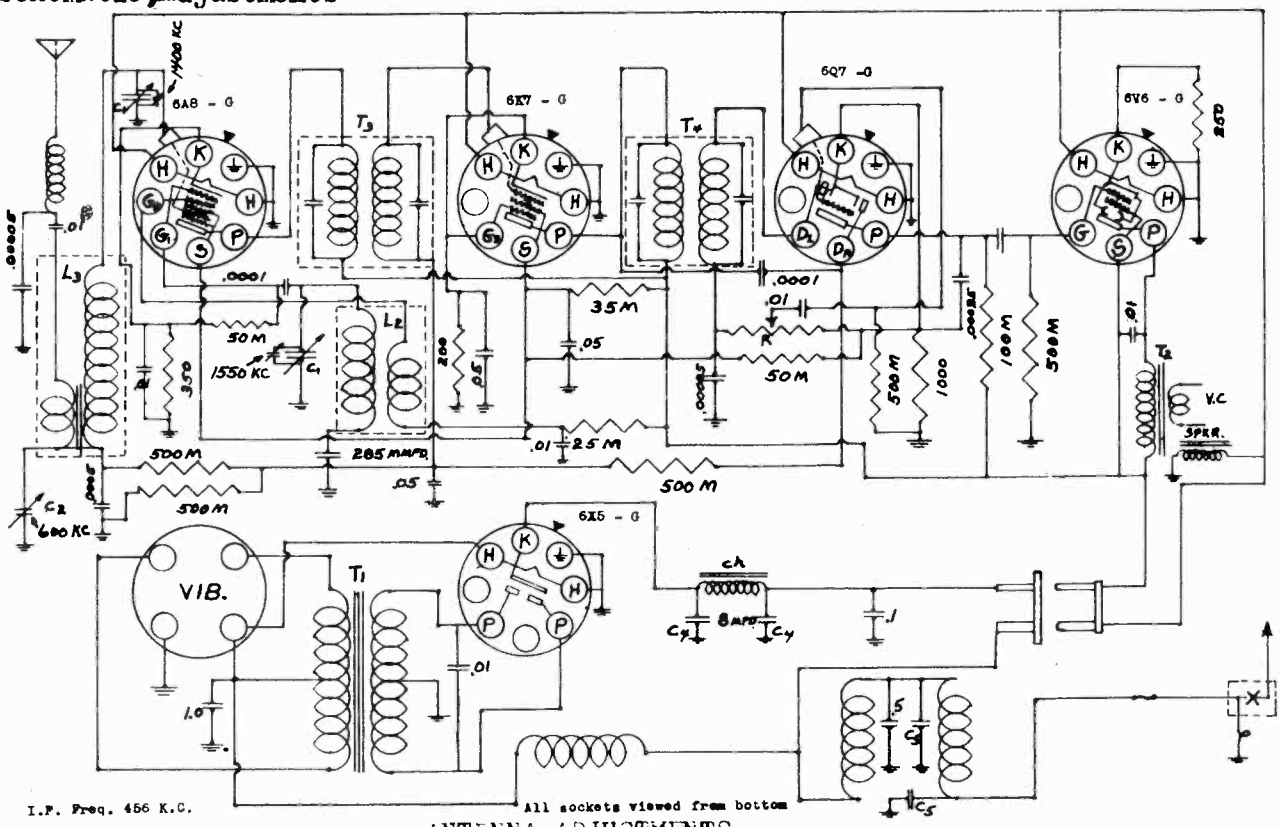
Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment in any other band. Grid cap leads should remain in place during alignment.

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

MODEL 4700
Schematic Adjustments

SEARS-ROEBUCK & CO.

Alignment



ANTENNA ADJUSTMENTS

See that a suitable aerial has been provided, place the radio on the floor of the drivers compartment and temporarily connect it so that it can be turned on and operated. The control cables and head should be assembled and fastened to the receiver. The case of the radio will have to be grounded against some metal part such as brake or gear shift lever.

Turn on receiver and tune in a station at about 600 on the dial. Near the point where the aerial is connected to the set a plug button will be found. This can be removed and by means of a small screw driver adjust the small screw found under the plug button. Turn this screw for maximum sensitivity. Now replace the plug button and turn the dial to about 1400 KC. Near the front of the case are two plug buttons, one being red color. Do not under any circumstance disturb the adjustment under the red button. This ordinarily does not need adjustment but should it be necessary, only a qualified radio technician must be engaged to make this adjustment. The other adjustment under the button which is of the same color as the case, is to be made for maximum sensitivity.

It is easier to make these adjustments when the receiver is on the floor of the car than after it is mounted and not so accessible.

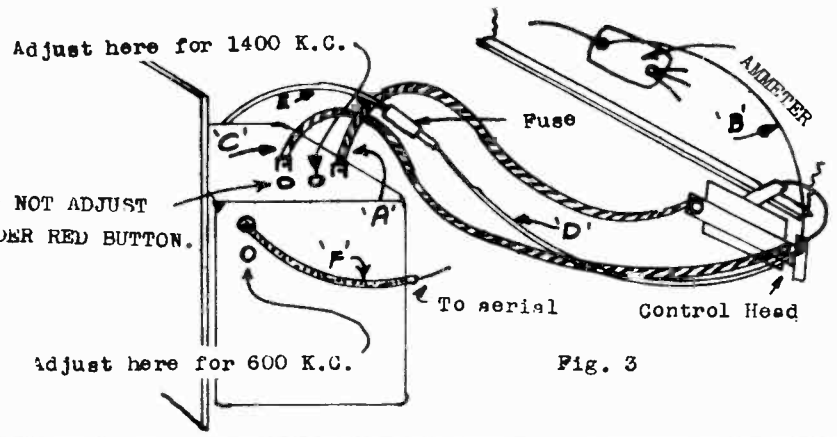
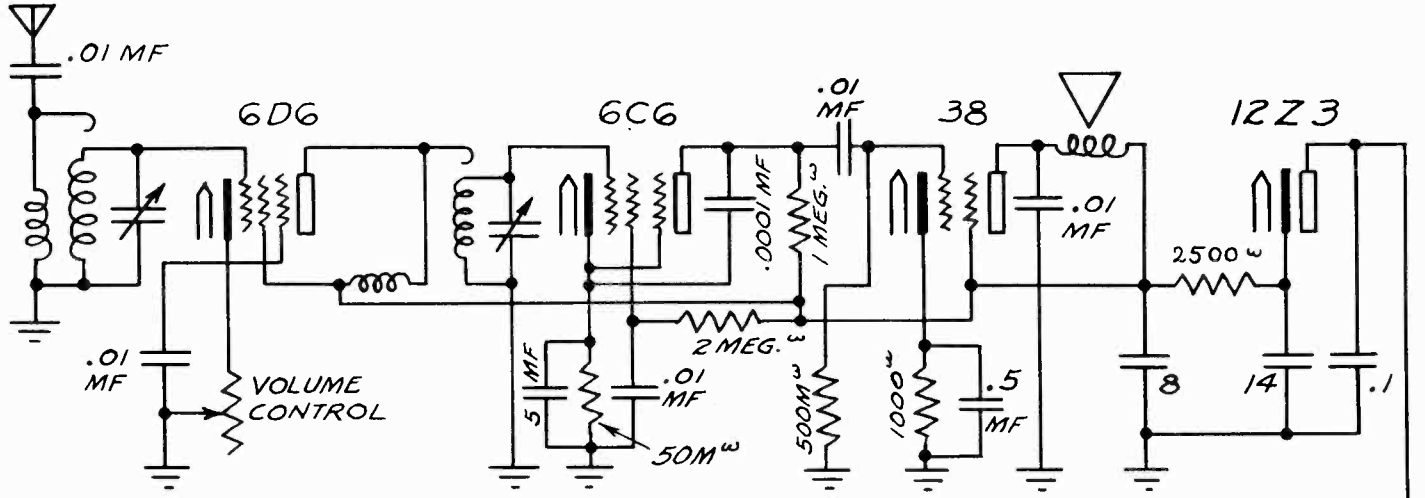
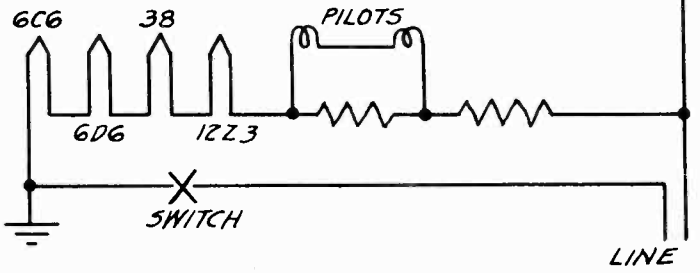


Fig. 3

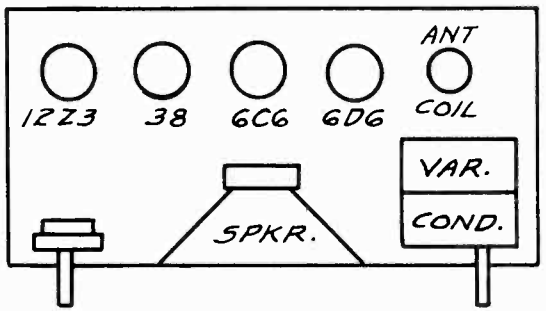
SEARS-ROEBUCK & CO.

MODELS 7173,7183
Schematic,Voltage
Socket,Alignment





TUBE	POSITION	EF	EP	ESG	EK
6D6	RF	6.3	100	100	2.1
6C6	DET.	6.3	18	14	1.5
38	PWR. OUT.	6.3	90	100	15.
12Z3	RECT.	12	—	—	118



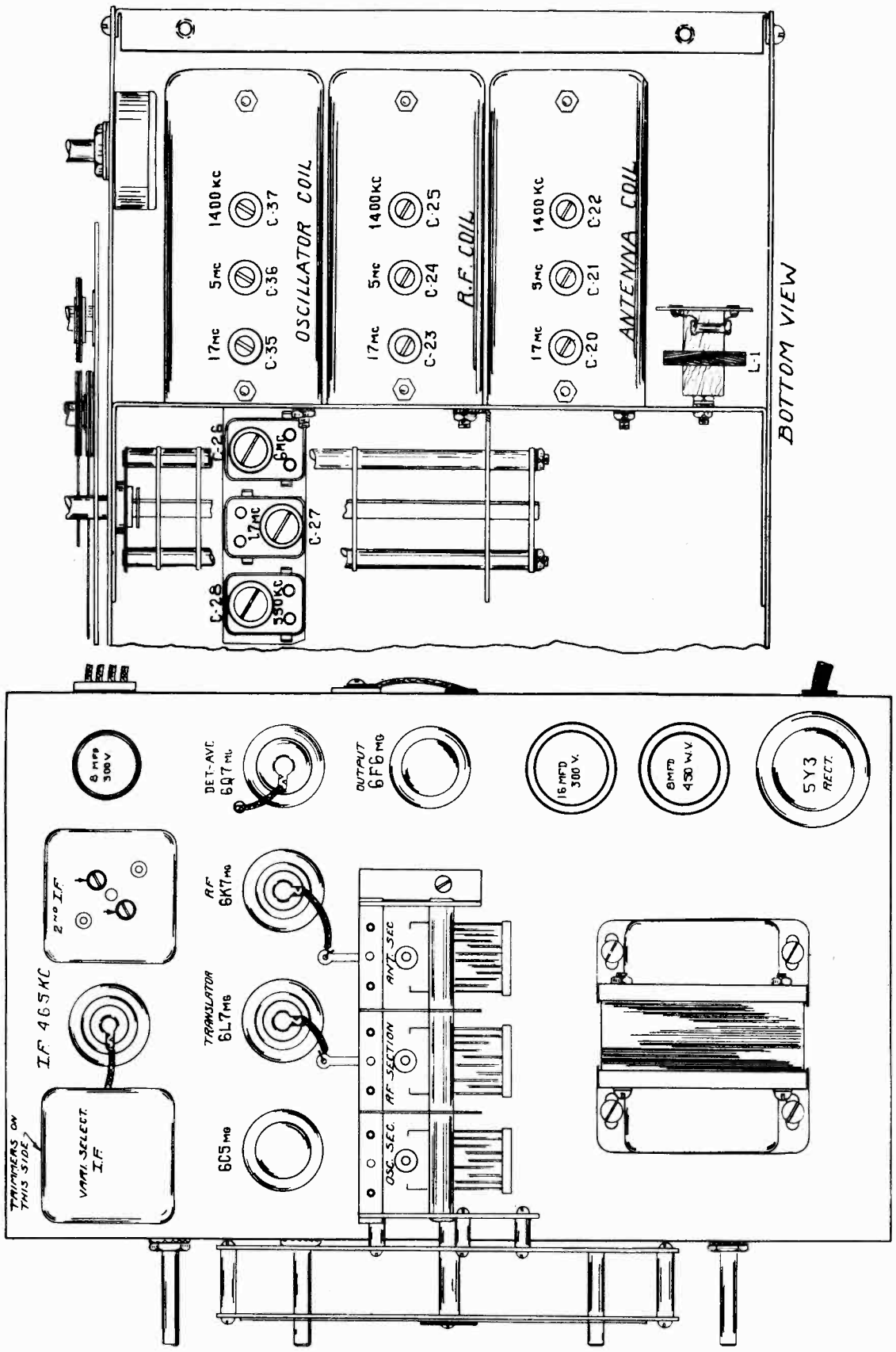
CIRCUIT: A four tube tuned radio frequency AC-DC receiver.

ALIGNMENT PROCEDURE:

Turn tuning knob to the extreme right in a clockwise direction so that the variable condenser is at minimum capacity. Apply a 1720 KC note to the antenna and adjust both trimmers on the variable condenser to maximum gain. Next, tune to the low frequency end and check tracking of coils for maximum gain. It may be necessary to bend plates to increase sensitivity.

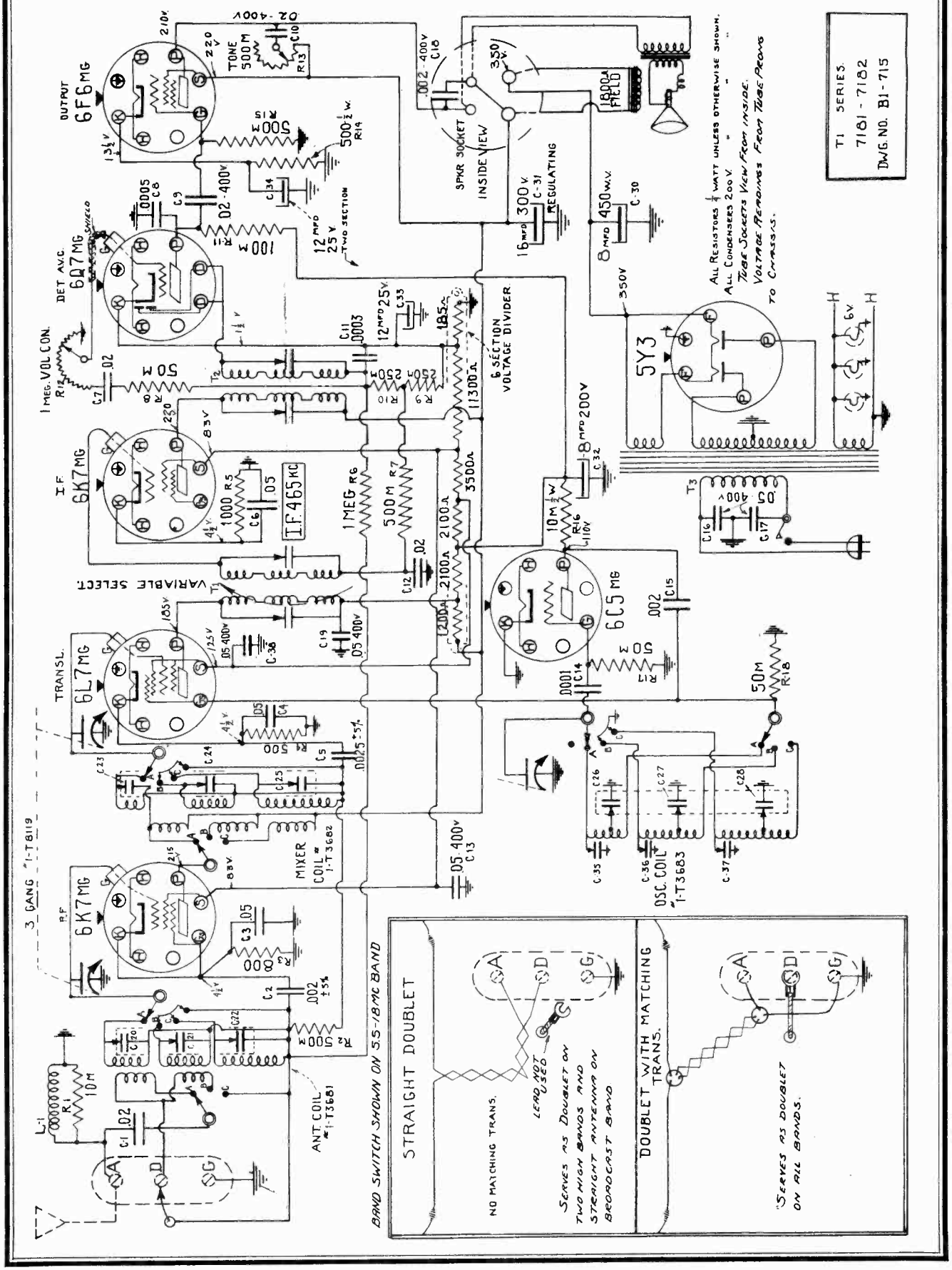
MODELS 7181,7182
Socket,Trimmers

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

MODELS 7181, 7182
Schematic, Voltage



THE ALIGNMENT PROCEEDURE

The following alignment instructions are given with the assumption that the service station has an oscillator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be 0 to 3 volt AC meter connected across the voice coil of the speaker or preferably an output meter connected in the plate circuit of the 42 power tube in series with an 8 MFD paper condenser.

I THE I.F. STAGES

The I.F.'s are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6L7 tube.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are the trimmers in the three I.F. cans. (See pictorial).

THE I.F. STAGES MUST BE ALIGNED WITH THE FIDELITY CONTROL IN THE SHARP POSITION, THAT IS WITH THE SHAFT TURNED ALL THE WAY TO THE LEFT.

The sensitivity of the I.F. system in the sharp position is about 200 microvolts. In the high fidelity position the sensitivity is about 20 microvolts.

Always use as low an output as possible from the signal generator when making the various adjustments.

II ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the condenser shaft to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can be lined up by removing dial glass and setting hand with screw in center of dial.

1. Set the test oscillator to 17 megacycles.

2. Turn wave band switch all the way to right for highest S.W. band, and set dial hand to 17 M.C.

3. Peak trimmer condenser C-35 of the oscillator coil (See pictorial) to resonance with 17 M.C. fed into antenna.

4. Adjust antenna and R.F. coil trimmers C-20 and C-23 to same frequency after the above mentioned oscillator trimmer has been set.

5. Turn dial hand to 6 M.C. on same band and peak padding condenser C-26 to 6 M.C.

III SHORTWAVE BAND 1.7 TO 5.5 M.C.

1. Set band switch to this band and dial hand to 5 M.C.

2. Peak trimmer C-36 to 5 M.C.

3. Peak antenna and R.F. trimmers C-21 and C-24 to 5 M.C.

4. Rotate dial to 1.7 M.C. and adjust Padding Condenser C-27 to 1.7 M.C.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximatly 16.9 M.C.

Increase oscillator signal by "opening up" the attenuator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

IV THE BROADCAST BAND

1. Turn wave band switch all the way to left and dial hand set to 1400KC (the top scale).

2. Peak oscillator trimmer C-37 to 1400 KC and R.F. circuit trimmers C-22 and C-25 to same frequency.

3. Set dial hand to 550 KC and adjust oscillator padding condenser C-28 to 550 KC.

4. Recheck dial at 1400 KC as in number (1) and (2).

5. Points in the middle of the dial may be checked and if necessary the plates of the front section of variable condenser may be bent for alignment.

V NOTES

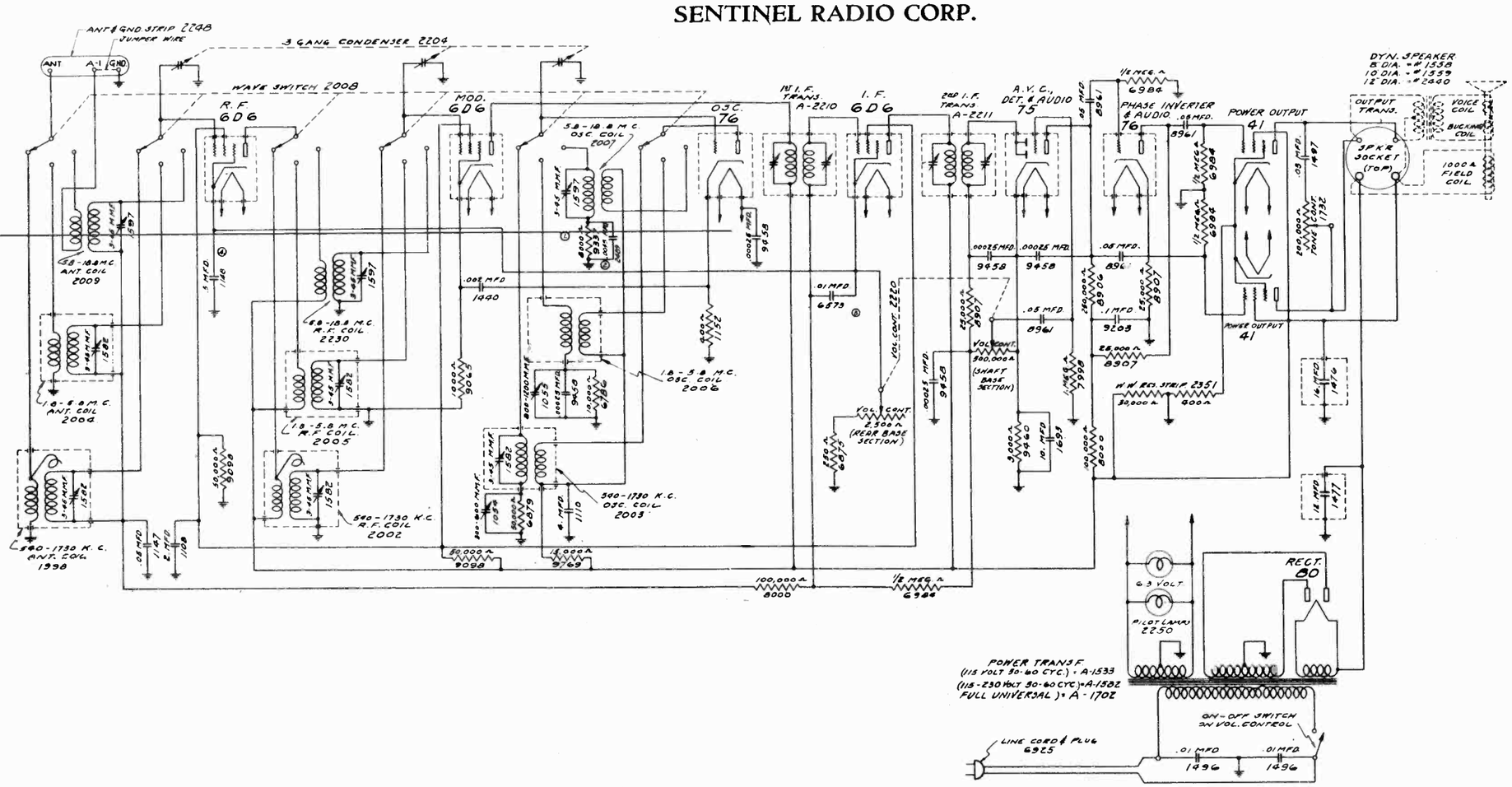
1. Seal all trimmers after their final adjustment.

2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.

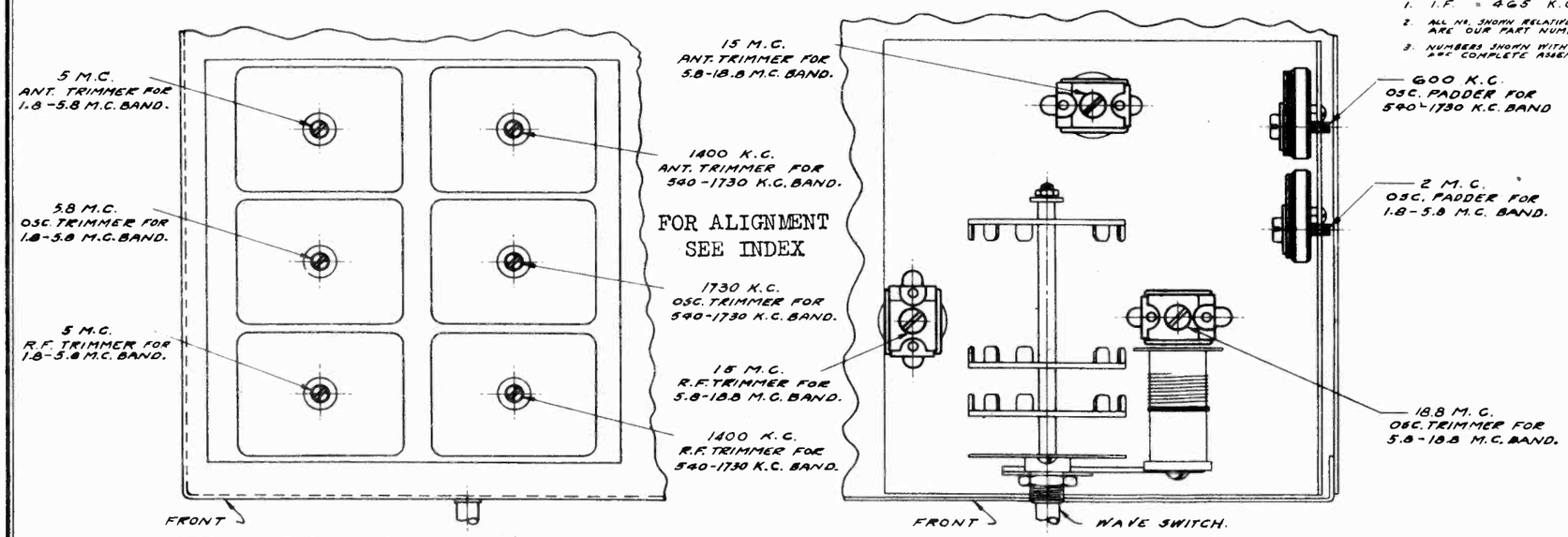
3. Refer to the schematic for the voltages at the tube sockets.

SENTINEL RADIO CORP.

MODEL 14 A
Schematic, Parts
Trimmers



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.

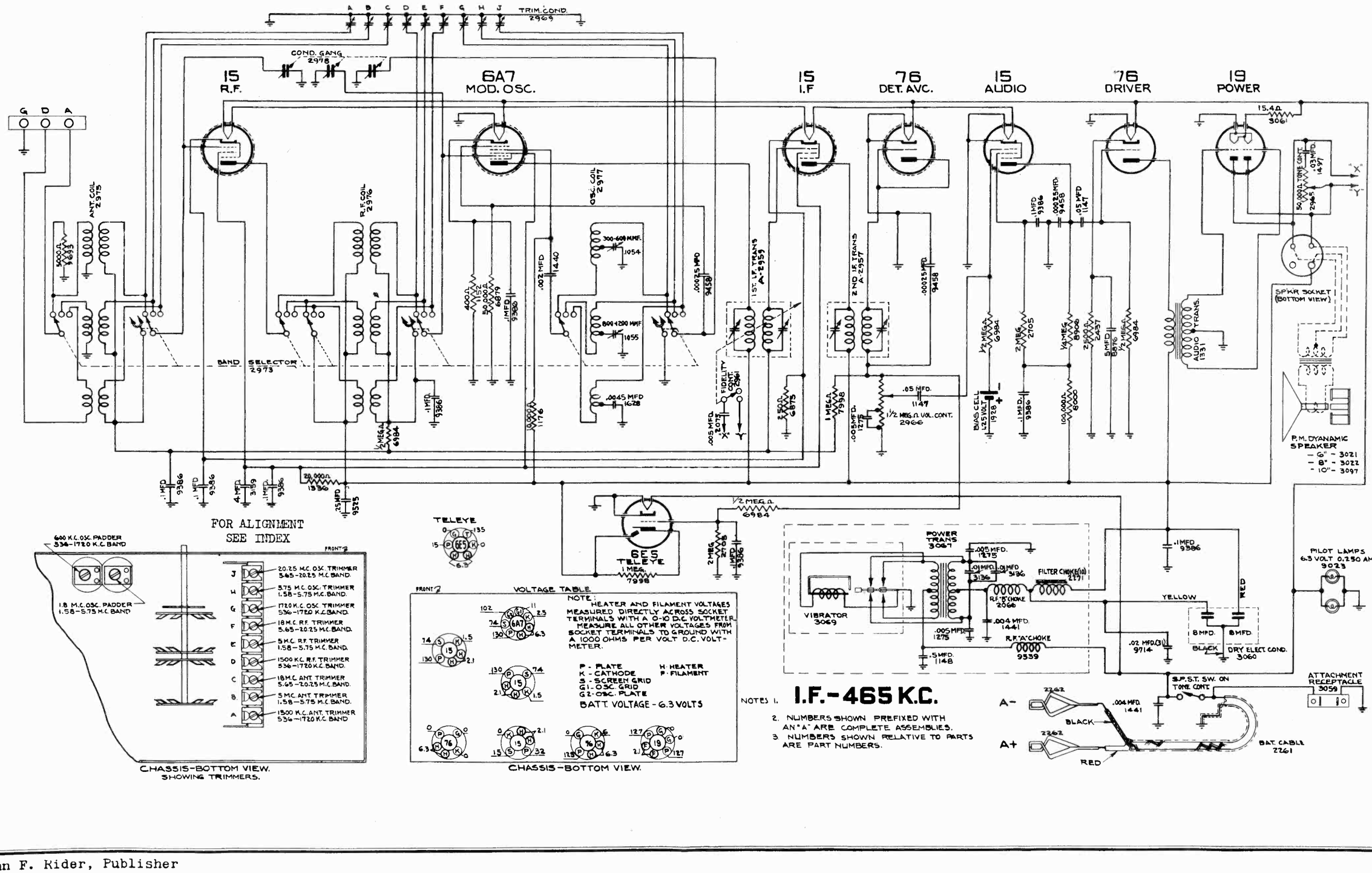


LEFT HAND (FRONT) TOP VIEW OF CHASSIS

RIGHT HAND (FRONT) BOTTOM VIEW OF CHASSIS

MODEL 66 B
Schematic, Parts
Socket, Voltage
Trimmers

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 14 A
Alignment, Socket Voltage

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis and inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left front corner of the receiver) will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.8 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.8 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillation trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.8 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.8 megacycles. Then vary the receiver dial slightly to the right and left of 17.8 megacycles, and if the fundamental peak was used in aligning at 18.8 megacycles the test oscillator signal will be heard at approximately 17.8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.8 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.8 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antenna and R.F. trimmers to maximum 15 megacycle signal sensitivity.

4. Leave band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial and set the test oscillator frequency to approximately 6 megacycles. While rocking gang condenser slightly to right and left adjust 6 megacycle oscillator padder for maximum sensitivity.

5. Place band selector switch for operation on 1.8 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

6. With the band selector switch set for operating on 1.8 to 5.8 Megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna and R.F. trimmers for maximum 5 megacycle signal sensitivity.

7. Leave band selector switch for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to approximately 2 megacycles. While rocking gang condenser slightly to right and left adjust 2 megacycle oscillator padder for maximum sensitivity.

8. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1730 kilocycle band and set test oscillator frequency to EXACTLY 1730 KILOCYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1730 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1730 KILOCYCLE OSCILLATOR TRIMMER.

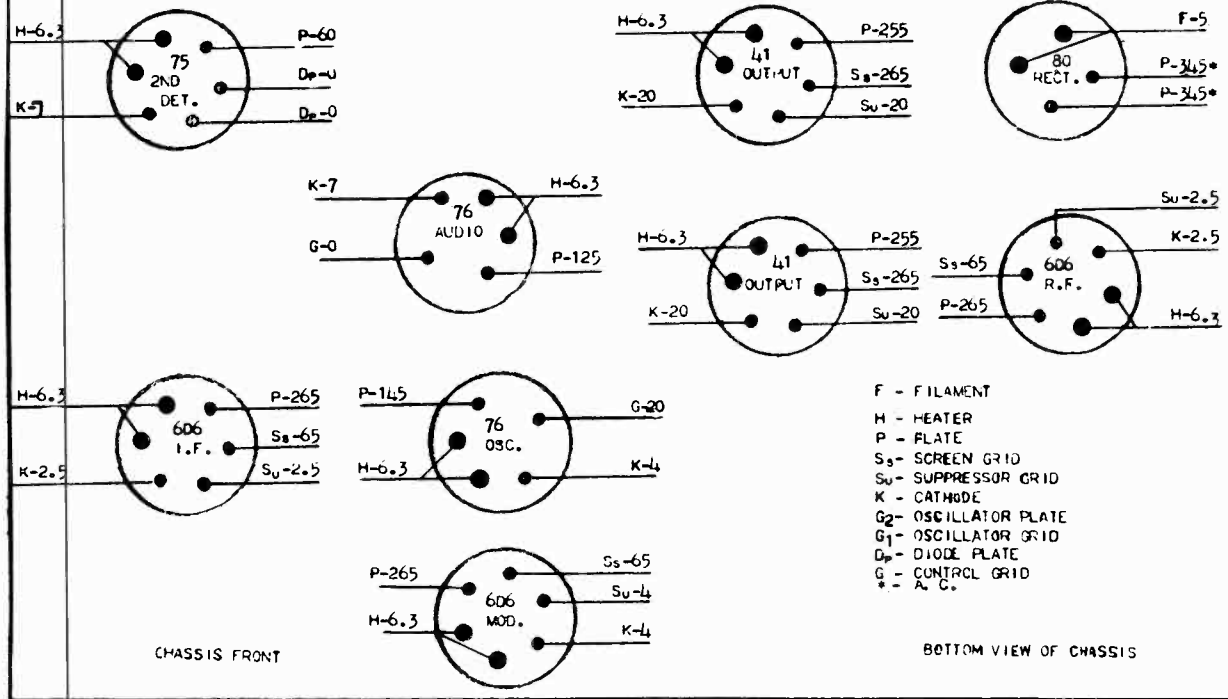
9. With band selector switch placed for operation on the 540 to 1730 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycles R. F. and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

10. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

VOLTAGE TABLE

LINE VOLTAGE : 115 VOLTS AC

MEASURE VOLTAGES BETWEEN CHASSIS AND SOCKET PRONGS



Model 66B
Eight Tube
Six Volt Battery Operated Superheterodyne Receiver

ALIGNING I.F.STAGE AT 465 KILOCYCLES:

(a) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I. F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-536 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(b) Remove test oscillator lead from grid of 6A7 tube and connect to receiver antenna post through a .00025 Mfd. series condenser.
(c) Adjust band selector switch for operation on the 1720-536 kilocycle band.
(d) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1500 kilocycles. Adjust 1500 K.C., R.F. and antenna trimmers for maximum sensitivity.
(e) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K. C. oscillator padder for maximum signal response.

ALIGNING 1.58-5.75 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
(b) Adjust band selector switch to 1.58-5.75 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.75 megacycles. Bring in 5.75 megacycle test band signal to maximum output by adjusting 5.75 M.C. oscillator trimmer.
(c) Tune receiver dial and test oscillator frequency to EXACTLY 5 Megacycles, and adjust 5 M.C. antenna and R.F. trimmers for maximum sensitivity.
(d) Set test oscillator and receiver dial to approximately 1.8 megacycles. Then while rotating gang condenser slightly to right and left adjust 1.8 megacycle oscillator padder.

ALIGNING 5.65-20.25 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.65-20.25 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 20.25 megacycles.

(b) Adjust 20.25 M.C. oscillator trimmer to bring in 20.25 megacycle test signal to maximum output.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 20.25 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 20.25 megacycles always check to see if the proper peak has been used. To do this leave test oscillator frequency at 20.25 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 19.25 megacycles. Then vary the receiver dial slightly to the right and left of 19.25 megacycles, and if the fundamental peak was used in aligning at 20.25 megacycles the test oscillator signal will be heard at approximately 19.25 megacycles on the receiver dial.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 18 megacycles.

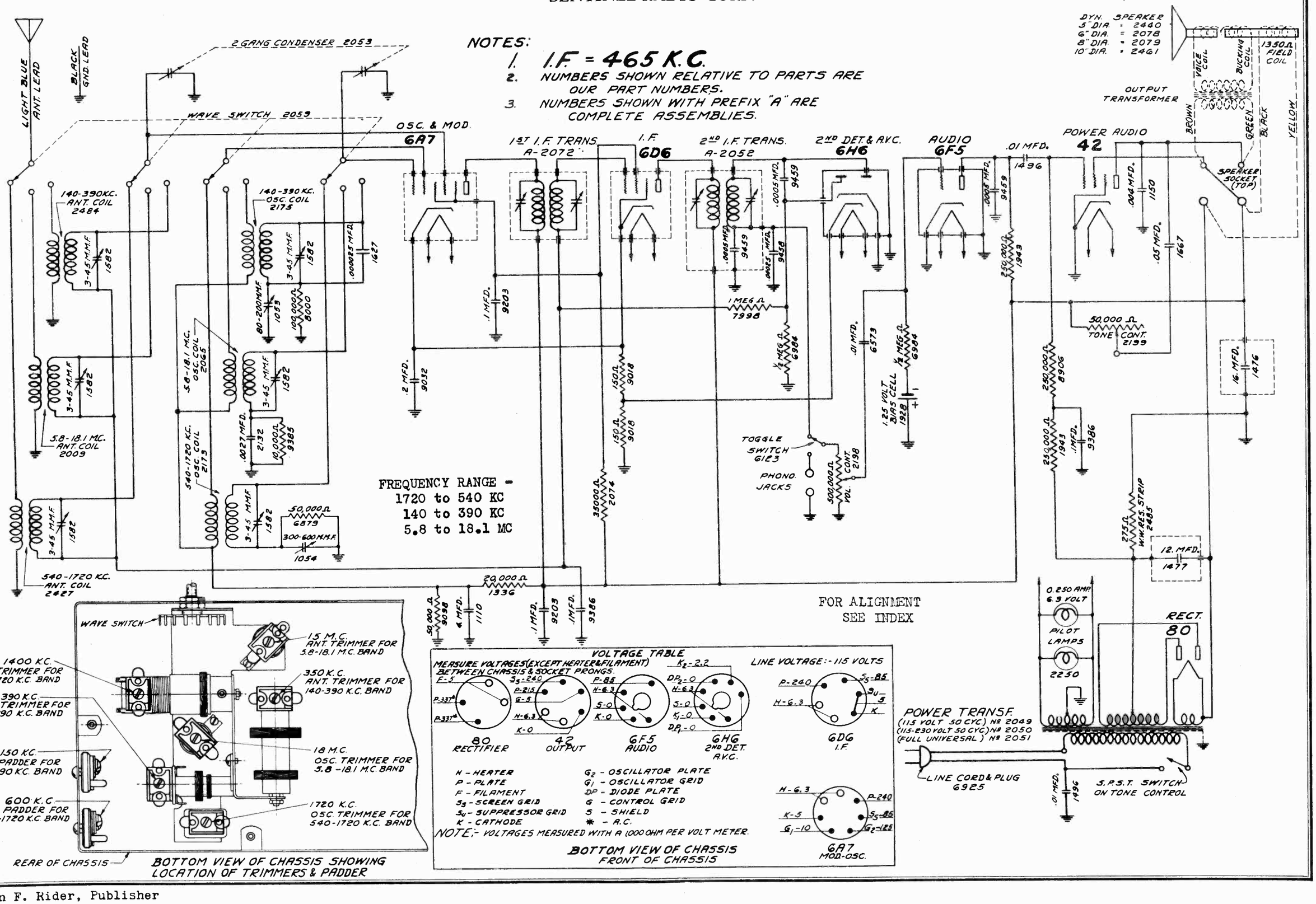
(d) Rock gang condenser slightly to right and left and adjust 18 M.C. antenna and R.F. trimmers for maximum 18 megacycle test signal response.

MODEL 44 A
Schematic, Parts

Socket, Trimmers
Voltage

SENTINEL RADIO CORP.

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



BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER

VOLTAGE TABLE

MEASURE VOLTAGES (EXCEPT HEATER & FILAMENT) BETWEEN CHASSIS & SOCKET PRONGS.

LINE VOLTAGE :- 115 VOLTS

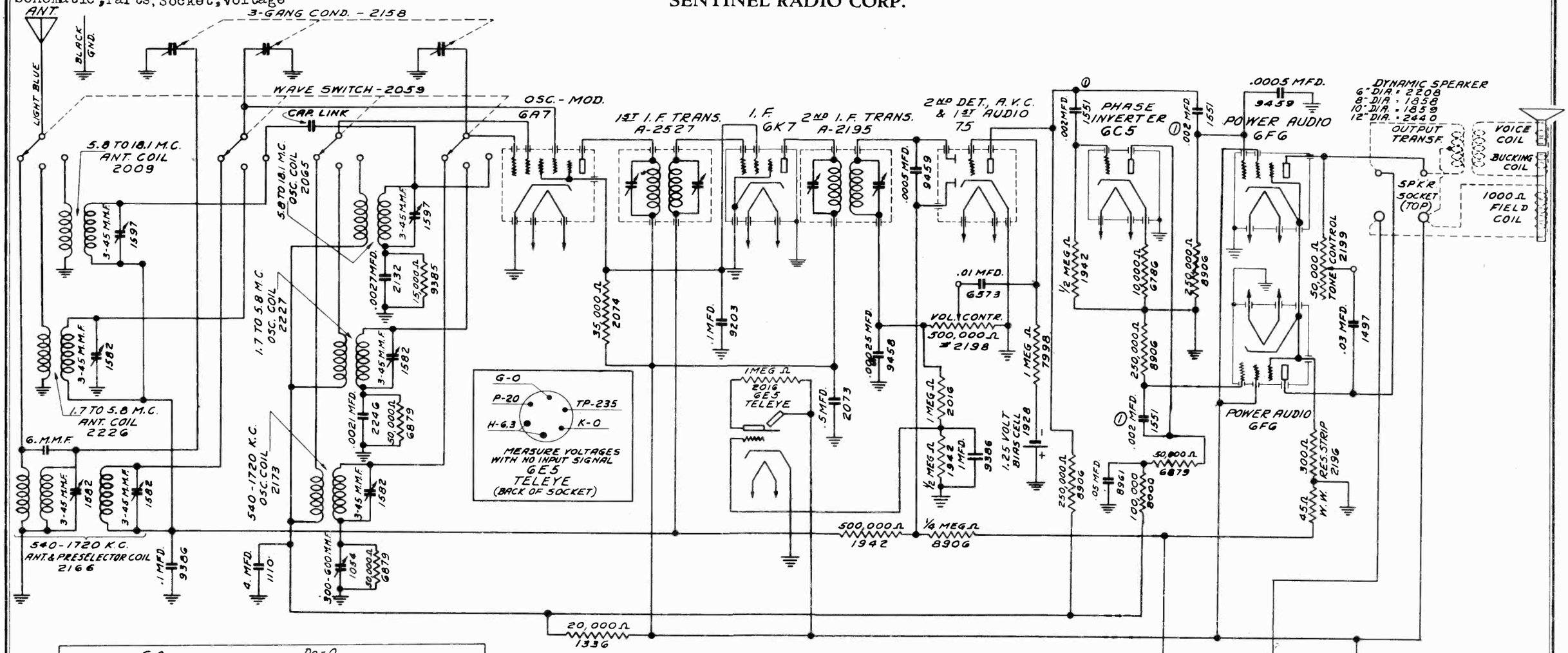
H - HEATER
P - PLATE
F - FILAMENT
S_3 - SCREEN GRID
S_u - SUPPRESSOR GRID
K - CATHODE
G_2 - OSCILLATOR PLATE
G_1 - OSCILLATOR GRID
DP - DIODE PLATE
G - CONTROL GRID
S - SHIELD
* - A.C.

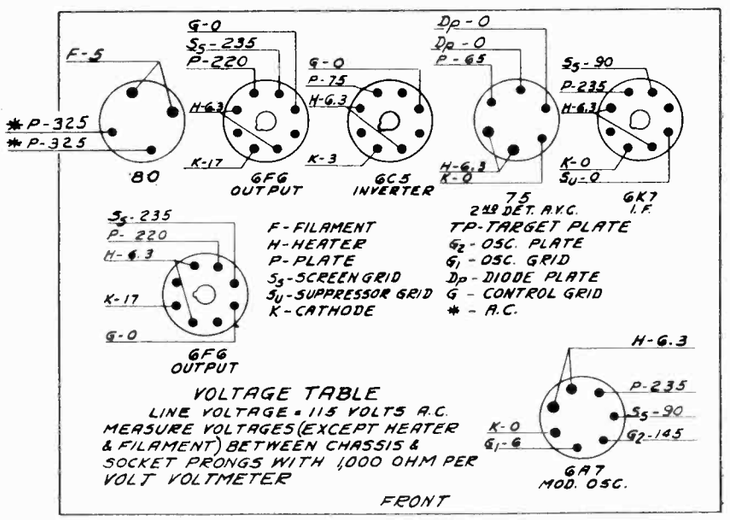
NOTE:- VOLTAGES MEASURED WITH A 1,000 OHM PER VOLT METER.

BOTTOM VIEW OF CHASSIS FRONT OF CHASSIS

MODEL 46 A
Schematic, Parts, Socket, Voltage

SENTINEL RADIO CORP.





BOTTOM VIEW OF CHASSIS

NOTE:-

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

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

Model 44A
Six Tube A. C. Superheterodyne Receiver

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6A7 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one ot the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18 MEGACYCLES.

Bring in the 18 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER at 18 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in.

3. With band selector switch set for operation on 5.8-18.1 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antenna trimmer to maximum 15 megacycle signal sensitivity.
4. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 1720-540 kilocycle band and set test oscillator frequency and receiver dial to EXACTLY 1720 KILOCYCLES. BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
5. With band selector switch placed for operation on the 1720-540 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 antenna trimmer for maximum 1400 kilocycle signal sensitivity.
6. Leave band selector switch for operation on 1720-540 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycles padder for maximum sensitivity.
7. Place band selector switch for operation on the 390-140 kilocycle band, and set test oscillator frequency and receiver dial to EXACTLY 390 KILOCYCLES. BRING IN THE 390 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT WITH 390 KILOCYCLE OSCILLATOR TRIMMER.
8. With band selector switch set for operation on 390-140 kilocycle band, tune the receiver dial and set test oscillator frequency to EXACTLY 350 KILOCYCLES. Adjust 350 kilocycle antenna trimmer for maximum 350 kilocycle signal response.
9. Leave band selector switch for operation on the 390-140 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 150 kilocycles. Then while rocking gang condenser slightly to right and left adjust 150 kilocycle padding condenser for maximum sensitivity.

Model 46A Eight Tube A. C. Superheterodyne Receiver

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transtormer by turning one ot the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

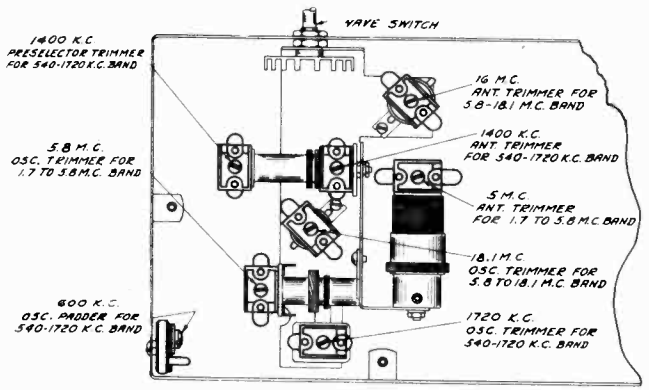
TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.1 MEGACYCLES.

Tune in the 18.1 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.1 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER at 18.1 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.1 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.1 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.1 megacycles, and if the fundamental peak was used in aligning at 18.1 megacycles the test oscillator signal will be heard at approximately 17.1 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.1 megacycle oscillator trimmer must be properly readjusted.

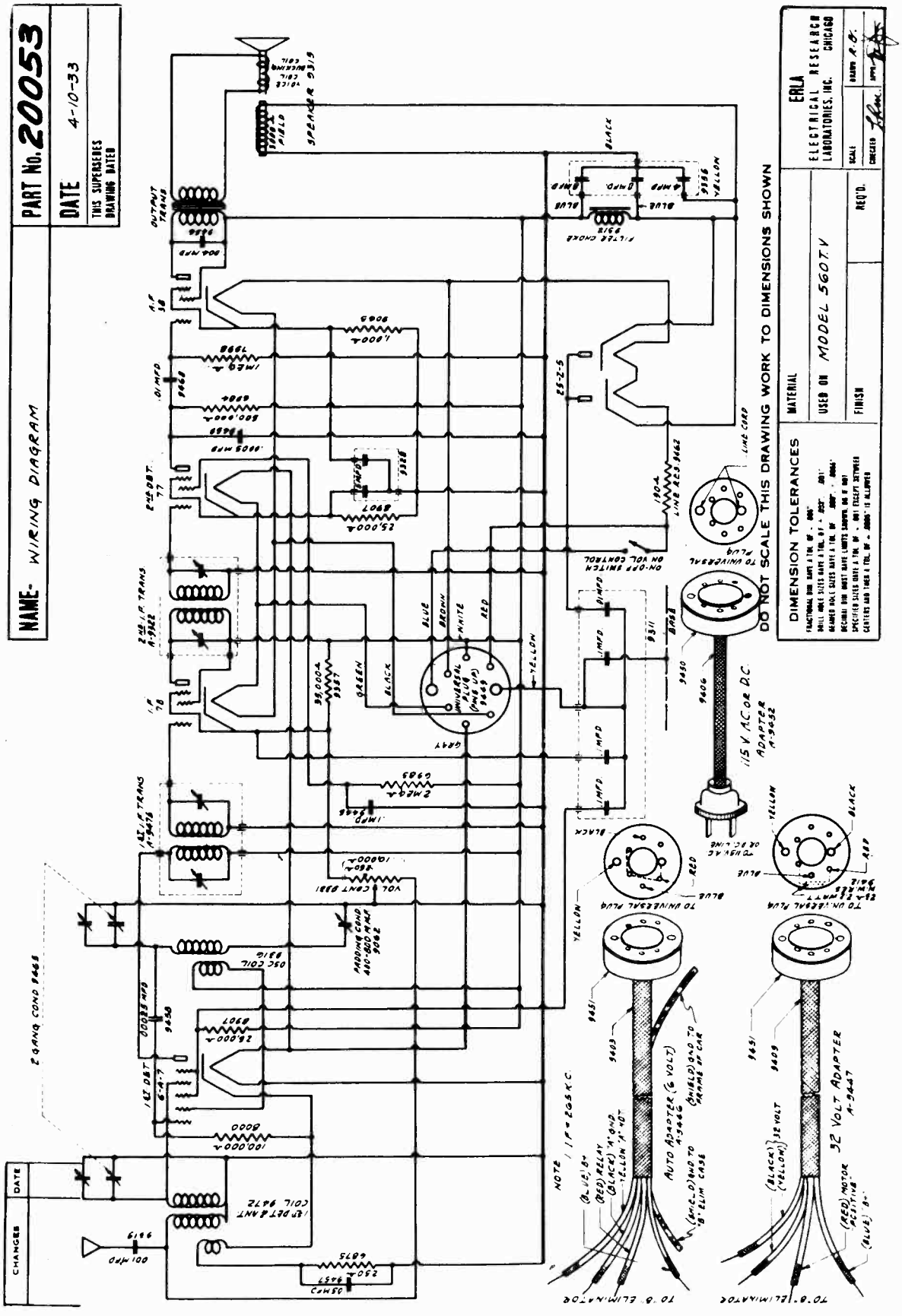
3. With band selector switch set for operation on 5.8 to 18.1 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES. Adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.
4. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES. BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.
5. With the band selector switch set for operation on the 1.7 to 5.8 megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna trimmer for maximum 5 megacycle signal sensitivity.
6. Replace the 400 ohm resister in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, tune receiver dial, and set test oscillator frequency to EXACTLY 1720 KILOCYCLES. NEXT BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
7. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
8. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.



BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER

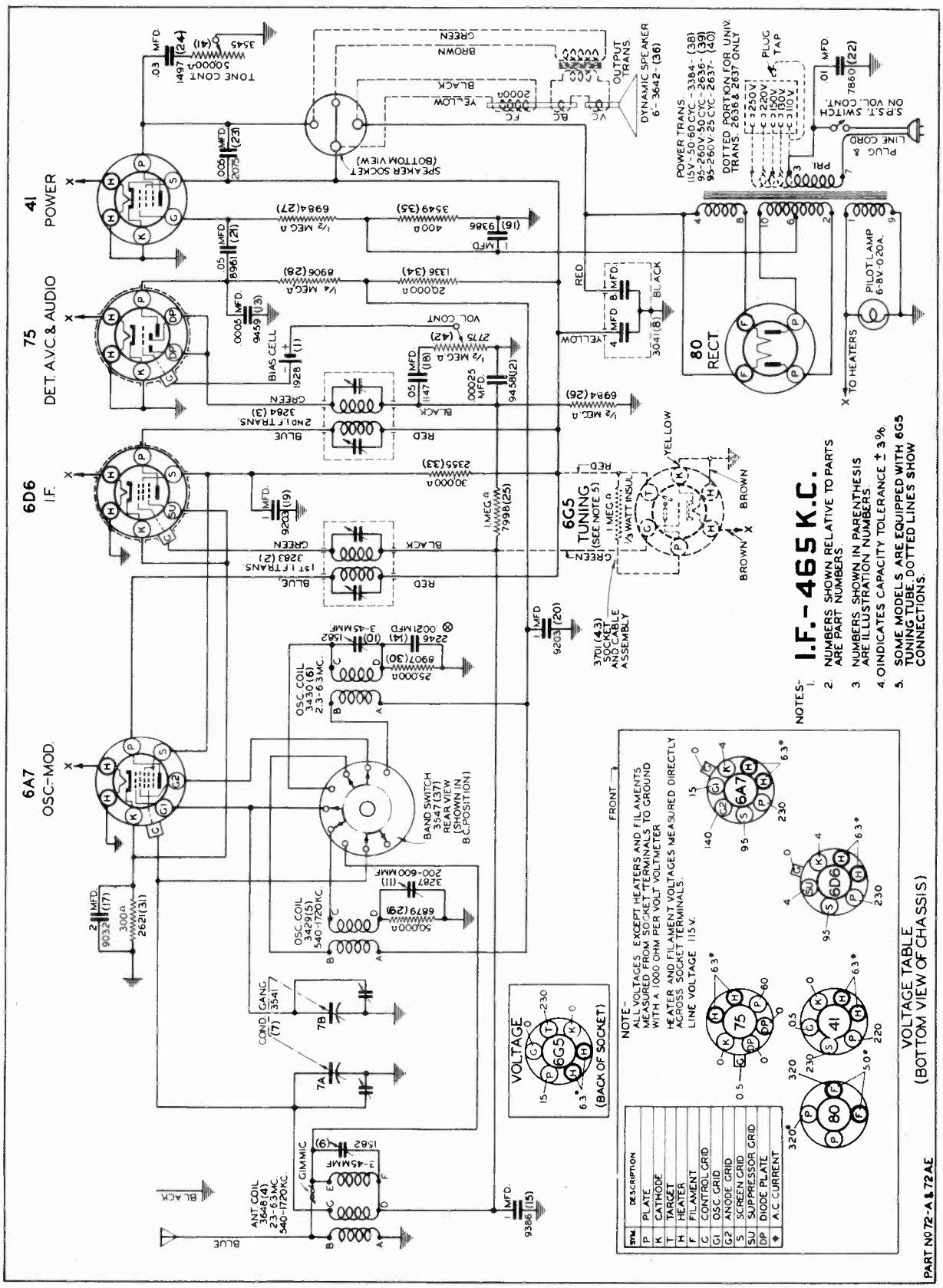
MODEL 560 TV
Schematic
Parts

SENTINEL RADIO CORP.



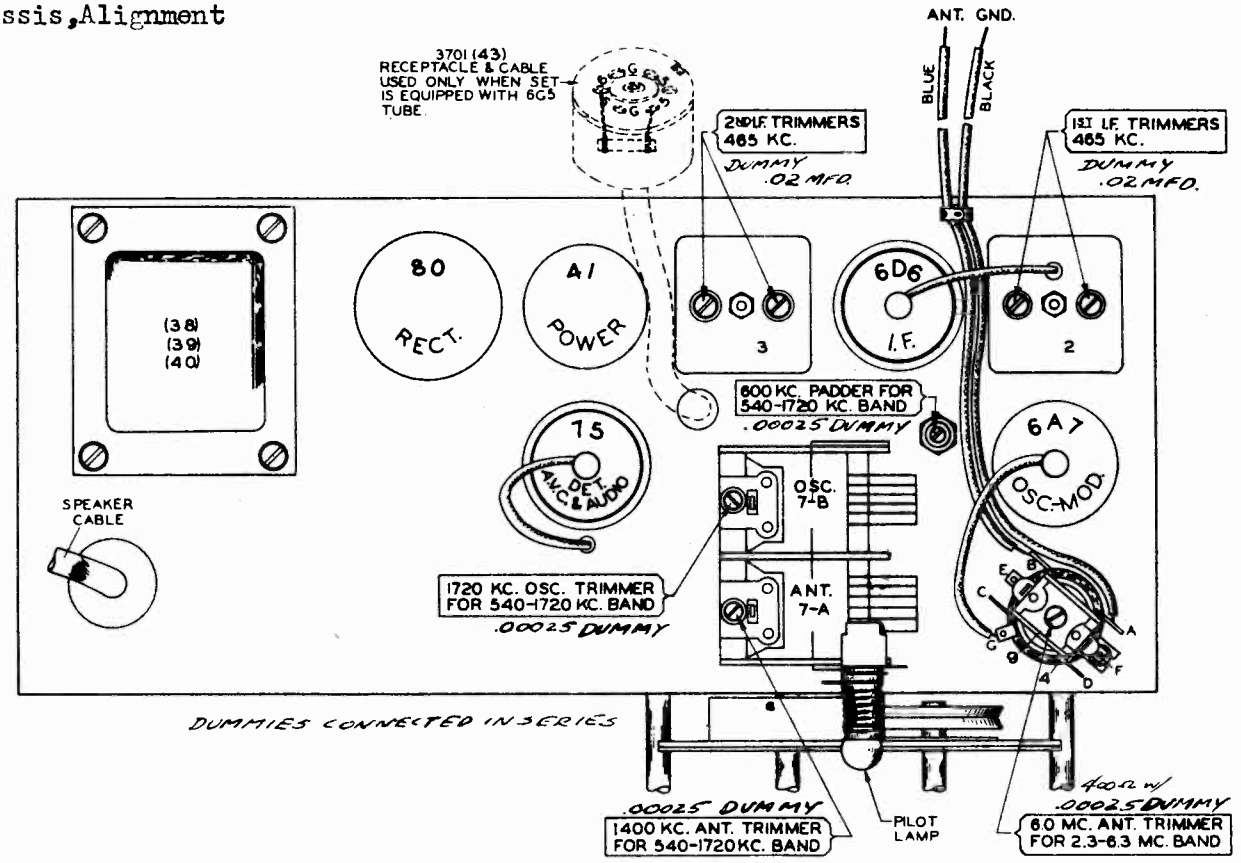
SENTINEL RADIO CORP.

MODELS 72 A, 72 AE
Schematic, Parts
Socket, Voltage

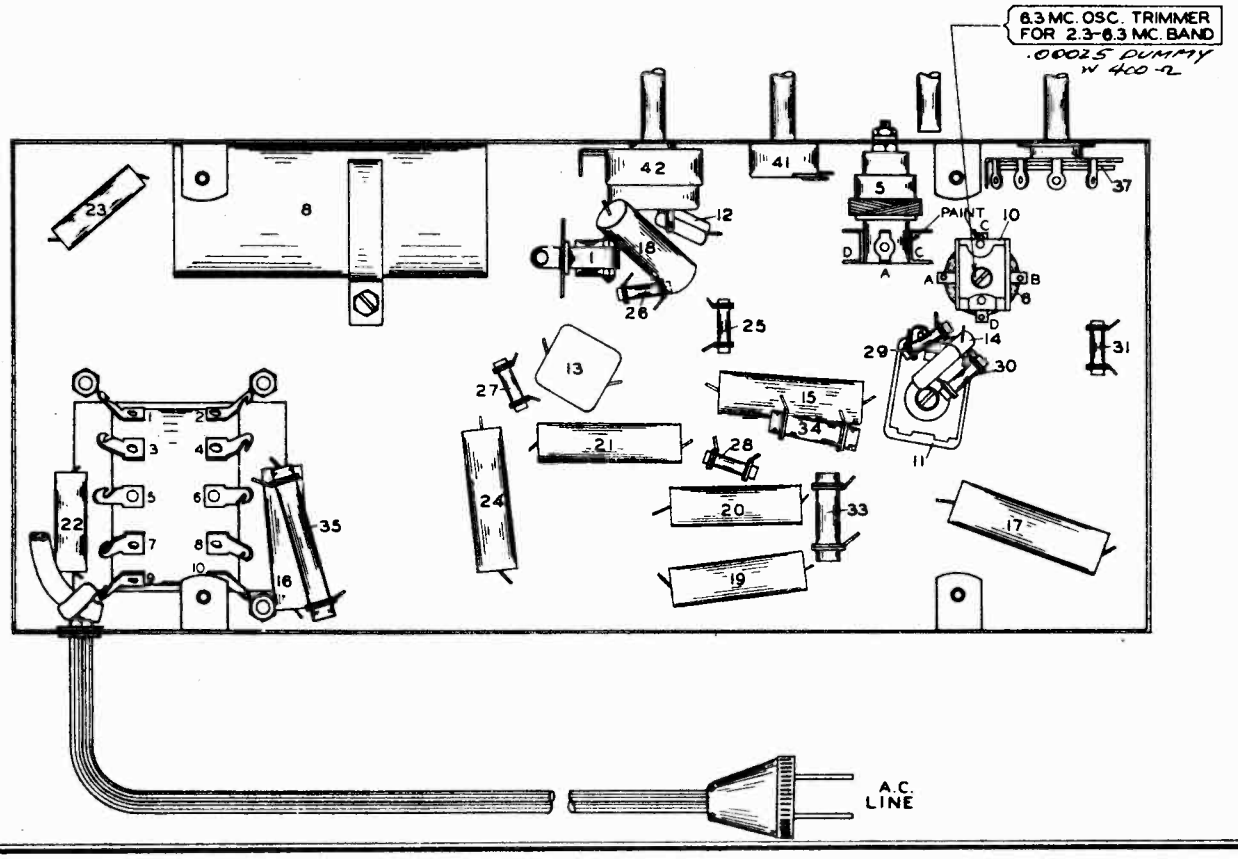


MODELS 72 A, 72 AE
Socket, Trimmers
Chassis, Alignment

SENTINEL RADIO CORP.

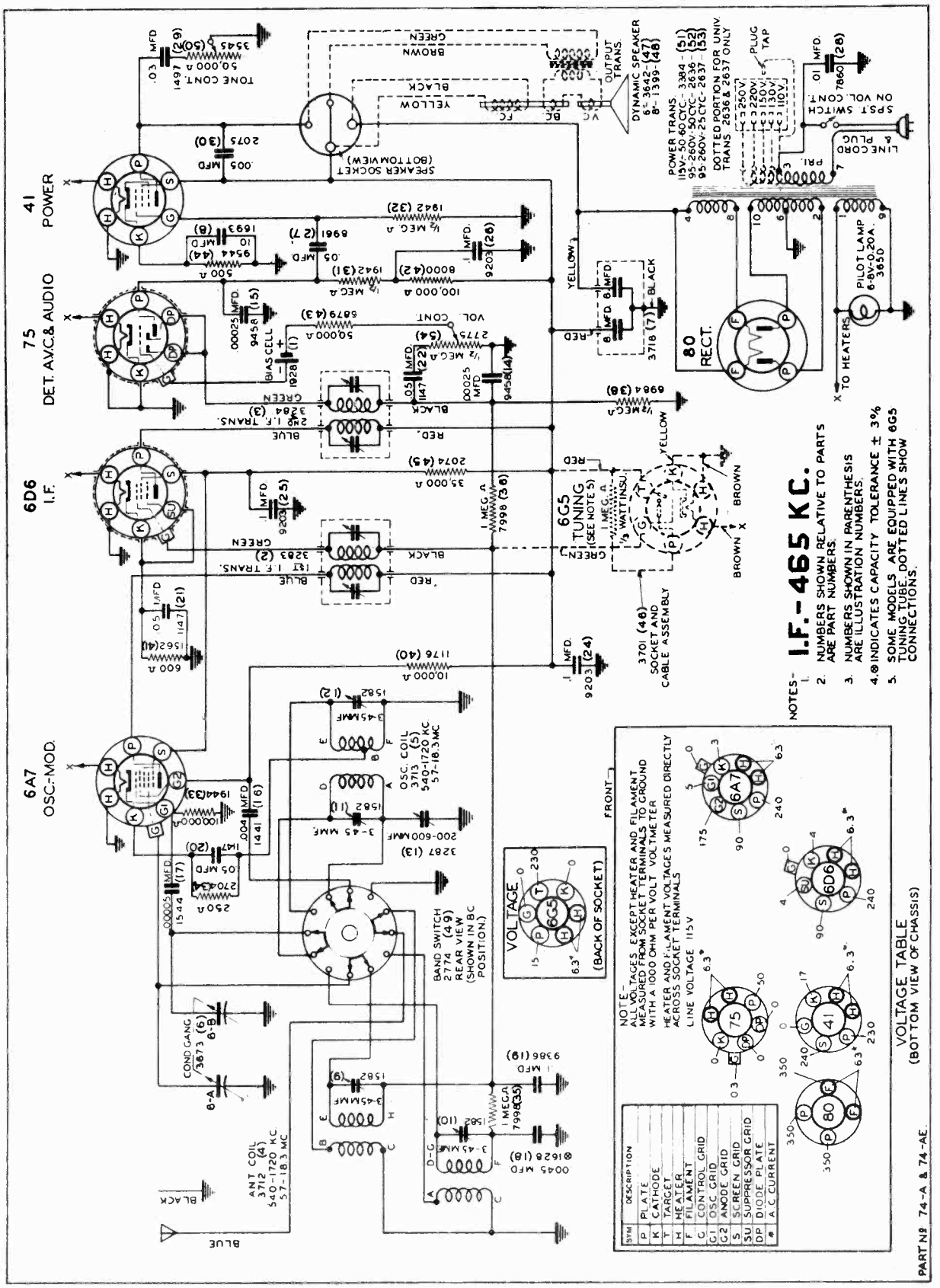


CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



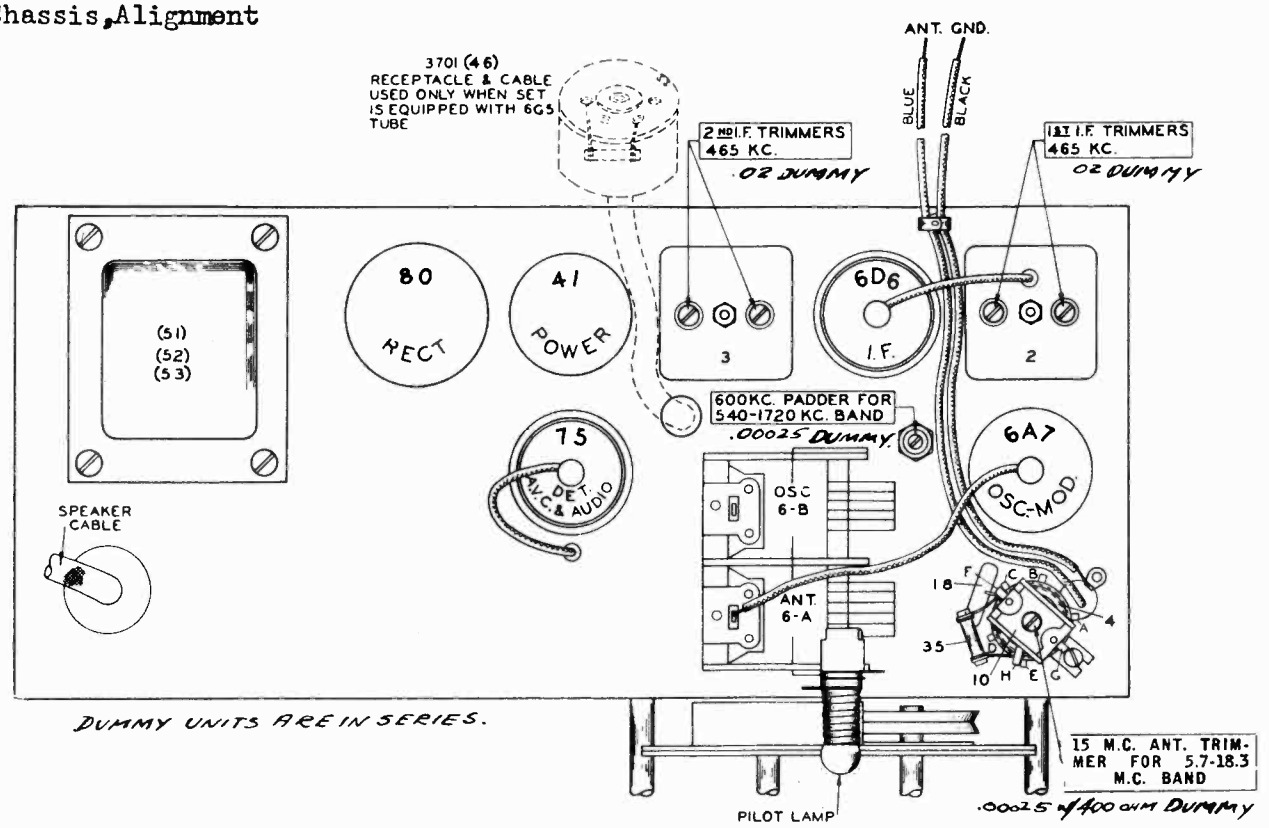
MODELS 74 A, 74 AE
Schematic, Parts
Socket, Voltage

SENTINEL RADIO CORP.

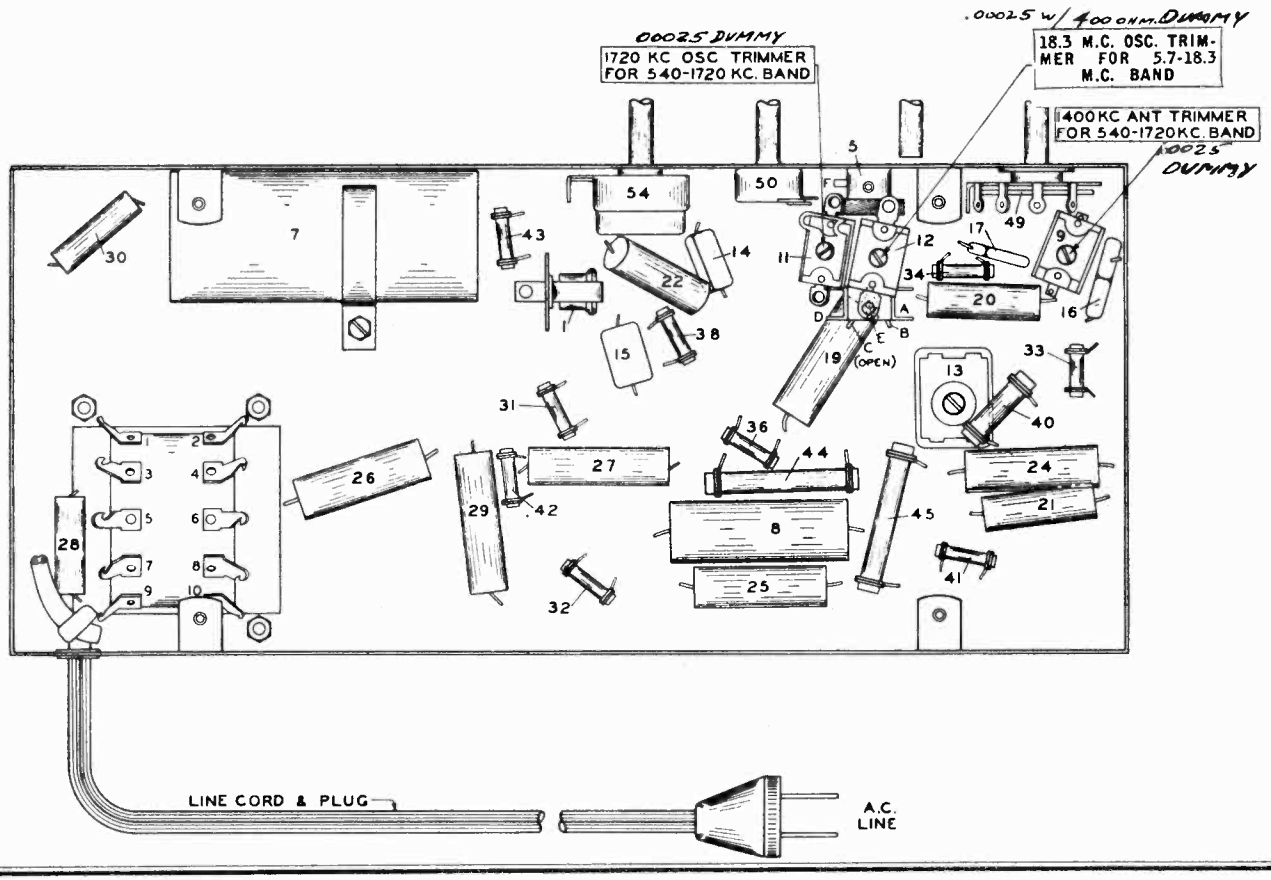


MODELS 74 A, 74 AE
Socket, Trimmers
Chassis, Alignment

SENTINEL RADIO CORP.

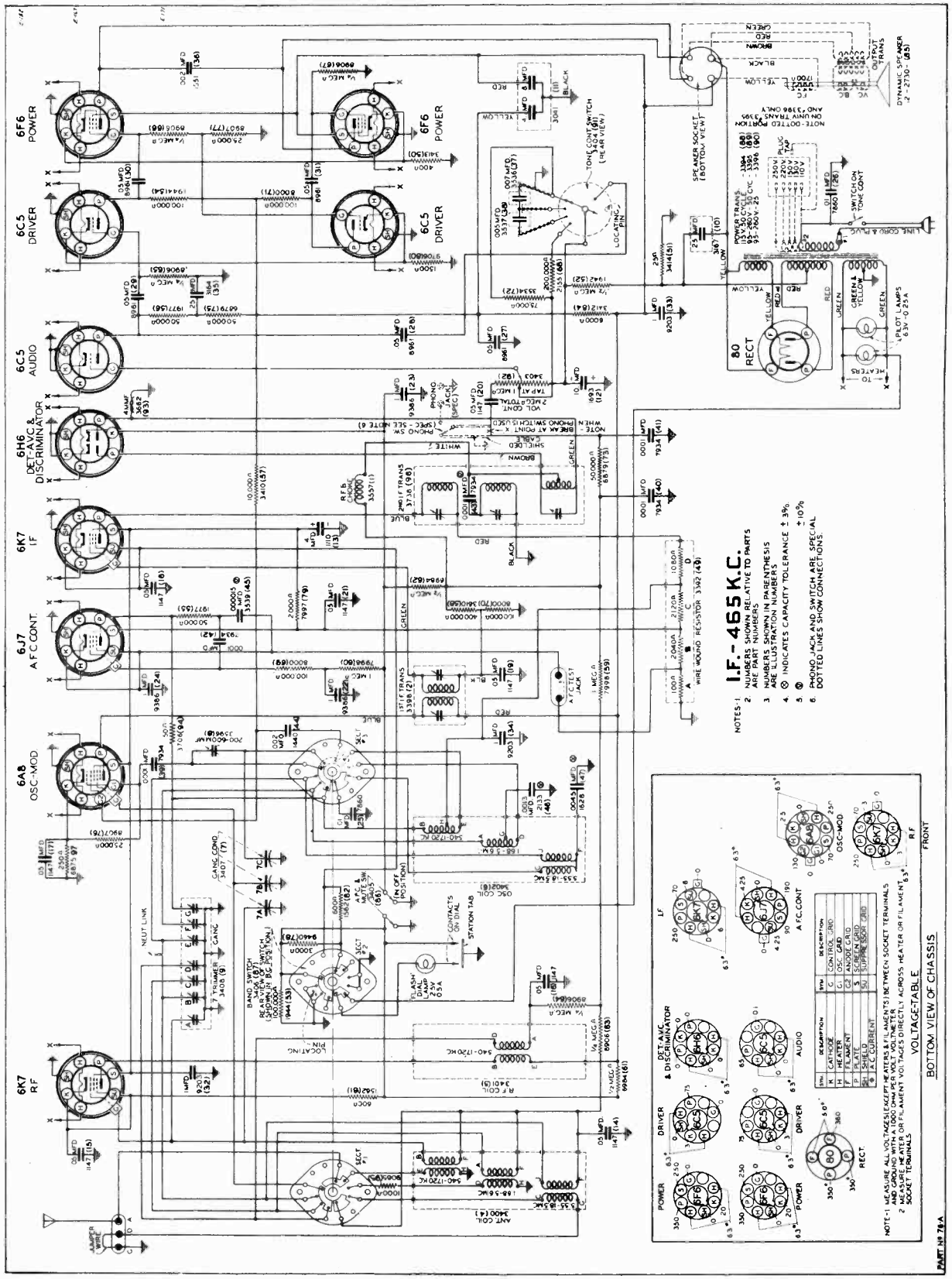


CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



SENTINEL RADIO CORP.

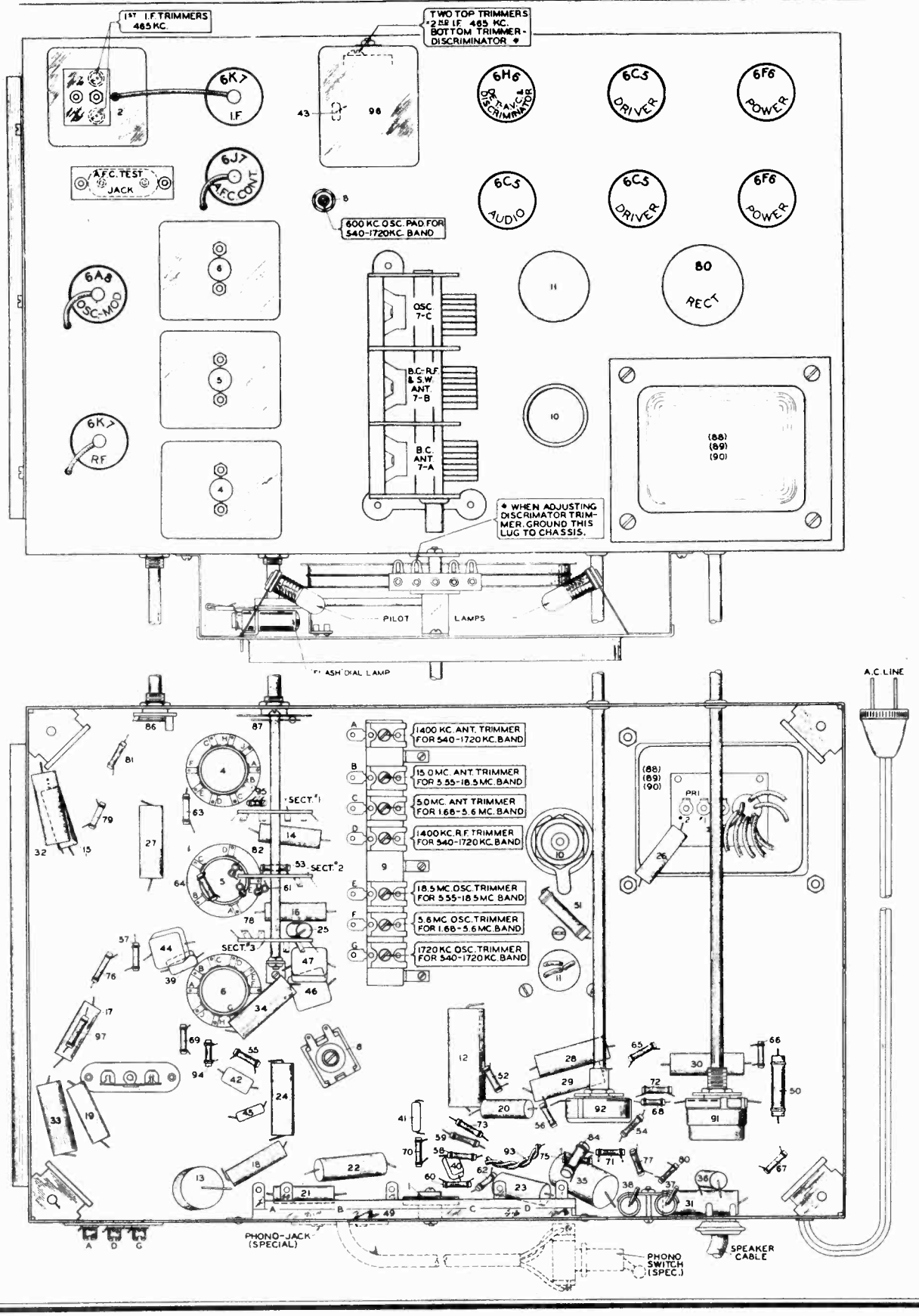
MODEL 76 A
Schematic, Parts
Socket, Voltage



MODEL 76 A
Socket, Trimmers
Chassis

SENTINEL RADIO CORP.

PARTS LAYOUT FOR MODEL 76-A RECEIVER.



ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Place automatic frequency control in the maximum left hand A.F.C. "off" position.

(b) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A8 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(c) Set test oscillator to EXACTLY 465 kilocycles and turn volume control on full.

(d) Remove shields held in position by snap fasteners over A.F.C. test jack and over trimmer screw holes in the first and second I.F. transformer shield cans.

(e) Peak second I.F. transformer trimmers for maximum 465 kilocycle output by adjusting the two trimmers accessible through the two top holes in the second I.F. transformer shield can. DO NOT TOUCH DISCRIMINATOR (BOTTOM) SCREW.

(f) Peak each of the first I.F. transformer trimmers for maximum 465 kilocycle signal output.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line, move needle to correct position.

(b) Remove test oscillator lead from grid of 6A8 tube and connect to receiver "A" antenna post through a .00025 Mfd. condenser.

(c) Adjust A.F.C. control to maximum left hand A.F.C. "off" position and band selector switch for operation on the 1720-540 kilocycle band.

(d) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. R.F. and antenna trimmers for maximum sensitivity.

(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

ALIGNING DISCRIMINATOR CIRCUIT:

(a) After completing 1720-540 kilocycle adjustment, set test oscillator to EXACTLY 465 KILOCYCLES and connect to grid of 6A8 tube through a .02 Mfd. Condenser—insert lead of double scale 0 to 1 and 0 to 5 milliammeter into A.F.C. test jack located on top of chassis adjacent to the 6L7 tube. To avoid possibility of damaging the meter should one of the milliammeter leads short to the metal chassis, ALWAYS TURN OFF RECEIVER WHEN INSERTING OR REMOVING MILLIAMMETER LEADS FROM A.F.C. TEST JACK.

(b) Short out A.F.C. mute switch by grounding the second from the left (looking at the front of the chassis) of the four lugs mounted on top of the dial assembly. The proper lug to ground is indicated in the "Note X" on chassis top parts view.

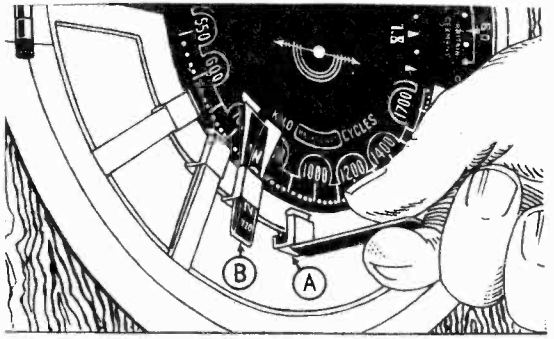
(c) Turn receiver on, place A.F.C. switch knob in A.F.C. "on" position and if meter needle jumps off scale adjust output of test oscillator until an approximate 2 M.A. deflection is obtained on the 0 to 5 milliammeter scale.

(d) Place band selector switch for operation on 1720-540 K.C. broadcast band—and set receiver dial somewhere near 1000 kilocycles at a point where no station is heard.

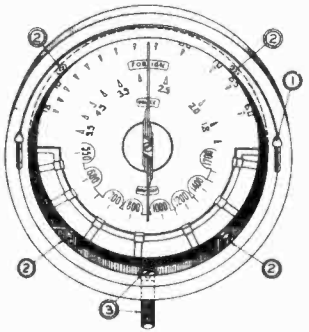
(e) Rotate A.F.C. switch knob from A.F.C. "on" to A.F.C. "off" position and note whether the milliammeter reading changes as the position of the A.F.C. switch is changed. No change in reading indicates probable proper discriminator trimmer adjustment, while a noticeable change indicates improper discriminator trimmer adjustment.

(f) IMPORTANT: DO NOT ADJUST DISCRIMINATOR TRIMMER UNLESS IT IS ABSOLUTELY NECESSARY. Place A.F.C. switch in A.F.C. "off" position and note milliammeter reading, then place A.F.C. switch in A.F.C. "on" position and CAREFULLY ADJUST DISCRIMINATOR TRIMMER UNTIL MILLIAMMETER READING IS EXACTLY THE SAME AS IT WAS WITH THE A.F.C. SWITCH IN THE "OFF" POSITION.

NOTE: As the discriminator trimmer screw is screwed in (increasing capacity) the milliammeter reading should decrease and as the discriminator trimmer is unscrewed (decreasing capacity) the milliammeter reading should increase. IF WHEN ADJUSTING THE DISCRIMINATOR TRIMMER THE MILLIAMMETER READING DOES NOT SHARPLY INCREASE OR DECREASE AS THE TRIMMER IS ADJUSTED EVEN AFTER SEVERAL TURNS OF THE TRIMMER SCREW, THIS DOES NOT INDICATE PROPER BALANCING BUT DOES INDICATE INCORRECT ADJUSTMENT AND THE DISCRIMINATOR TRIMMER SHOULD BE SET TO ABOUT ½ CAPACITY AND THE ADJUSTMENT OF THE DISCRIMINATOR TRIMMER MADE ALL OVER AGAIN.



Above Diagram shows method of inserting and setting tabs.



ALIGNING 1.68-5.6 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.

(b) Adjust band selector switch to 1.68-5.6 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.6 megacycles. Bring in 5.6 megacycle test signal to maximum output by adjusting 5.6 M. C. oscillator trimmer.

(c) Tune receiver dial and test oscillator frequency to EXACTLY 5 Megacycles and adjust 5 M.C. antenna trimmer for maximum sensitivity.

ALIGNING 5.55-18.5 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.55-18.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 18.5 megacycles.

(b) Adjust 18.5 M.C. oscillator trimmer to bring in 18.5 megacycle test signal to maximum output.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.5 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.5 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18.5 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 17.5 megacycles. Then vary the receiver dial slightly to the right and left of 17.5 megacycles, and if the fundamental peak was used in aligning at 18.5 megacycles the test oscillator signal will be heard at approximately 17.5 megacycles on the receiver dial.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 15 megacycles.

(c) Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

To assure more accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

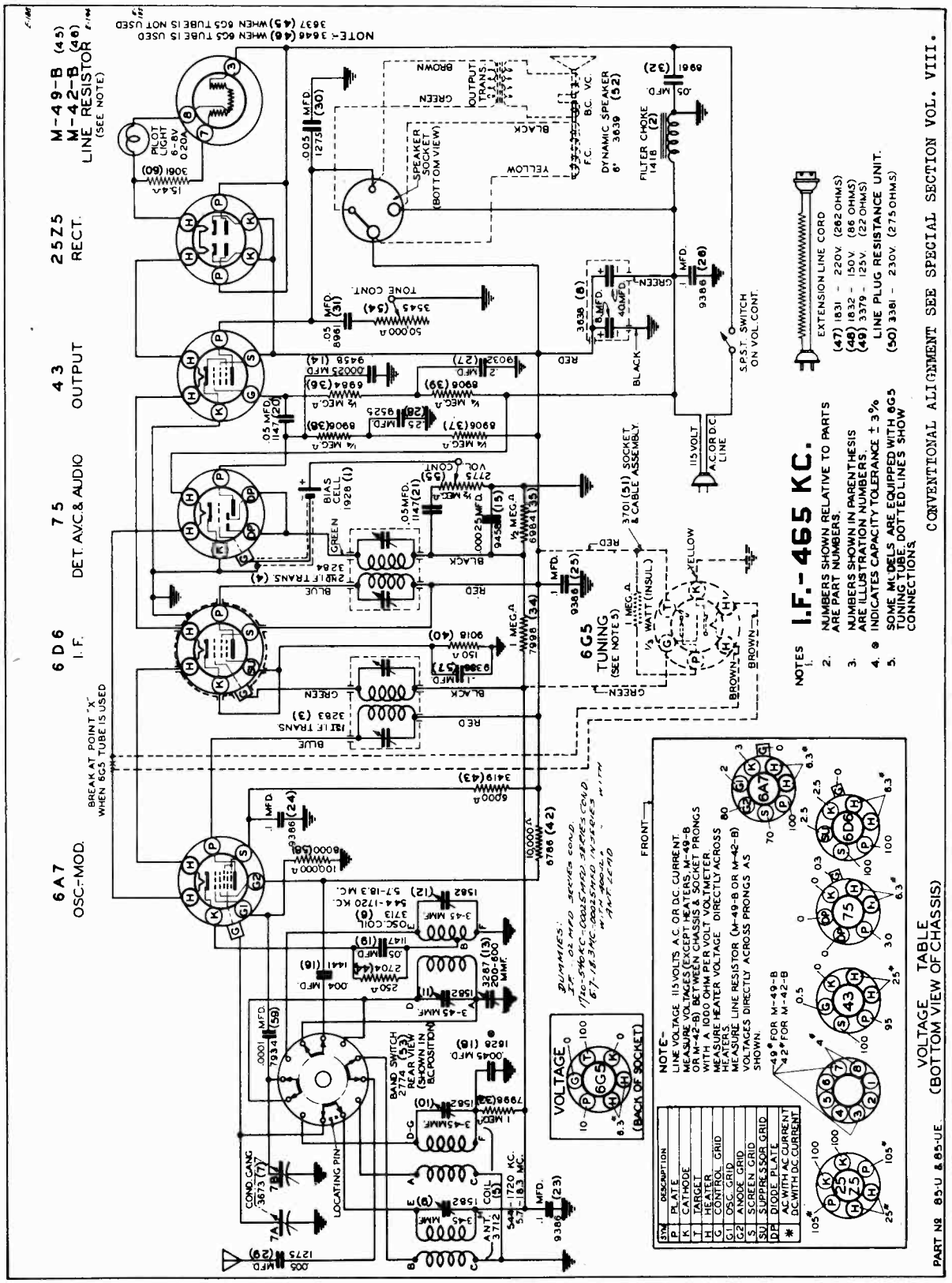
PROCEDURE FOR REMOVING RECEIVER FROM CABINET.

1. Unscrew the two knurled head screws mounted on front of the glass frame and then holding onto the screws pull dial glass away from the cabinet.
2. Swing 'rapid tuning' lever to center position as shown, loosen (do not remove) screw thru hole in bottom center, and remove lever knob.
3. Loosen set screws on all five tuning knobs, and remove knobs from shafts. (Not shown in sketch).
4. Remove four bolts at bottom side of chassis mtg. shelf (not shown in sketch.)
5. Remove wood screws on the pressure brackets at rear of chassis (not shown in sketch) and then slide receiver out of cabinet.
6. When replacing receiver in cabinet, reverse entire procedure given above.

MODELS 85,85 UE
Schematic,Parts

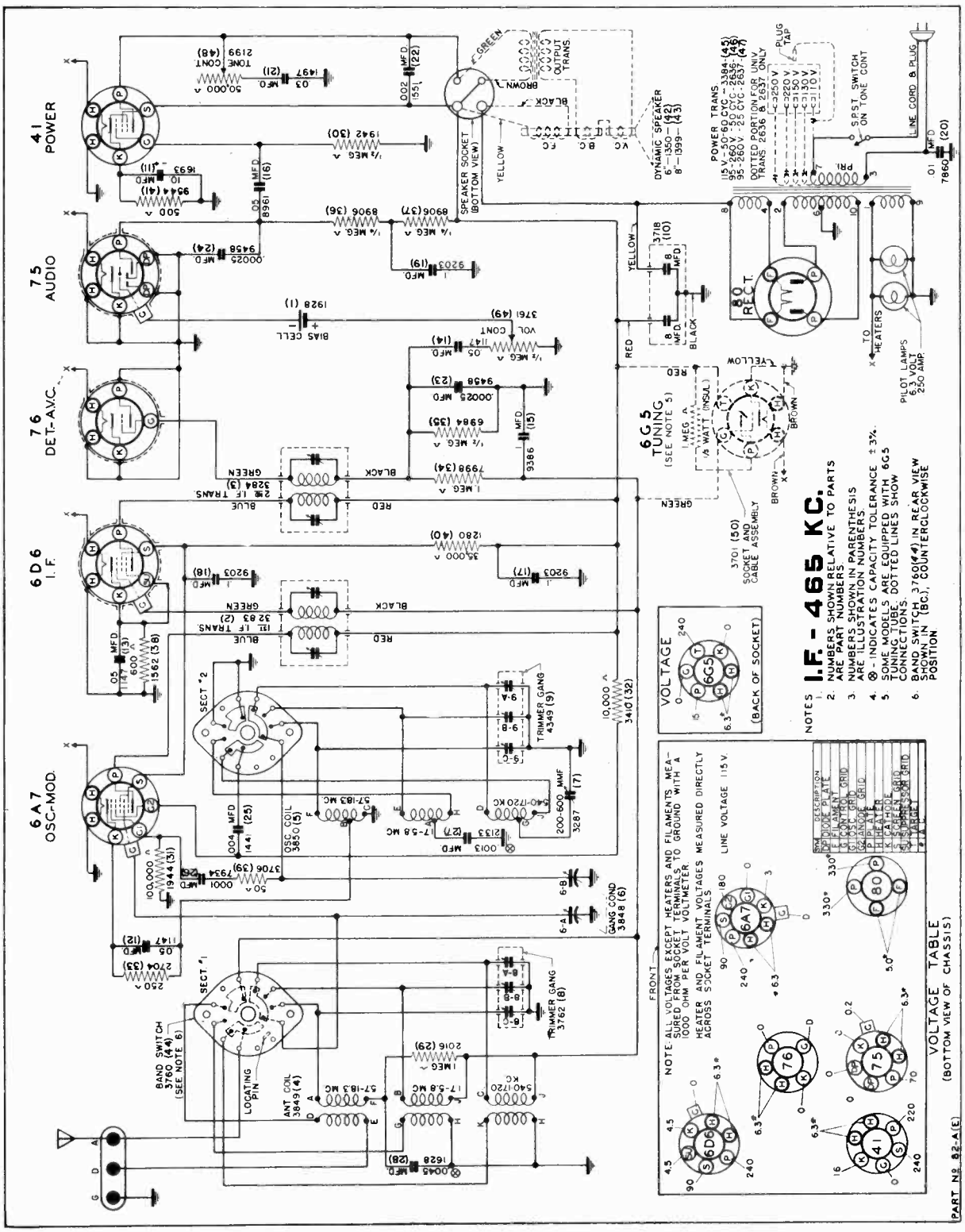
SENTINEL RADIO CORP.

Socket,Voltage
Alignment



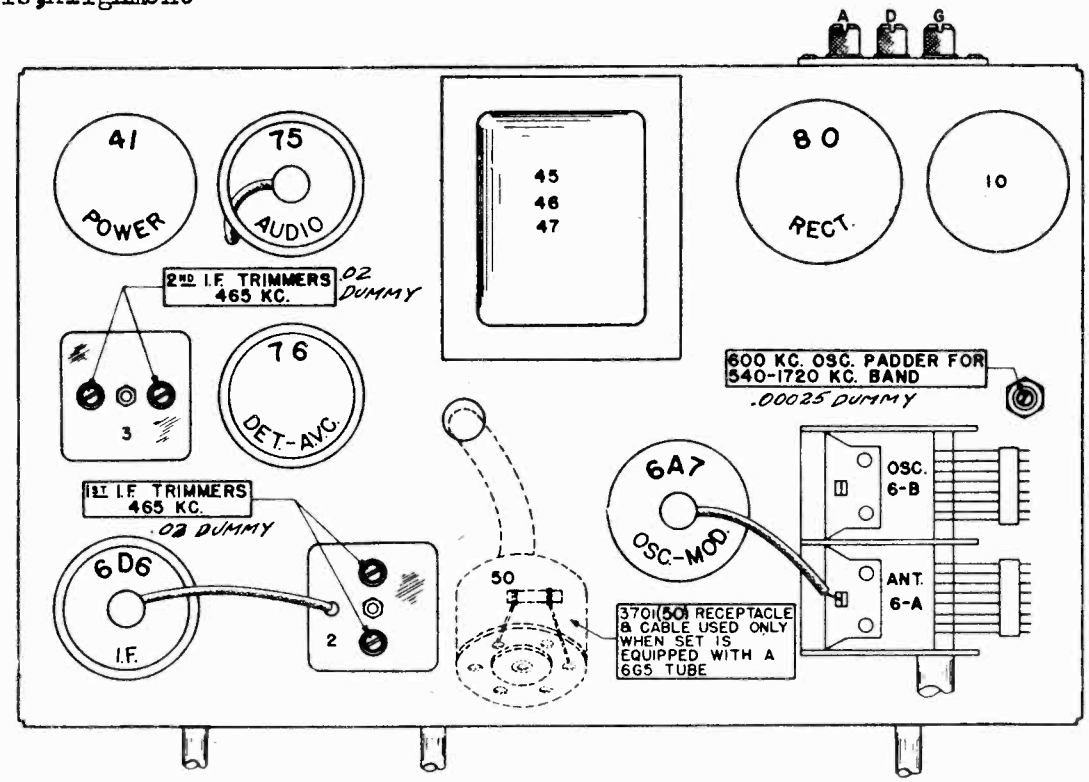
SENTINEL RADIO CORP.

MODELS 82 A, 82 AE
Schematic, Parts
Socket, Voltage

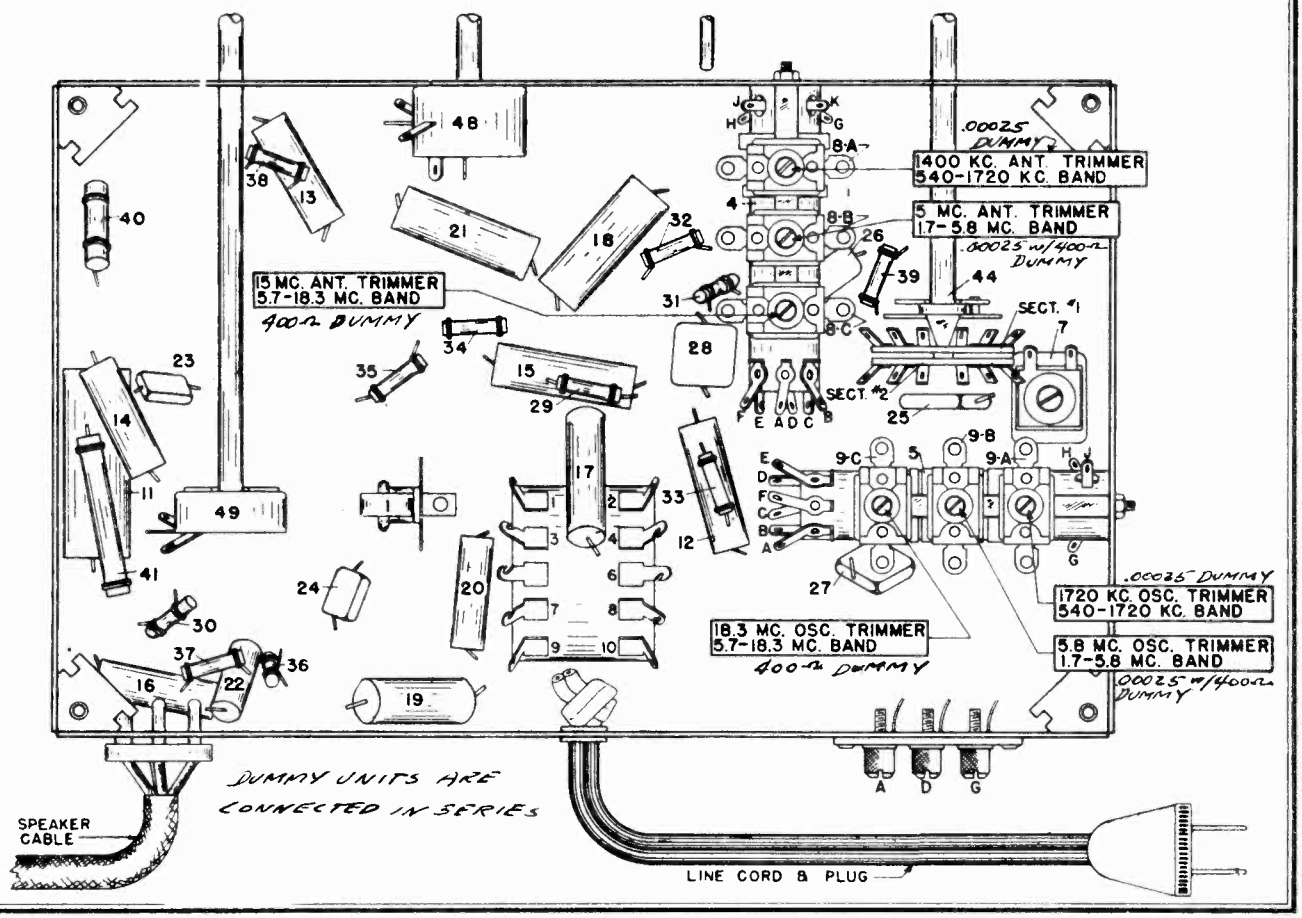


MODELS 82 A, 82 AE
Socket, Trimmers
Chassis, Alignment

SENTINEL RADIO CORP.

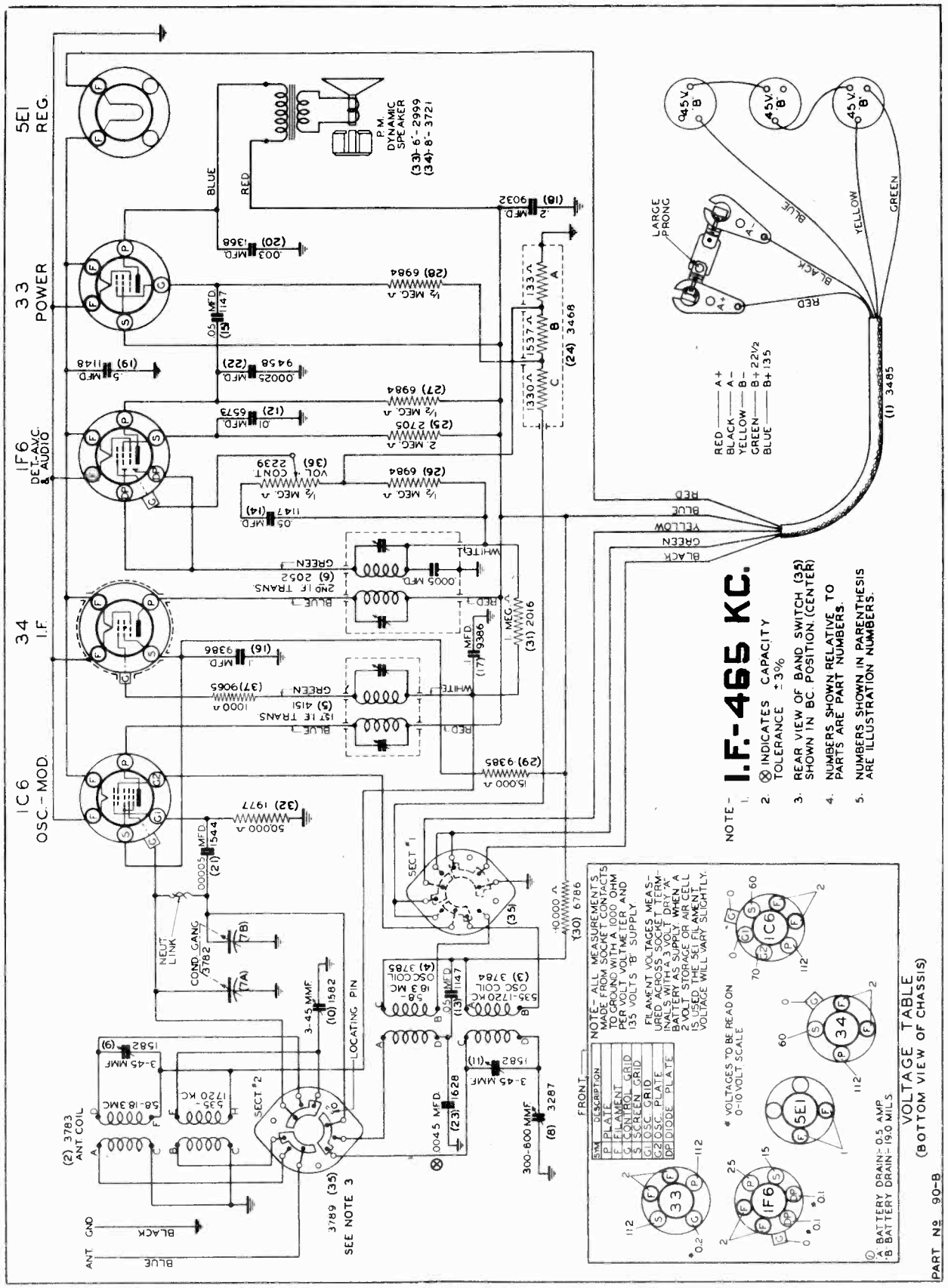


CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



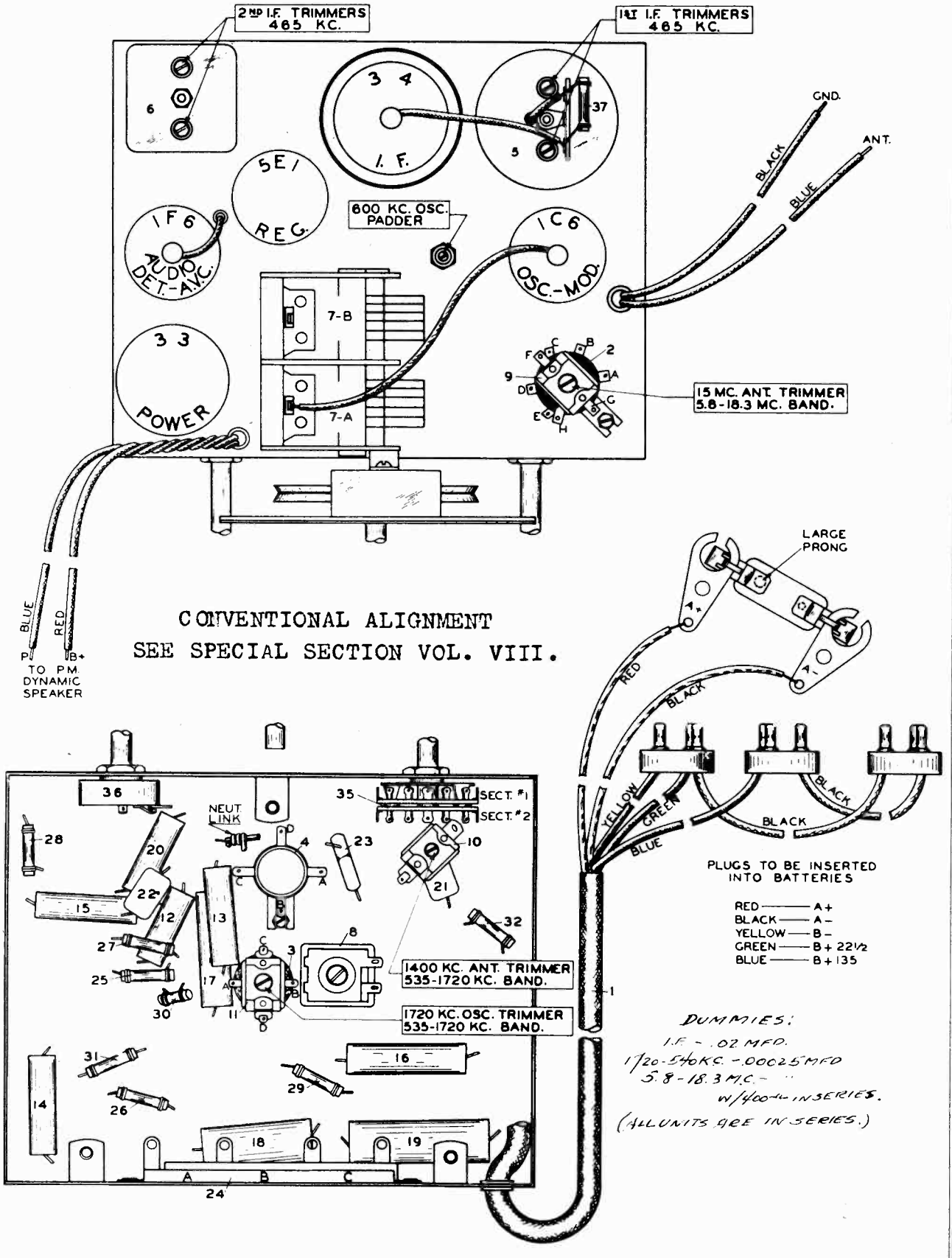
SENTINEL RADIO CORP.

MODEL 90 B
Schematic, Parts
Socket, Voltage



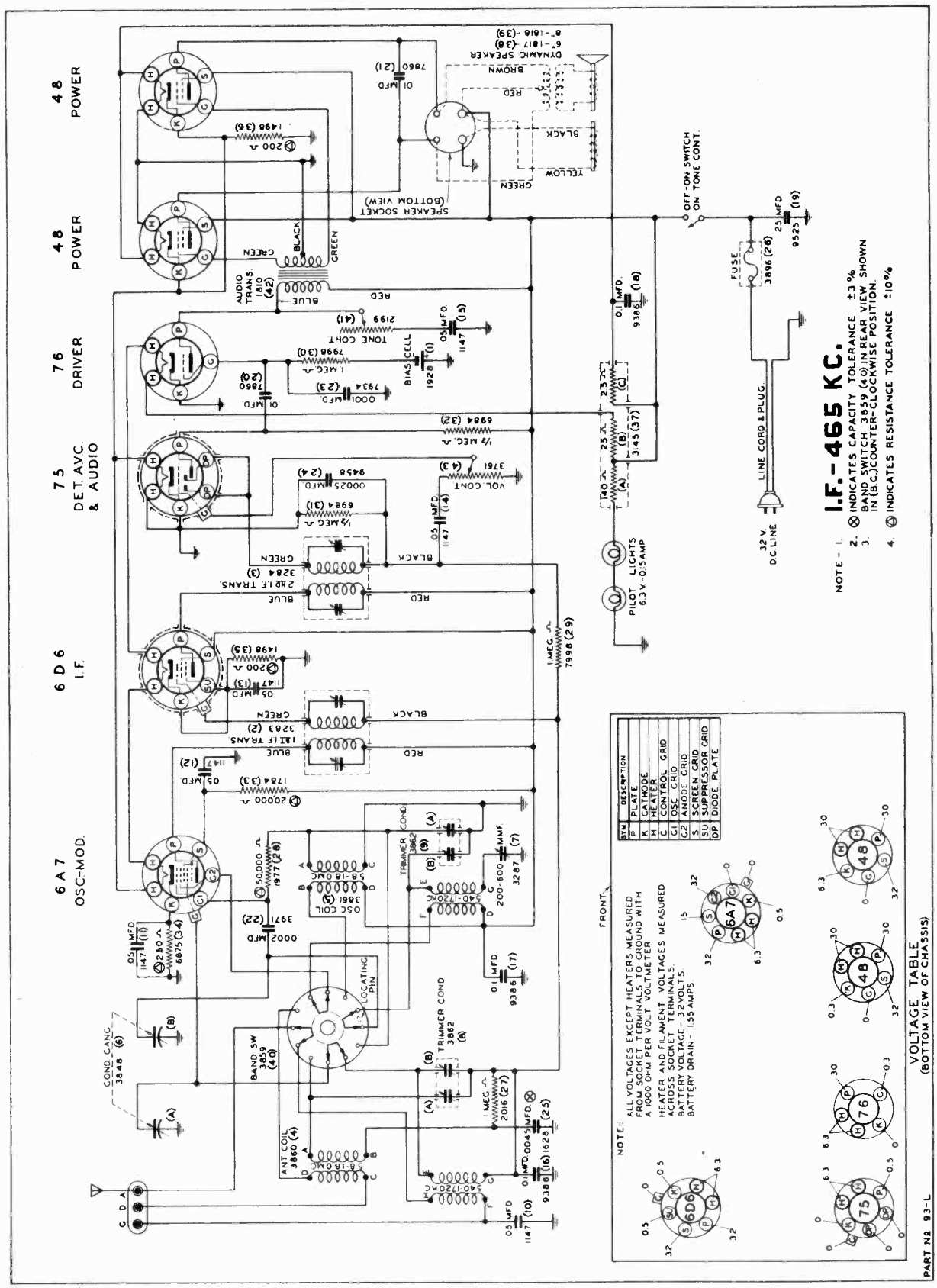
MODEL 90 B
Socket, Trimmers
Chassis, Alignment

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 93 L
Schematic, Parts
Socket. Voltage



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

ELIMINATION OF INTERFERENCE CAUSED BY A 32-VOLT LIGHT PLANT

General

Two kinds of static-like noise may be heard when you operate your 32 volt radio at the same time the generating plant is charging the plant batteries.

Static-like noise, due to the action of the brushes on the commutator, may reach the set through the supply lines. Such noise can generally be eliminated by the use of .5 Mfd. 200 volt condensers, as shown in Figs. 1 and 3.

Static-like noise, due to the operation of the high tension circuit may radiate through the air to the antenna of the set. Radiation has been found to extend a half mile in extreme cases. Proper placement of the antenna, along with the use of a spark plug suppressor and correct shielding will entirely eliminate this type of noise.

When eliminating these electrical disturbances always apply the remedies given in the order in which they appear.

Usual Installations

Install spark plug suppressor on the spark plug and connect the high tension lead to the suppressor, as shown in Figure 3.

For four cylinder plants use four spark plug supressors, one attached to each spark plug.

CAUTION: Disconnect batteries from generator before attaching suppressor equipment.

Connect one .5 Mfd. 200 volt condenser between one positive brush and the generator frame and one condenser between one negative brush and the generator frame as shown in Figure 1.

FOUR CYLINDER PLANTS. For four cylinder plants attach a condenser to the positive and negative brushes as shown in Figure 2.

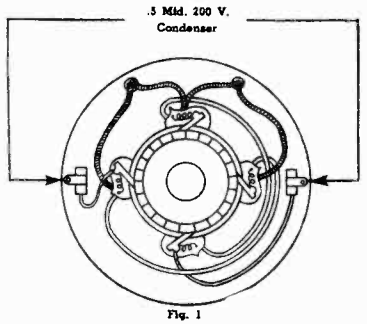


Fig. 1

Extreme Cases

To determine if the high tension wiring is radiating into the antenna disconnect the antenna and ground from the receiver and if the noise is eliminated or materially reduced, the noise is being picked up by the antenna. In such a case, obtain a piece of electrician's loom which will just slide over the high tension wire and a piece of copper braid shielding which will just slip over the loom. Cut a piece of loom just long enough to cover the high tension wire from the coil to the spark plug suppressor. Cut a piece of shielding that will be one inch shorter than the loom when the shielding is extended over the loom.

Ignition Noise on Battery Leads

Sometimes the ignition interference will travel up the battery leads. This condition can be corrected as follows: Attach a .5 Mfd. condenser between the POSITIVE terminal at the top of the control box and the frame of the box. (Be sure the frame of the box is well grounded to the generator frame.) Attach a .5 Mfd. condenser between the NEGATIVE terminal at the top of the control box and the control box frame.

Ignition Interference on Supply Leads

In extreme cases the ignition interference will travel up the supply leads to the radio receiver. This condition can be corrected by attaching a .5 Mfd. condenser between the ungrounded side of the line (in the main switch box) and ground (or the grounded side of the line if one side of the line is grounded).

Grounding

Some cases may require a thorough grounding of the system. This may be accomplished by running a No. 12 B. & S. gauge wire from the generator frame to a good ground. Conduit and metal switch boxes should also be grounded.

If it is necessary to ground one side of the supply lines, first ground them temporarily, one at a time through a 32 volt lamp. One side of the line will light the light, the other will not. The side which WILL NOT light the light should be grounded.

DO NOT apply any of the remedies listed under "Extreme Cases", before trying the ones listed under "Usual Cases".

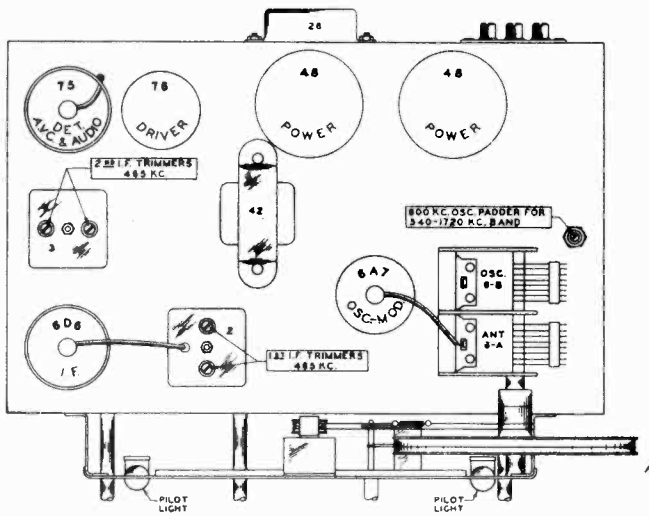
Slip the loom over the high tension lead. Slip the shielding over the loom so that it is one-half inch from each end of the loom. Wrap some fine copper wire around the shielding near the end of the shielding to hold the shielding in place. Solder the wire to the shielding so it will not slip due to plant vibration. The shield may be taped in place if the tape is very adhesive. DO NOT USE FRICTION TAPE.

Solder a short braid pig-tail to the shielding and ground it under the nearest screw in the generator frame.

This receiver is designed for operation on 32 volt battery plants only and must not be used on battery plants of a HIGHER RATED VOLTAGE than 32 volts without a voltage regulator.

The power plug attached to the end of the power cord must be inserted correctly IN THE 32 VOLT POWER SUPPLY OUTLET OR RECEPTACLE, OTHERWISE THE SET WILL NOT OPERATE. If after inserting the plug and turning the receiver on, the set does not operate after approximately two minutes, remove this plug and turn it half-way around and reinsert it in the power receptacle.

A 4 AMPERE FUSE is located on the back of the chassis underneath receptacle marked "Fuse" and protects the receiver from damage should a defect occur in the set or if it is connected to the improper power supply. Continued burning out of fuses on the proper power supply is indicative of some defect. THE WARRANTY IS VOID IF THE RECEIVER IS OPERATED WITH THE FUSE SHORTED OUT OR WITH A FUSE LARGER THAN 4 AMPERES.



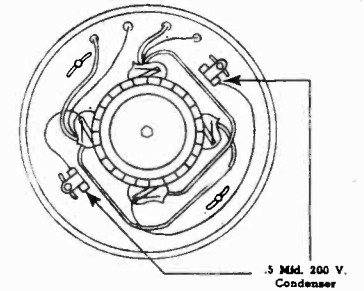


Fig. 2

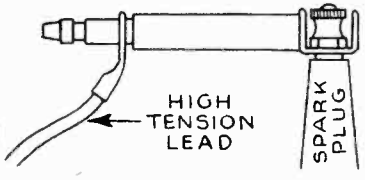
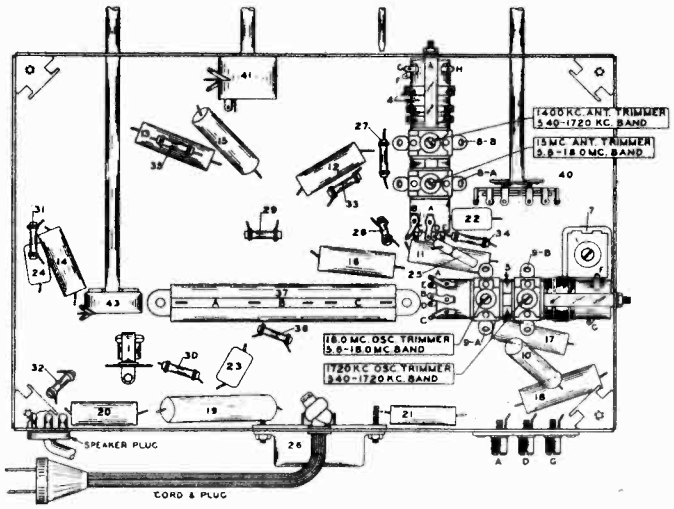
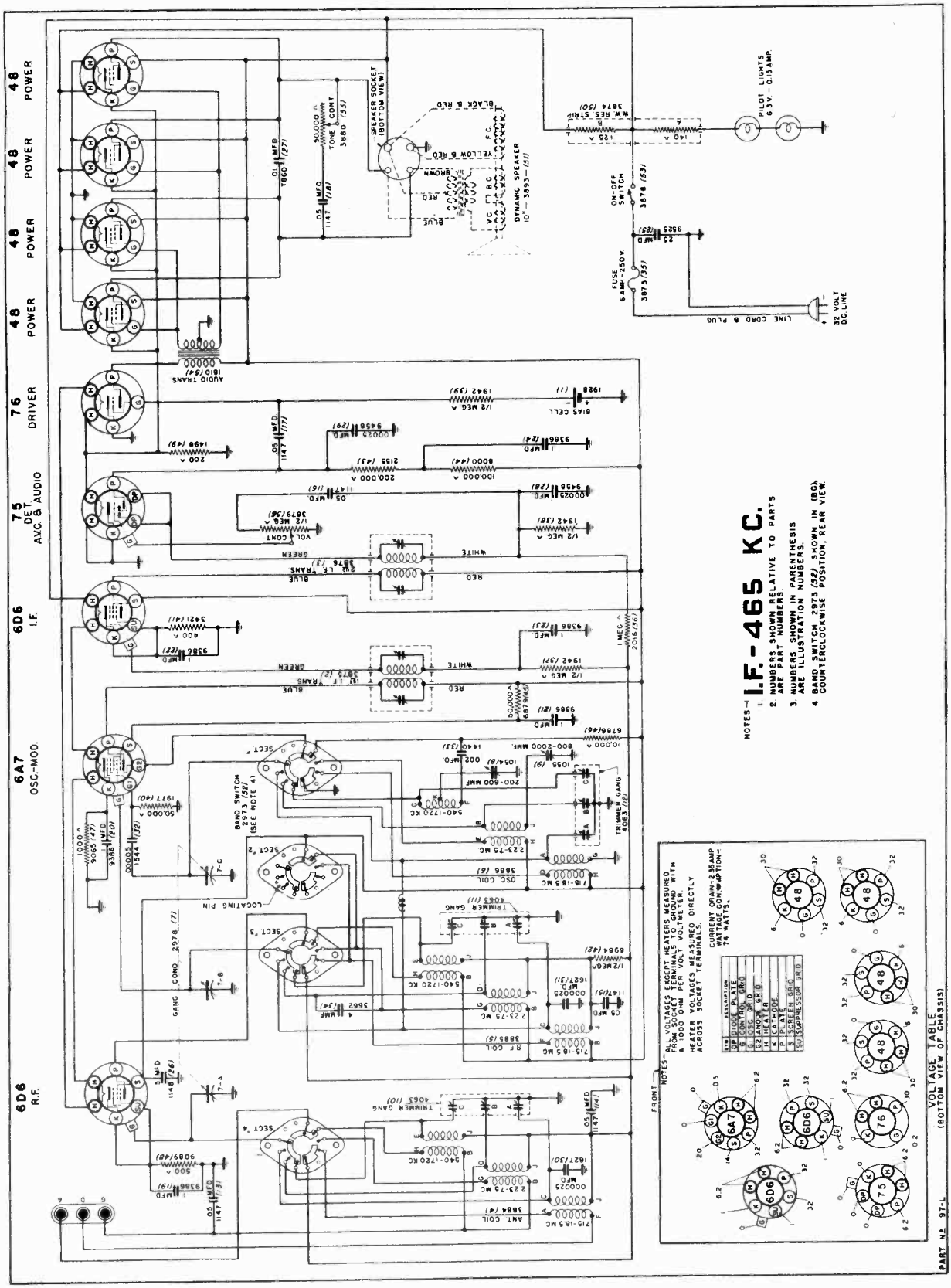


Fig. 3



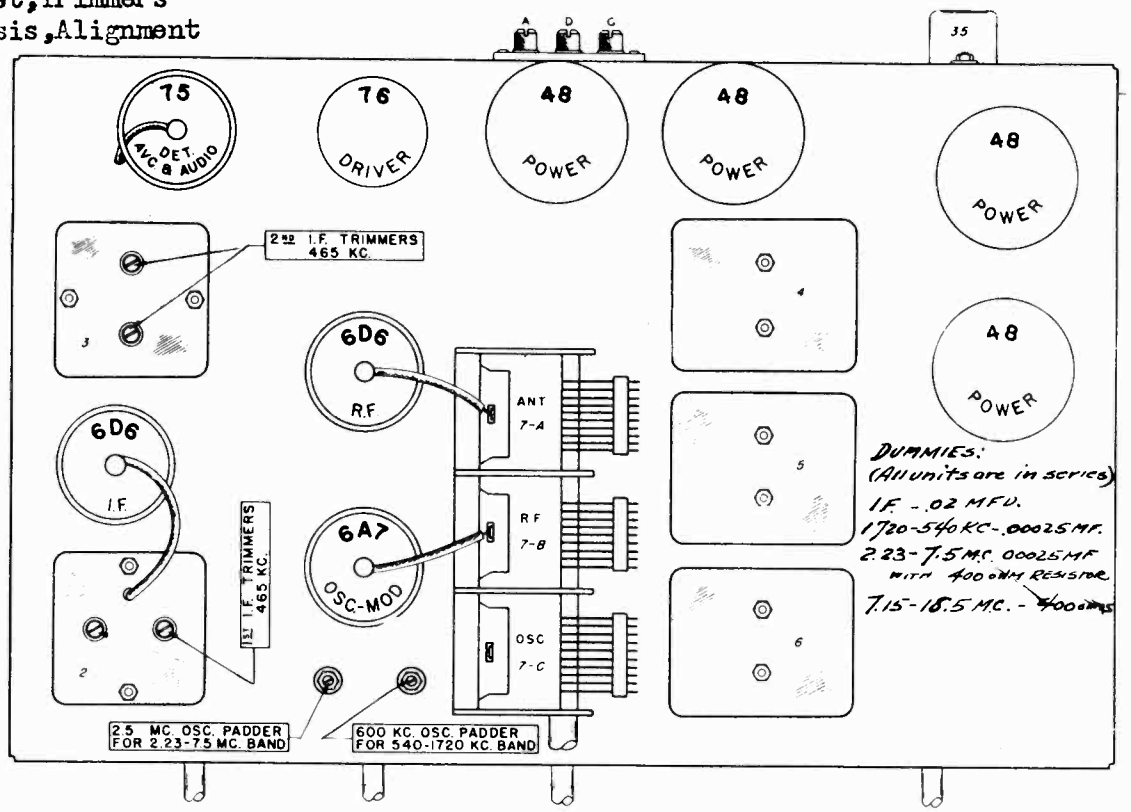
SENTINEL RADIO CORP.

MODEL 97 L
Schematic, Parts
Socket, Voltage

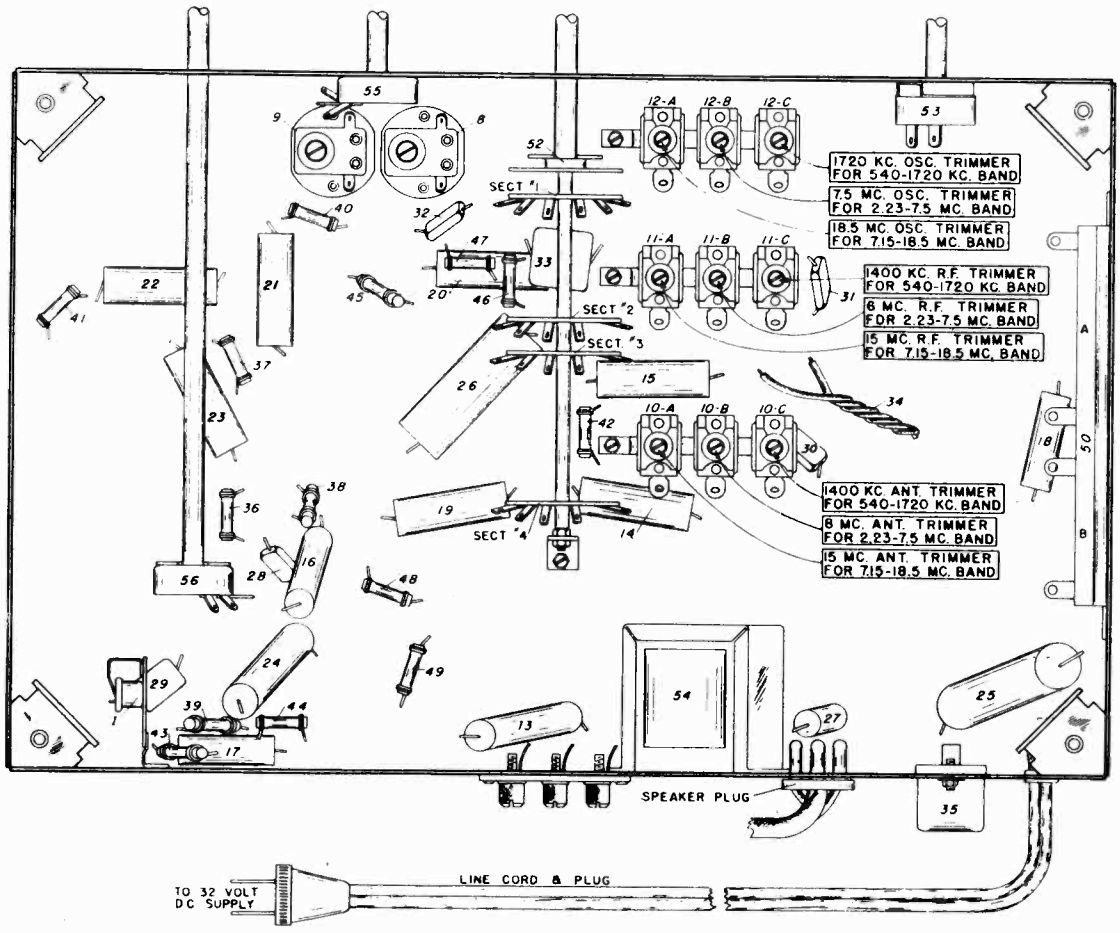


MODEL 97 L
Socket, Trimmers
Chassis, Alignment

SENTINEL RADIO CORP.



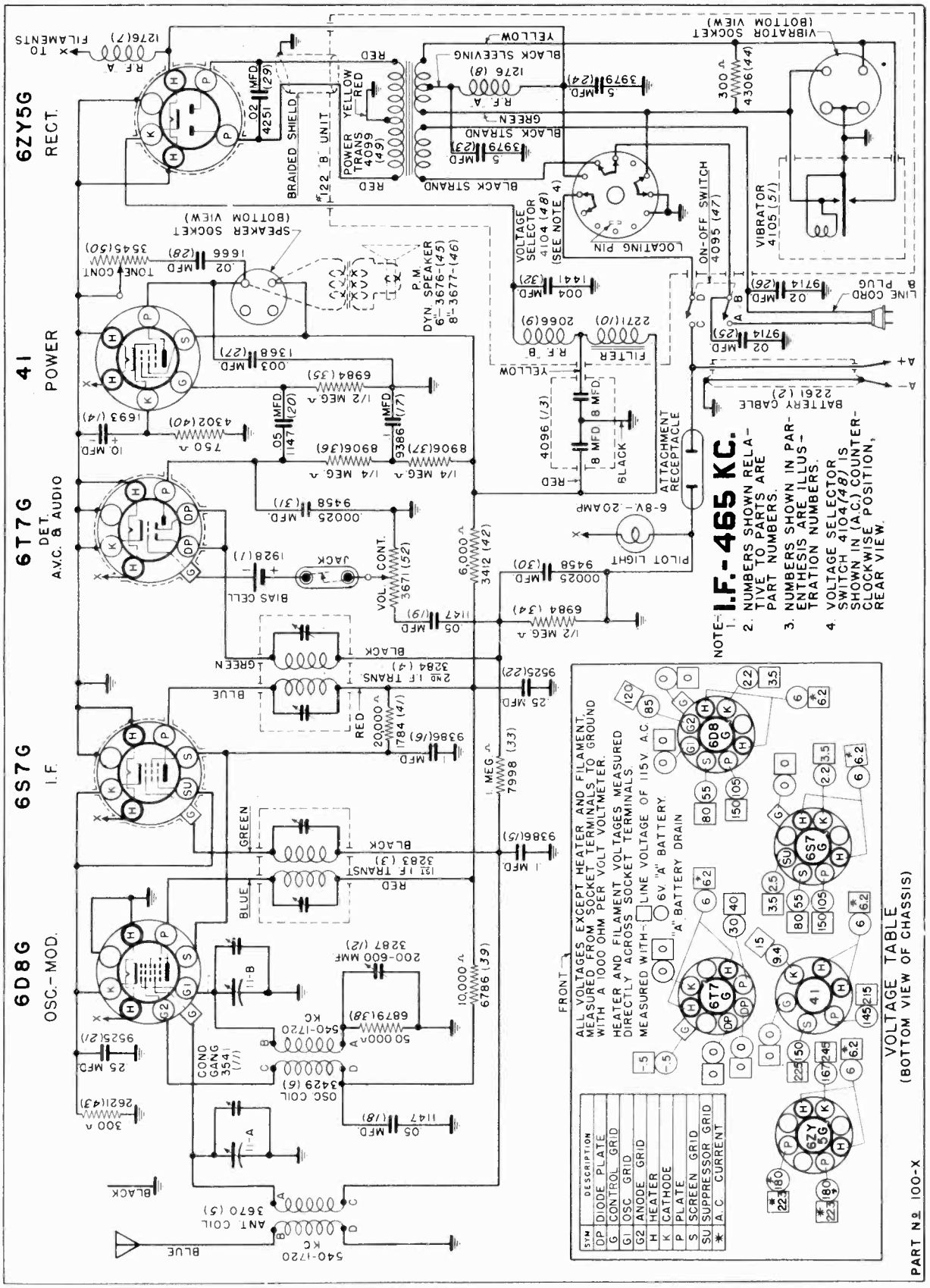
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



FOR ELIMINATION OF INTERFERENCE CAUSED BY A 32 VOLT PLANT SEE MODEL 93L.

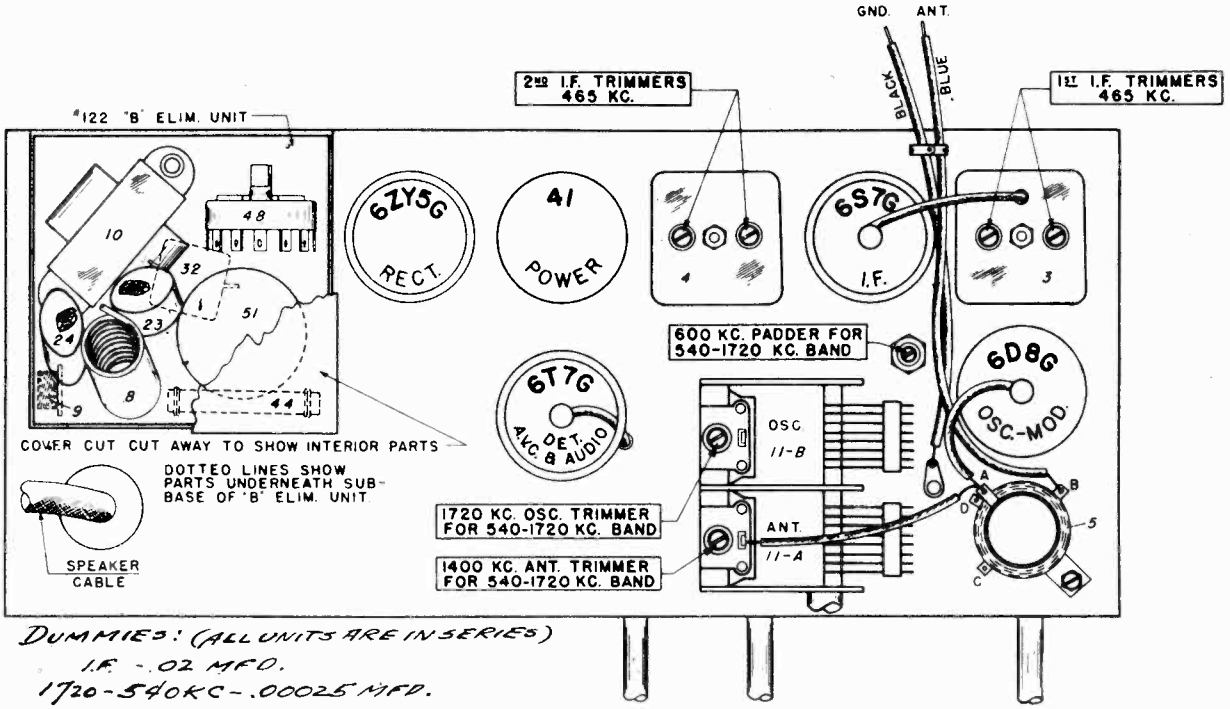
SENTINEL RADIO CORP.

MODEL 100 X
Schematic, Parts
Socket, Voltage



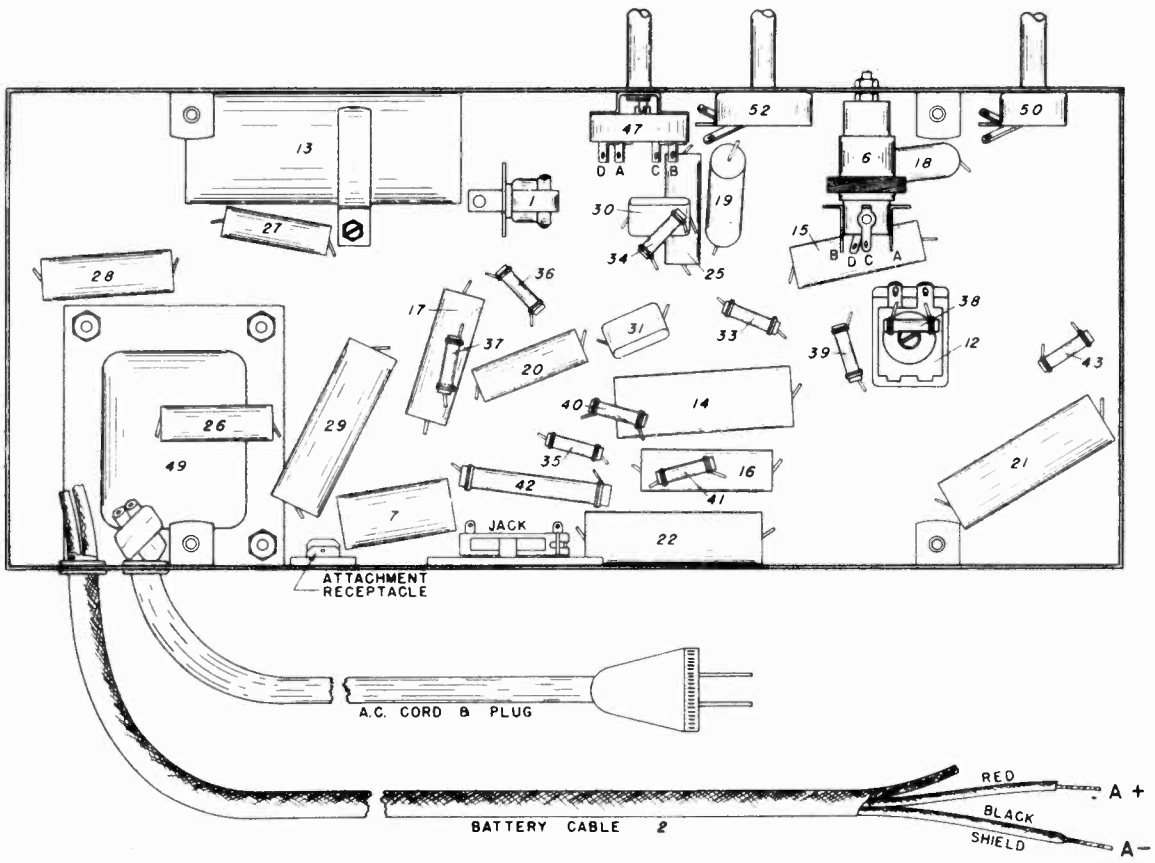
MODEL 100 X
Socket, Trimmers
Chassis, Alignment

SENTINEL RADIO CORP.



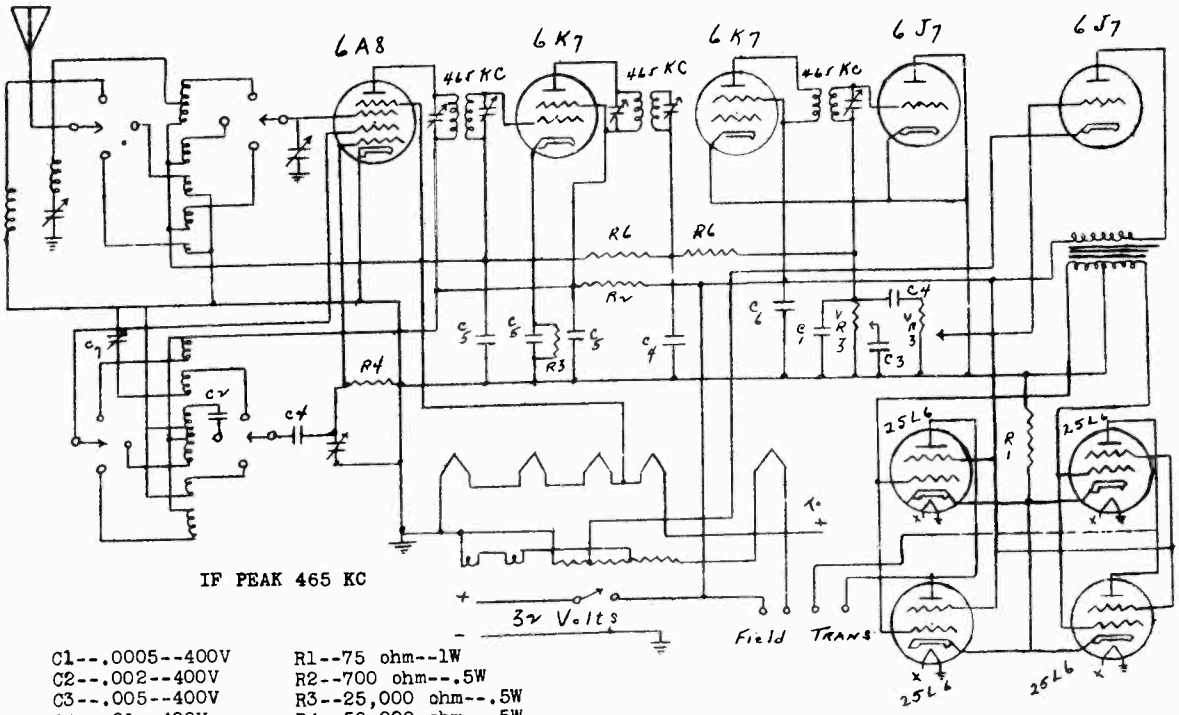
DUMMIES: (ALL UNITS ARE IN SERIES)
I.F. - .02 MFD.
1720-540KC - .00025 MFD.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



SETCHELL CARLSON RADIO PRODUCTS

MODEL 332
MODEL 622
Schematics

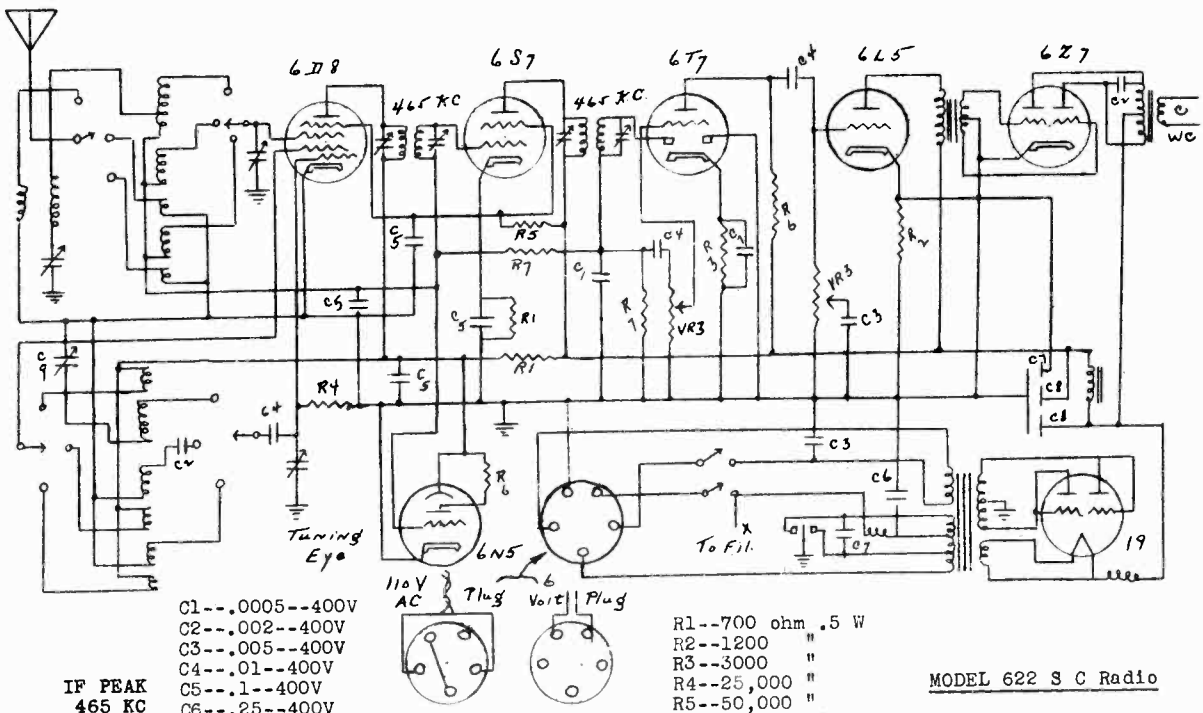


IF PEAK 465 KC

C1--.0005--400V
C2--.002--400V
C3--.005--400V
C4--.01--400V
C5--.1--400V
C6--.25--20QV
C7--Adj. Padder

R1--75 ohm--1W
R2--700 ohm--.5W
R3--25,000 ohm--.5W
R4--50,000 ohm--.5W
R5--200,000 ohm--.5W
R6--500,000 ohm--.5W
VR3--.5 meg. pot.

MODEL 332 S. C. RADIO



IF PEAK 465 KC

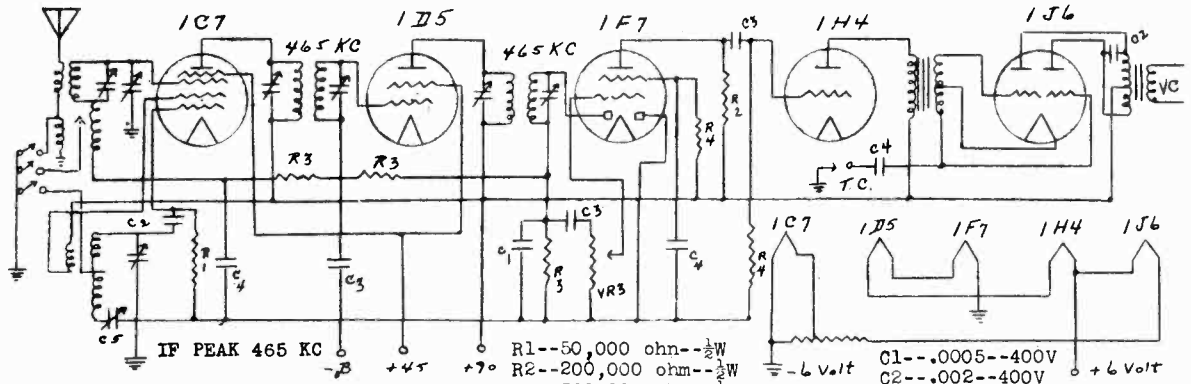
C1--.0005--400V
C2--.002--400V
C3--.005--400V
C4--.01--400V
C5--.1--400V
C6--.25--400V
C7--10--50V
C8--8--600V
C9--Adj. Padder

R1--700 ohm .5 W
R2--1200 "
R3--3000 "
R4--25,000 "
R5--50,000 "
R6--200,000 "
R7--500,000 "
VR3--.5 Meg. Pot.

MODEL 622 S C Radio

MODEL 600
MODEL 602
MODEL 620
Schematics

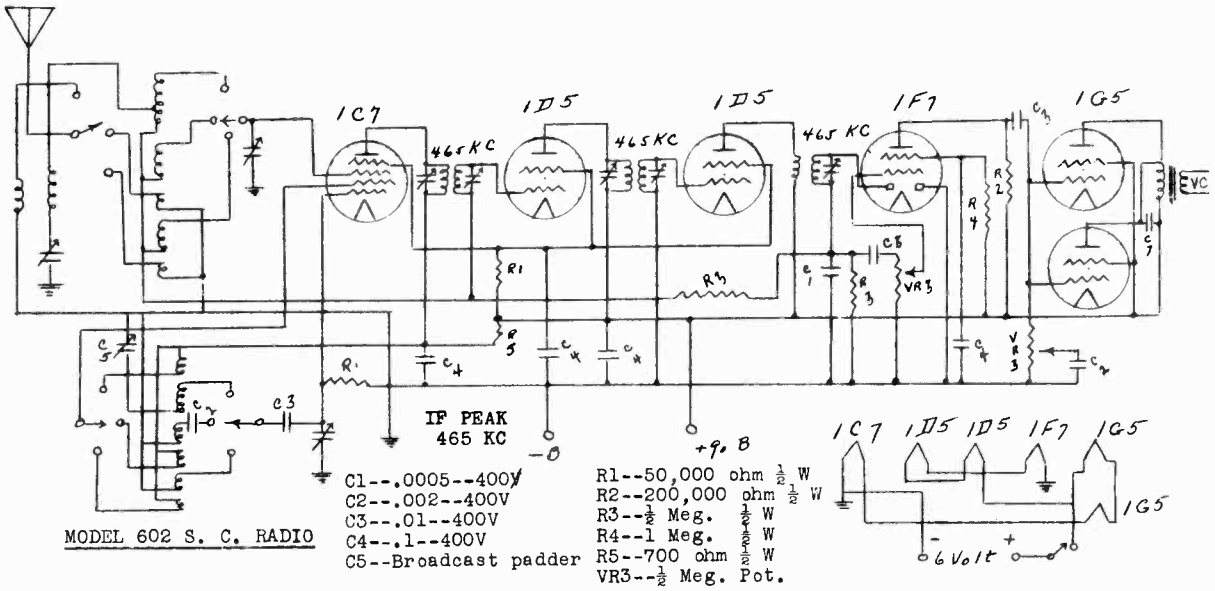
SETCHELL CARLSON RADIO PRODUCTS



MODEL 600--S.C. RADIO

R1--50,000 ohn--½W
R2--200,000 ohm--½W
R3--500,000 ohm--½W
R4--1 meg.ohm--½W
VR3--½ meg. Pot.

C1--.0005--400V
C2--.002--400V
C3--.01--400V
C4--.1--200V
C5--Broadcast padder



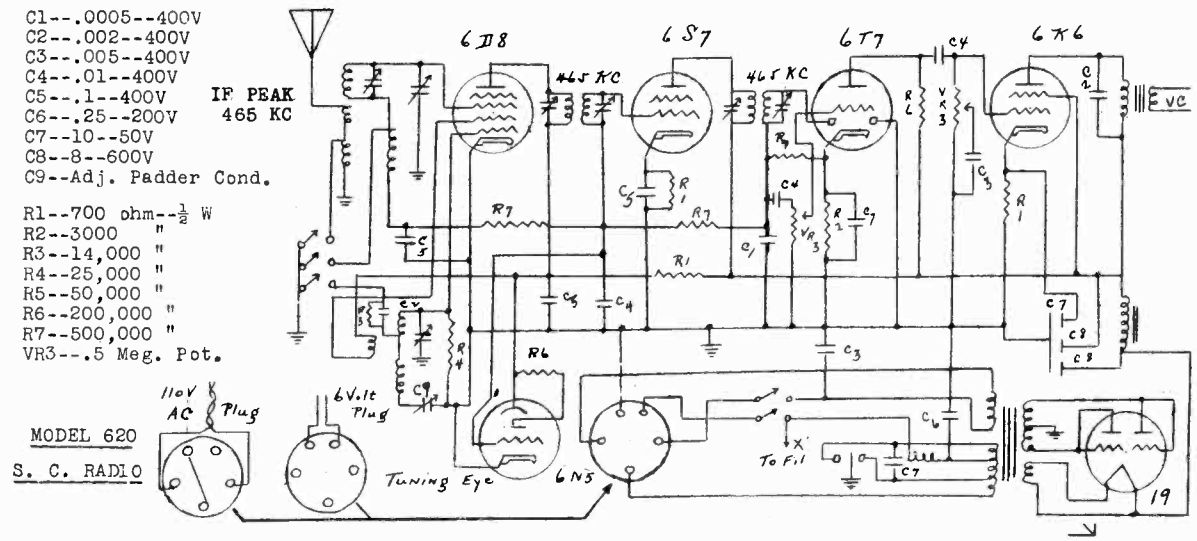
MODEL 602 S. C. RADIO

C1--.0005--400V
C2--.002--400V
C3--.01--400V
C4--.1--400V
C5--Broadcast padder

R1--50,000 ohm ½ W
R2--200,000 ohm ½ W
R3--½ Meg. ½ W
R4--1 Meg. ½ W
R5--700 ohm ½ W
VR3--½ Meg. Pot.

C1--.0005--400V
C2--.002--400V
C3--.005--400V
C4--.01--400V
C5--.1--400V
C6--.25--200V
C7--10--50V
C8--8--600V
C9--Adj. Padder Cond.

R1--700 ohm--½ W
R2--3000 "
R3--14,000 "
R4--25,000 "
R5--50,000 "
R6--200,000 "
R7--500,000 "
VR3--.5 Meg. Pot.

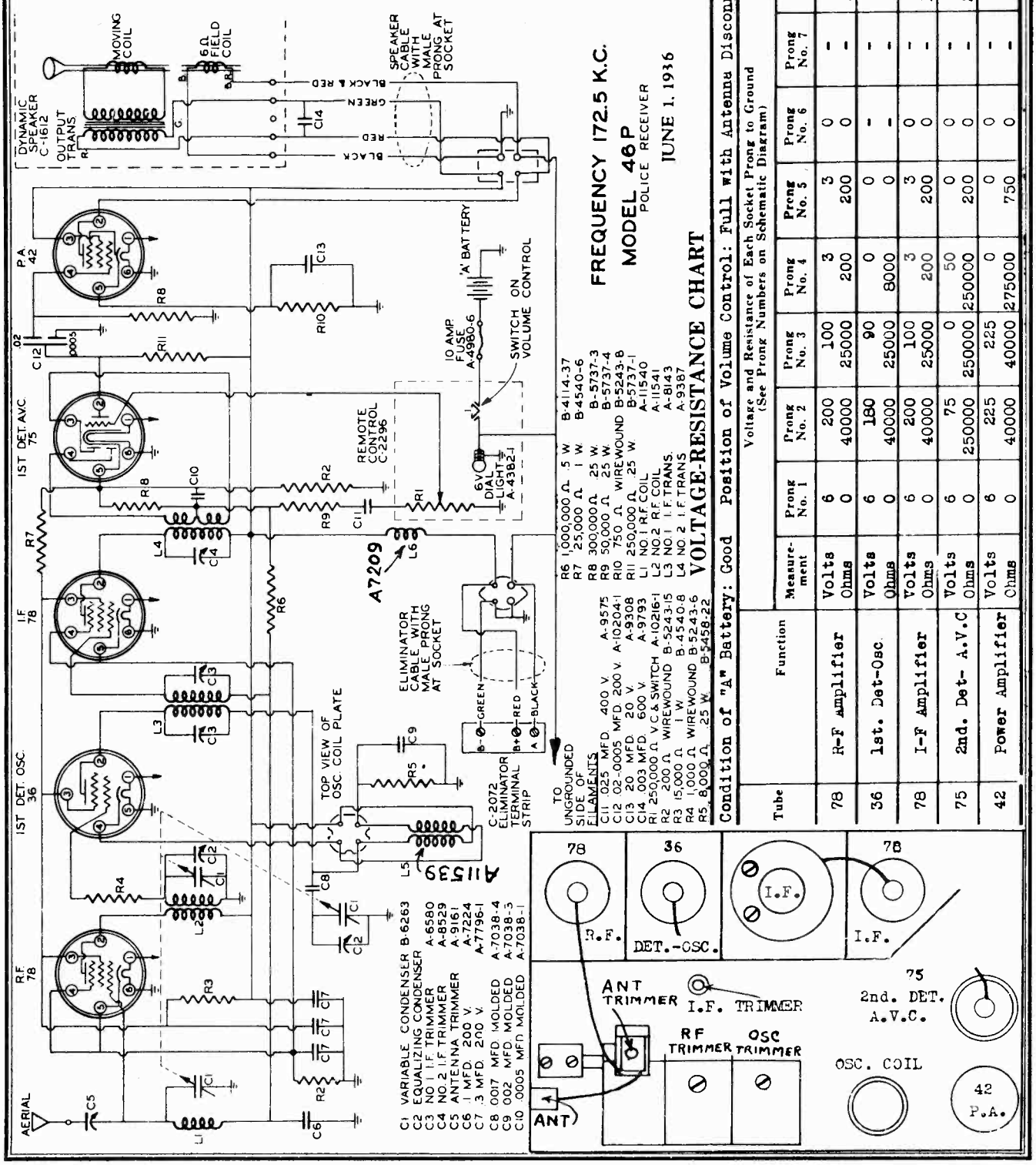


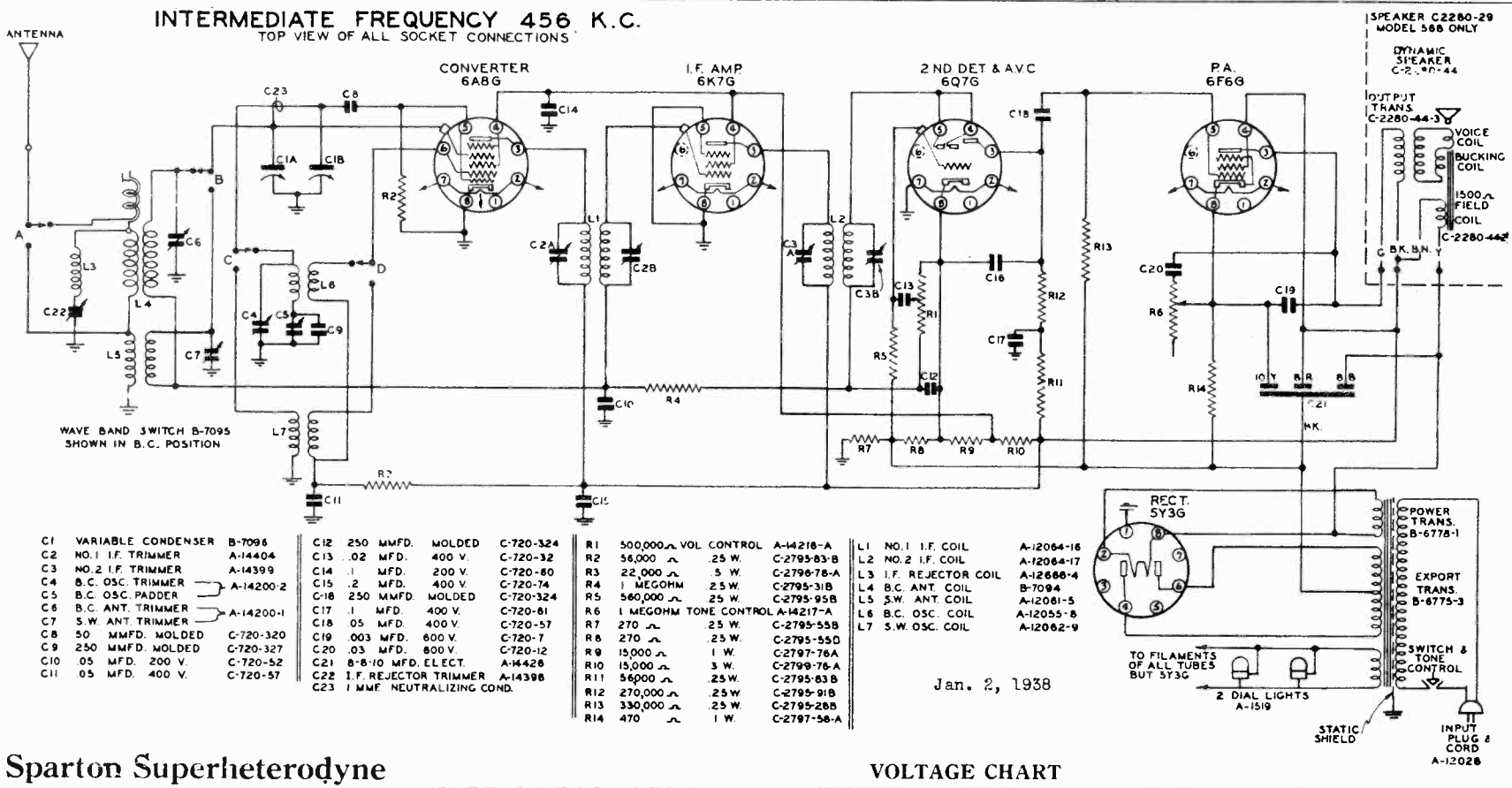
MODEL 620
S. C. RADIO

SPARKS WITHINGTON CO.

MODEL 46P
Schematic, Parts
Voltage, Resistance
Trimmers, Alignment

Generator at 172.5 KC, connected to grid cap of 36, align IF trimmers to peak. Connect Generator to ANT and Gnd of receiver (Same frequency), align OSC trimmer to maximum peak. Reset generator to 2200 KC, align RF to maximum peak. After set has been installed, tune in a signal of approximately 2200 KC and peak the antenna trimmer for maximum response. Repeat adjustments for maximum performance.





C1	VARIABLE CONDENSER	B-7096	C12	250 MMFD.	MOLDED	C-720-324	R1	500,000Ω	VOL. CONTROL	A-14218-A	L1	NO.1 I.F. COIL	A-12064-16
C2	NO.1 I.F. TRIMMER	A-14404	C13	.02 MFD.	400 V.	C-720-32	R2	56,000 Ω	.25 W.	C-2795-83-B	L2	NO.2 I.F. COIL	A-12064-17
C3	NO.2 I.F. TRIMMER	A-14399	C14	.1 MFD.	200 V.	C-720-60	R3	22,000 Ω	.5 W.	C-2796-78-A	L3	I.F. REJECTOR COIL	A-12666-4
C4	B.C. OSC. TRIMMER	A-14200-2	C15	.2 MFD.	400 V.	C-720-74	R4	1 MEGOHM	.25 W.	C-2795-31B	L4	B.C. ANT. COIL	B-7094
C5	B.C. OSC. PADDER		C16	250 MMFD.	MOLDED	C-720-324	R5	560,000 Ω	.25 W.	C-2795-95B	L5	S.W. ANT. COIL	A-12061-5
C6	B.C. ANT. TRIMMER	A-14200-1	C17	.1 MFD.	400 V.	C-720-61	R6	1 MEGOHM	TONE CONTROL	A-14217-A	L6	B.C. OSC. COIL	A-12055-8
C7	S.W. ANT. TRIMMER		C18	.05 MFD.	400 V.	C-720-57	R7	270 Ω	.25 W.	C-2795-55B	L7	S.W. OSC. COIL	A-12062-9
C8	50 MMFD. MOLDED	C-720-320	C19	.003 MFD.	600 V.	C-720-7	R8	270 Ω	.25 W.	C-2795-55D			
C9	250 MMFD. MOLDED	C-720-327	C20	.03 MFD.	600 V.	C-720-12	R9	15,000 Ω	1 W.	C-2797-76A			
C10	.05 MFD. 200 V.	C-720-52	C21	8-8-10 MFD. ELECT.		A-14428	R10	15,000 Ω	3 W.	C-2799-76-A			
C11	.05 MFD. 400 V.	C-720-57	C22	I.F. REJECTOR TRIMMER		A-14398	R11	56000 Ω	.25 W.	C-2795-83B			
			C23	1 MMF. NEUTRALIZING COND.			R12	270,000 Ω	.25 W.	C-2795-91B			
							R13	330,000 Ω	.25 W.	C-2795-28B			
							R14	470 Ω	1 W.	C-2797-58-A			

Sparton Superheterodyne

Models

518
518-X

558-B 558-C
558-BX 558-CX

568 578
568-X 578-X

VOLTAGE CHART

Line Voltage: 120 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A8G	Converter	0	6.2	250	90	-4.5	152	0	0	-.25
6K7G	I.F. Amp.	0	6.2	250	90	250	0	0	0	-.25
6Q7G	2nd Det. - AVC	0	6.2	56	-2	-2	4	0	2.5	-2.2
6F6G	Power Amp.	0	6.2	235	250	.1	0	0	12	-
5Y3G	Rect.	0	340*	0	340*	0	340*	0	340*	-

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. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

SPARKS WITHINGTON CO

MODELS 518,518X,558B,558BX,558C
558CX,568,568X,578(1938),578X
Alignment,Socket,Trimmers
MODELS 528-2,588-2
Socket,Trimmers,Alignment

ALIGNMENT (see note)

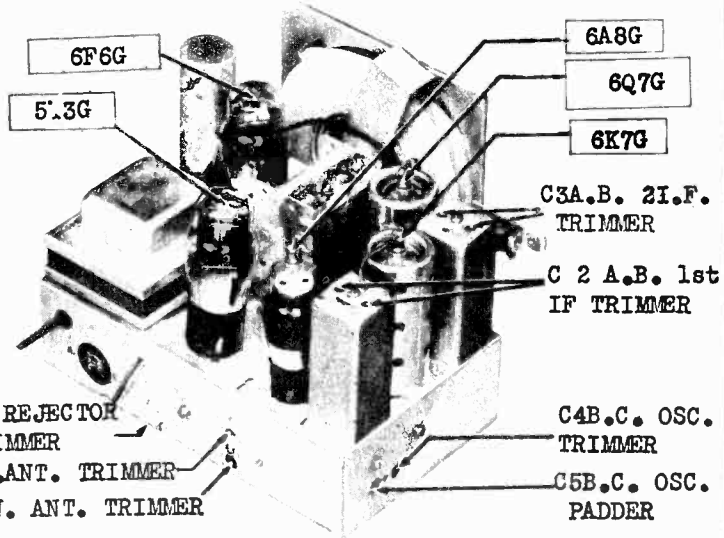
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC.	Open	C3 A,B	2nd I.F. Trans.
							C2 A,B	1st I.F. Trans.
2	Rejector	Ant.	200 mmf.	456	BC.	Closed	C22	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC.	1500	C4 Osc.	
							C6 Ant.	
4		Ant.	200 mmf.	600	BC.	600	C5 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC, 600KC)							
7	S.W. Band	Ant.	*	18 MC.	SW.	18 MC.	C7 Ant.	
8	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
9	(Check operations 1 to 8 inclusive)							

* 100 ohm and 200 mmf. in series.

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

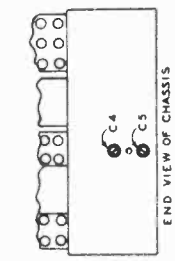
ALIGNMENT (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C26 A,B	3rd I.F. Trans.
							C25 A,B	2nd I.F. Trans.
							C24 A,B	1st I.F. Trans.
2	Rejector	Ant.	150 mmf	456	BC		C7	Adjust to minimum
3	Broadcast Band	Ant.	150 mmf.	1500	BC	1500	C4 Osc.	
							C2 Ant.	
4		Ant.	150 mmf.	600	BC	600	C5 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
7	S.W. Band	Ant.	400 ohm	15 MC.	SW	15 MC.	C5 Ant.	
8	(Check operations 1 to 7 inclusive)							

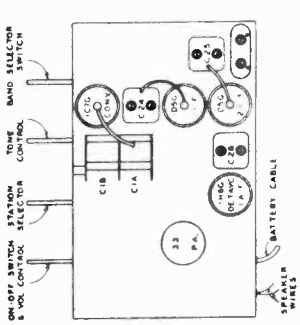


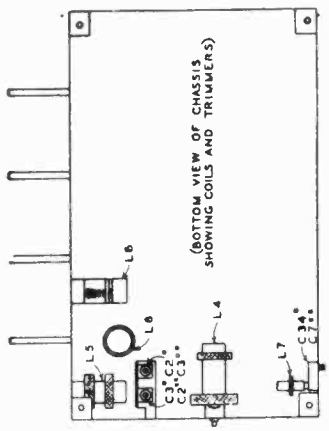
NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.

MODEL 528-2 & 588-2



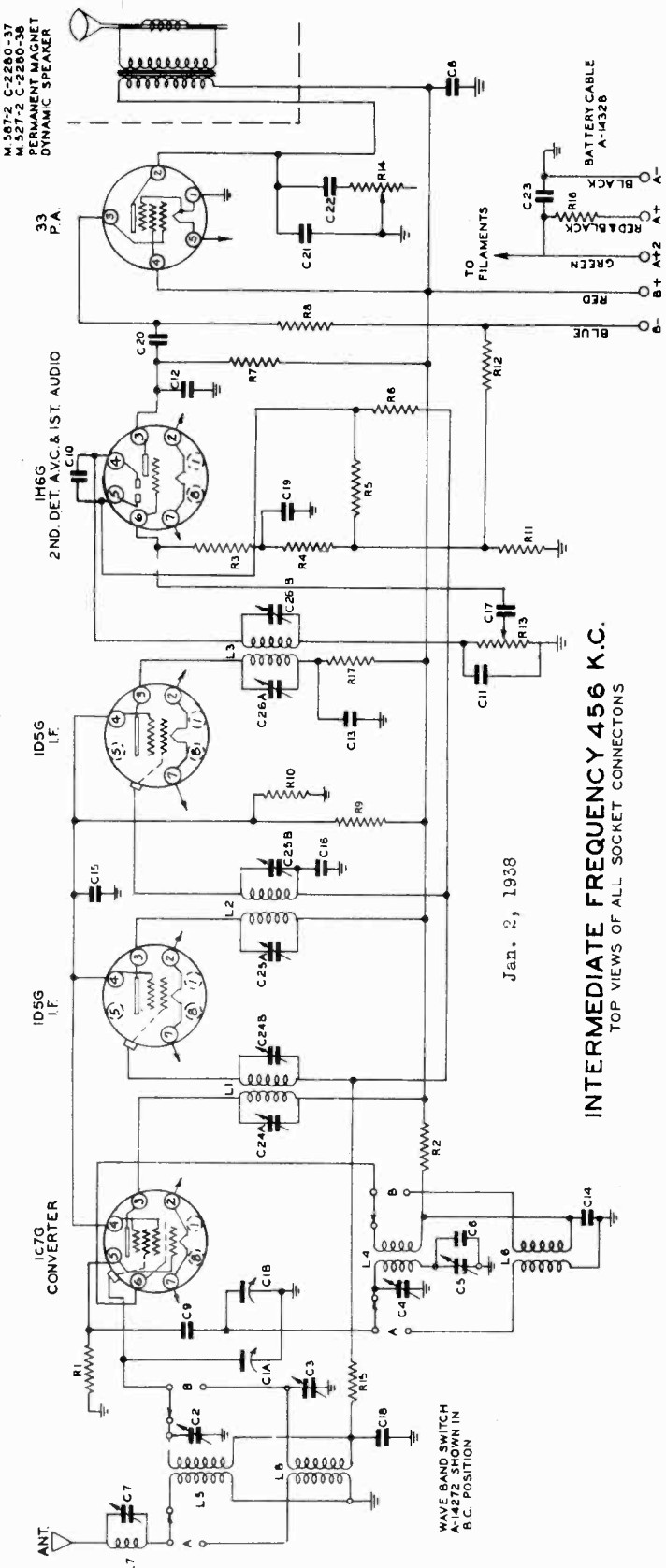
TRIMMER LOCATIONS





MODELS 528-2,588-2
Schematic,Parts
Voltage

SPARKS WITHINGTON CO.



C1AAB	VARIABLE CONDENSER	B-6776	C14 .1 MFD. 200 V.	C-720-60	R1 47000 Ω 25 W.	C-2795-82B	R10 56,000 Ω 1 W.	C-2797-83A	L1 NO.1 I.F. COIL A-12064-14
C2	B.C. ANT. TRIMMER	A-12334	C15 .5 MFD. 200 V.	C-720-104	R2 10,000 Ω 5 W.	C-2796-74A	R11 150 Ω 5 W.	C-2796-52A	L2 NO.2 I.F. COIL A-12064-14
C3	S.W. ANT. TRIMMER		C16 .05 MFD. 100 V.	C-720-58	R3 470,000 Ω 25 W.	C-2795-94B	R12 390 Ω 5 W.	C-2796-57A	L3 NO.3 I.F. COIL A-12064-15
C4	B.C. OSC. TRIMMER	A-14388	C17 .05 MFD. 100 V.	C-720-58	R4 220,000 Ω 25 W.	C-2795-90B	R13 500,000 Ω VOL CONTROL & SWITCH	A-14274-A	L4 B.C. OSC. COIL A-12055-7
C5	B.C. OSC. PADDER		C18 .1 MFD. 100 V.	C-720-62	R5 470,000 Ω 25 W.	C-2795-94B	R14 1 MEGOHM TONE CONTROL	A-12087-A	L5 B.C. R.F. COIL A-12056-4
C6	.00025 MFD. MOLDED	C-720-324	C19 .1 MFD. 100 V.	C-720-62	R6 1 MEGOHM 25 W.	C-2795-94B	R15 3600 Ω 25 W.	C-2795-71B	L6 S.W. OSC. COIL A-12082-11
C7	I.F. REJECTOR TRIMMER	A-12834-1	C20 .05 MFD. 200 V.	C-720-52	R7 220,000 Ω 25 W.	C-2795-90B	R16 5 OHMS WIREWOUND	B-3243-43	L7 I.F. REJECTOR COIL A-12866-3
C8	8 MFD. 200 V. ELECT.	A-14273	C21 .001 MFD. 400 V.	C-720-136	R8 470,000 Ω 25 W.	C-2795-94B	R17 4700 Ω 25 W.	C-2795-70B	L8 S.W. R.F. COIL A-12081-5
C9	.00005 MFD. MOLDED	C-720-315	C22 .03 MFD. 600 V.	C-720-43	R9 15,000 Ω 1 W.	C-2797-76A			
C10	.0001 MFD. MOLDED	C-720-325	C23 1 MFD. 100 V.	C-720-102					
C11	.00025 MFD. MOLDED	C-720-324	C24 NO.1 I.F. TRIMMER	A-14375					
C12	.00025 MFD. MOLDED	C-720-327	C25 NO.2 I.F. TRIMMER	A-14375					
C13	.5 MFD. 200 V.	C-720-104	C26 NO.3 I.F. TRIMMER	A-14375					

VOLTAGE CHART

Batteries in Good Condition — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1C7G	Converter	-	0	115	55	7	78	2	-	-.2
1D5G	1st I.F. Amp.	-	0	115	55	-	-	2	-	0
1D5G	2nd I.F. Amp.	-	0	110	55	-	-	2	-	0
1H6G	Det. AVC	-	0	22	0	2.5	0	2	-	-
33	Power Amp.	2	110	.5	115	0	-	-	-	-

Notes: Voltage readings are for schematic diagram.
Always use meter scale which will give greatest deflection within scale limits, All DC measurements made with 1000 ohms per volt voltmeter.
Unless designated otherwise, voltages in table are + DC voltages.
Allow 15% + or - on all measurements.

Sparton Superheterodyne

Models

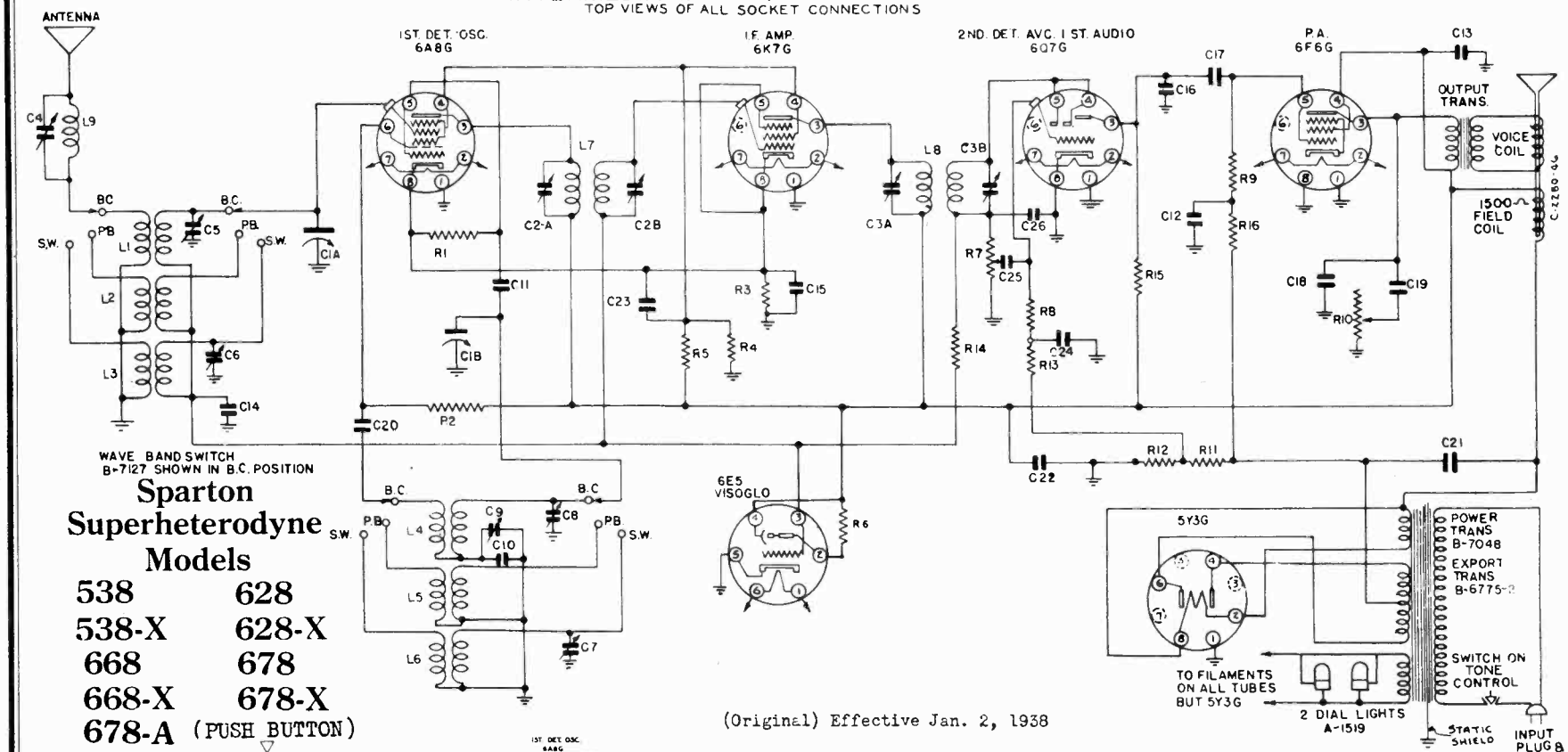
528-2 588-2

BATTERY

MODELS 538, 538X, 628, 628X, 668
668X, 678, 678X, 678A (Selectronne
Schematic, Parts

INTERMEDIATE FREQUENCY 456 K.C.

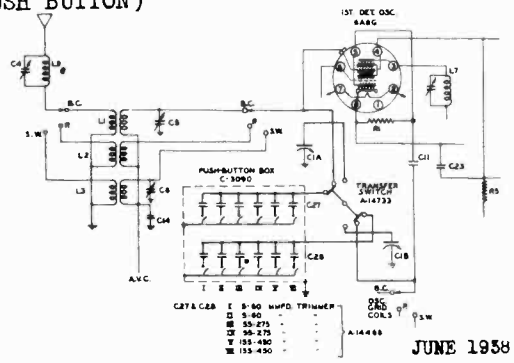
TOP VIEWS OF ALL SOCKET CONNECTIONS



Sparton Superheterodyne Models

538	628
538-X	628-X
668	678
668-X	678-X
678-A (PUSH BUTTON)	

(Original) Effective Jan. 2, 1938



JUNE 1938

DIAGRAM OF CONNECTIONS FOR MODEL 678-A PUSH BUTTON BOX AND TRANSFER SWITCH. REFER TO SCHEMATIC ABOVE.

FOR TUNER DATA SEE INDEX

C1-A C1-B	VARIABLE COND.	B-7108
C2	*1 I.F. TRIMMER	A-14404
C3	*2 I.F. TRIMMER	A-14399
C4	I.F. REJECTOR TRIM	A-12834-1
C5	B.C. ANT. TRIMMER	A-14199
C6	S.W. ANT. TRIMMER	
C7	S.W. OSC. TRIMMER	
C8	B.C. OSC. TRIMMER	A-14388
C9	B.C. OSC. PADDER	
C10	200 MMFD. MOLDED	C-7Z0-350
C11	.00005 MFD.	C-7Z0-320
C12	.1 MFD. 200 V.	C-7Z0-60
C13	.1 MFD. 400 V.	C-7Z0-61
C14	.05 MFD. 100 V.	C-7Z0-58
C15	.1 MFD. 200 V.	C-7Z0-60
C16	250 MMFD. MOLDED	C-7Z0-319
C17	.05 MFD. 400 V.	C-7Z0-46
C18	.006 MFD. 600 V.	C-7Z0-15
C19	.03 MFD. 600 V.	C-7Z0-12
C20	.001 MFD. 400 V.	C-7Z0-136
C21	16 MFD. ELECT.	A-14013
C22	30 MFD. ELECT.	A-14012
C23	.1 MFD. 200 V.	C-7Z0-60
C24	.1 MFD. 200 V.	C-7Z0-60
C25	.05 MFD. 200 V.	C-7Z0-54
C26	250 MMFD. MOLDED	C-7Z0-319

R1	56000 Ω .25 W.	C-2795-838
R2	22000 Ω .5 W.	C-2796-784
R3	160 Ω .25 W.	C-2795-1408
R4	27000 Ω 1 W.	C-2797-794
R5	15000 Ω 2 W.	C-2798-764
R6	1 MEGOHM .25 W. 628 ONLY	C-2795-968
R7	.5 MEG VOLUME CONTROL	A-14216-A
R8	560,000 Ω .25 W.	C-2795-958
R9	270,000 Ω .25 W.	C-2795-918
R10	1 MEG. TONE CONTROL	A-14217-A
R11	220 Ω 2 W.	C-2798-544
R12	27 Ω .25 W.	C-2795-438
R13	1 MEGOHM .25 W.	C-2795-988
R14	1 MEGOHM .25 W.	C-2795-988
R15	270,000 .25 W.	C-2795-918
R16	270,000 .25 W.	C-2795-918

L1	B.C. ANT. COIL	A-14478
L3	S.W. ANT. COIL	
L2	P.B. ANT. COIL	A-12061-8
L4	B.C. OSC. COIL	A-14483
L6	S.W. OSC. COIL	
L5	P.B. OSC. COIL	A-12057-3
L7	*1 I.F. COIL	A-12064-19
L8	*2 I.F. COIL	A-12064-17
L9	I.F. REJECTOR COIL	A-12666-3

MODELS 538,538X,628,628X,668
668X,678,678X,678A
Voltage,Alignment,Socket
Trimmers

SPARKS WITHINGTON CO.

MODELS 538-538X, 628-628X, 668-668X, 678-678X, and 678A (push button)

VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1*	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6A8G	Converter	0	0	245	110	-5	155	6.2	3.2	0
6K7G	I.F. Amp.	0	0	245	110	3.2	-	6.2	3.2	0
6Q7G	2nd Det. AVC-1st Audio	0	0	105	-.1	-.1	-.1	6.2	0	-.1
6F6G	P.A.	0	0	225	235	.1	.3	6.2	0	-
5Y3G	Rect.	0	335*	-	335*	-	335*	-	335*	-
6E5	Viso-Glo	6.3	30	-.1	245	0	0	-	-	-

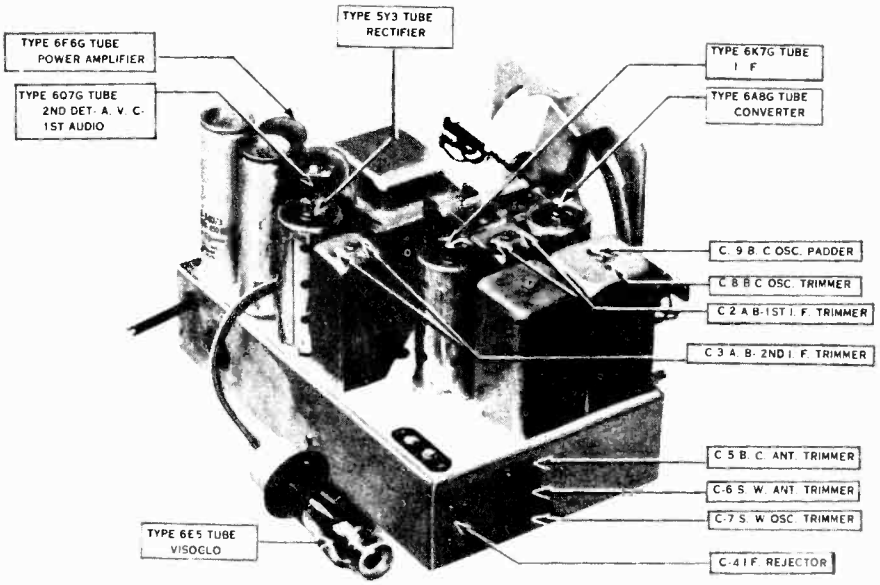
Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

ALIGNMENT (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C2A C2B	1st I.F.
							C3A C3B	2nd I.F.
2	Rejector	Ant.	200 mmf.	456	BC	Closed	C4	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 Ant.	
4		Ant.	200 mmf.	600	BC	600	C9 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC, 600 KC)							
7	Short-Wave Band	Ant.	*	15 MC.	SW.	15 MC.	C7 Osc.	Rock dial slightly while adjusting
							C6 Ant.	
8	(Check calibration and sensitivity at 15 MC. and 6 MC.)							
9	Police Band	Ant.	*		Police	(Check at 6 MC. and 1.95 MC.)	No Trimmers	
10	(Check operations 1 to 9 inclusive)							

*100 ohm and 200 mmf. in series

NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.



CHASSIS ILLUSTRATION

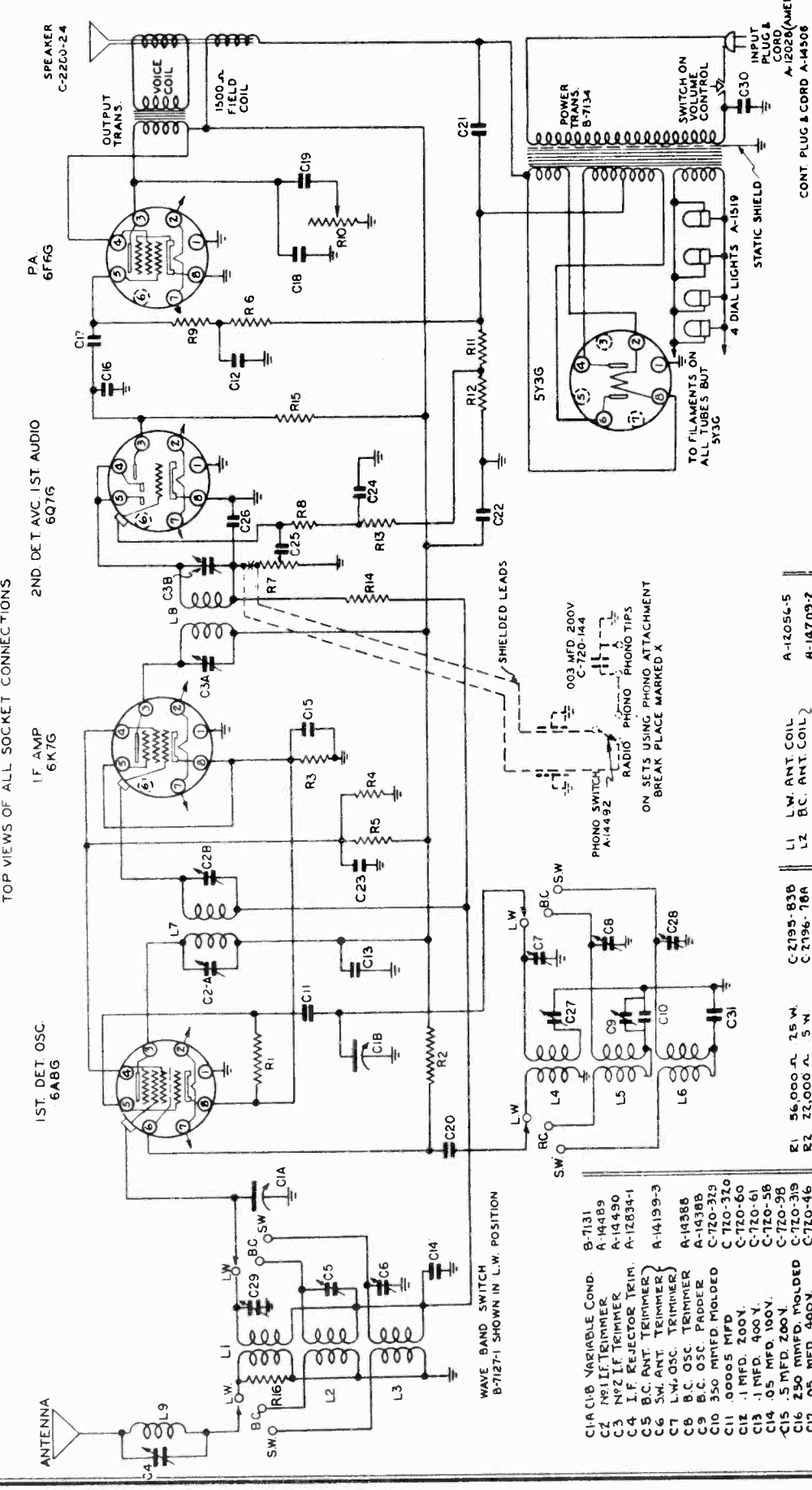
(PUSH-BUTTON BOX NOT SHOWN)

SPARKS WITHINGTON CO.

MODEL 548X Schematic Parts

(Original) Effective Jan. 2, 1938

SPARTON SUPERHETERODYNE MODELS 548X
INTERMEDIATE FREQUENCY 345 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS



C1A C1B Variable Cond.	B-7131	R1	56,000 Ω .25 W.	C-2195-83B	L1 L.W. ANT COIL A-12056-5
C2 No1 I.F. Trimmer	A-14489	R2	22,000 Ω .5 W.	C-2196-78A	L2 B.C. ANT COIL A-14209-2
C3 No2 I.F. Trimmer	A-14490	R3	160 Ω .25 W.	C-2195-140B	L3 S.W. ANT COIL A-12294-4
C4 I.F. Rejector Trim.	A-12834-1	R4	12,000 Ω 1 W.	C-2197 75A	L4 L.W. OSC. COIL
C5 B.C. Ant. Trimmer	A-14199-3	R5	15,000 Ω 2 W.	C-2198-76A	L5 B.C. OSC. COIL A-14213-1
C6 S.W. Ant. Trimmer		R6	270,000 Ω .25 W.	C-2795-91B	L6 S.W. OSC. COIL
C7 L.W. OSC. TRIMMER	A-14388	R7	.5 MEG VOLUME CONTROL	A-14216-A1	L7 No1 I.F. COIL A-12064-20
C8 B.C. OSC. TRIMMER	A-14388	R8	560,000 Ω .25 W.	C-2195-95B	L8 No2 I.F. COIL A-12064-21
C9 B.C. OSC. PADDER	C-720-329	R9	270,000 Ω .25 W.	C-2195-91B	L9 I.F. REJECTOR COIL A-12666-3
C10 350 MMFD MOLDED	C-720-320	R10	1 MEG TONE CONTROL	A-14217-A-1	
C11 .00005 MFD	C-720-60	R11	220 Ω 2 W.	C-2198-54A	
C12 .1 MFD. 200V.	C-720-61	R12	27 Ω .25 W.	C-2795-43B	
C13 .1 MFD. 400 V.	C-720-58	R13	1 MEGOHM .25 W.	C-2195-98B	
C14 .05 MFD. 100V.	C-720-98	R14	1 MEGOHM 1 W.	C-2195-98B	
C15 .5 MFD. 200V.	C-720-319	R15	270,000 Ω .25 W.	C-2195-91B	
C16 250 MMFD. MOLDED	C-720-46	R16	10,000 Ω .25 W.	C-2195-74B	
C17 .05 MFD. 400V.	C-720-15				
C18 .006 MFD. 600V.	C-720-12				
C19 .03 MFD. 600V.	C-720-136				
C20 .001 MFD. 400V.	A-14073				
C21 .16 MFD. ELECT.	A-14072				
C22 30 MFD. ELECT.	C-720-60				
C23 .1 MFD. 200V.	C-720-60				
C24 .1 MFD. 200 V.	C-720-54				
C25 .05 MFD. 200V.	C-720-319				
C26 250 MMFD. MOLDED					
C27 L.W. OSC. PADDER	A-14199-2				
C28 S.W. OSC. TRIMMER					
C29 L.W. ANT. TRIMMER	C-720-17				
C30 .006 MFD. 600 V.	C-720-351				
C31 .004 MFD. MOLDED					

MODEL 548X
Voltage, Alignment
Socket, Trimmers

SPARKS WITHINGTON CO.

VOLTAGE CHART

Line Voltage: 112 volts — Position of Volume Control: Full with Antenna Disconnected
Power Transformer on 95-115 V. tap

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1*	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6A8G	Converter	0	0	270	95	-10	160	6.3	3	0
6K7G	I.F.	0	0	270	95	3	-	6.3	3	0
6Q7G	2nd Det.-AVC-1st Audio	0	0	100	-.1	-.1	-.1	6.3	0	-.1
6F6G	P.A.	0	0	254	272	1	2	6.3	0	-
5Y3G	Rect.	0	320*	-	380*	-	380*	-	320*	-

Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

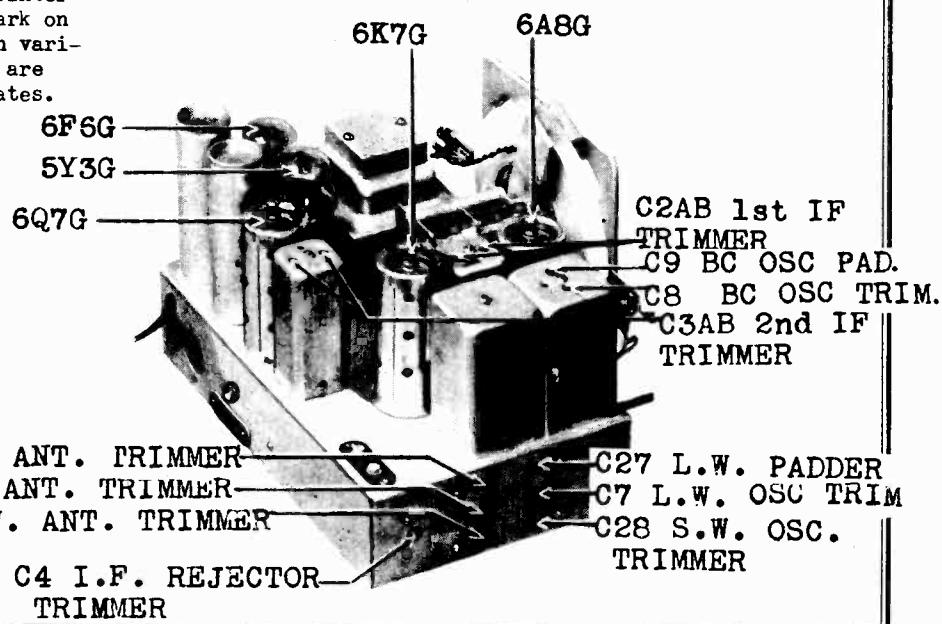
ALIGNMENT (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	345	BC	Open	C2A C2B	1st I.F.
							C3A C3B	2nd I.F.
2	Rejector	Ant.	200 mmf.	345	BC	Closed	C4	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 Ant.	
4		Ant.	200 mmf.	600	BC	600	C9 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
7	Long-Wave Band	Ant.	200 mmf.	300	L.W.	300	C7 Osc.	(with C29 turned tight)
8		Ant.	200 mmf.	300	L.W.	300	C29 Ant.	
9		Ant.	200 mmf.	150	L.W.	150	C27 Pad	
10	(Repeat operations 7, 8 and 9)							
11	Short-Wave Band	Ant.	*	15 MC.	S.W.	15 MC.	C28 Osc.	Rock dial slightly while adjusting
12							C6 Ant.	
13	(Check calibration and sensitivity at 15 MC. and 6 MC.)							
14	(Check operations 1 to 13 inclusive)							

*100 ohm and 200 mmf. in series.
NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.

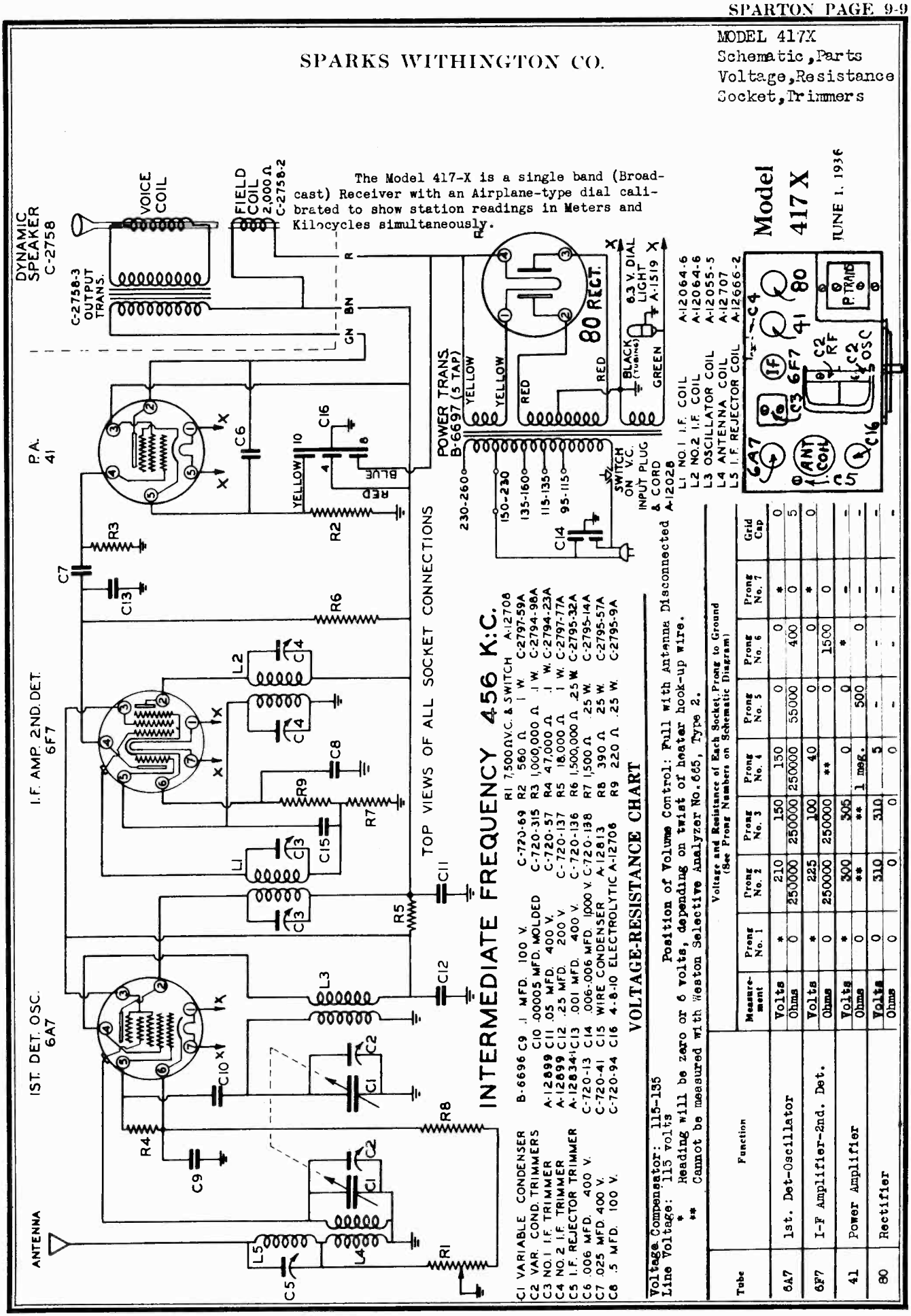
CHASSIS ILLUSTRATION

Model 548-X



SPARKS WITHINGTON CO.

MODEL 417X
Schematic, Parts
Voltage, Resistance
Socket, Trimmers



C1 VARIABLE CONDENSER B-6696
C2 VAR. COND. TRIMMERS C9 .1 MFD. 100 V. C-720-69
C3 NO.1 I.F. TRIMMER C10 .00005 MFD. MOLDED C-720-315
C4 NO.2 I.F. TRIMMER A-12899 C11 .05 MFD. 400 V. C-720-57
C5 I.F. REJECTOR TRIMMER A-12899 C12 .25 MFD. 200 V. C-720-137
C6 .006 MFD. 400 V. A-12834 C13 .001 MFD. 400 V. C-720-136
C7 .025 MFD 400 V. C-720-13 C14 .006-.006 MFD. 1000 V. C-720-138
C8 .5 MFD. 100 V. C-720-41 C15 WIRE CONDENSER A-12813
C-720-94 C16 4-8-10 ELECTROLYTIC A-12706
R1 7,500 Ω V.C. & SWITCH A-12706
R2 560 Ω 1 W. C-2797-59A
R3 1,000,000 Ω .1 W. C-2794-98A
R4 47,000 Ω .1 W. C-2794-23A
R5 18,000 Ω 1 W. C-2797-77A
R6 1,500,000 Ω .25 W. C-2795-32A
R7 1,500 Ω .25 W. C-2795-14A
R8 390 Ω 25 W. C-2795-57A
R9 220 Ω .25 W. C-2795-9A

VOLTAGE-RESISTANCE CHART

Voltage Compensator: 115-135
Line Voltage: 115 volts
* Reading will be zero or 6 volts, depending on twist of heater hook-up wire.
** Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

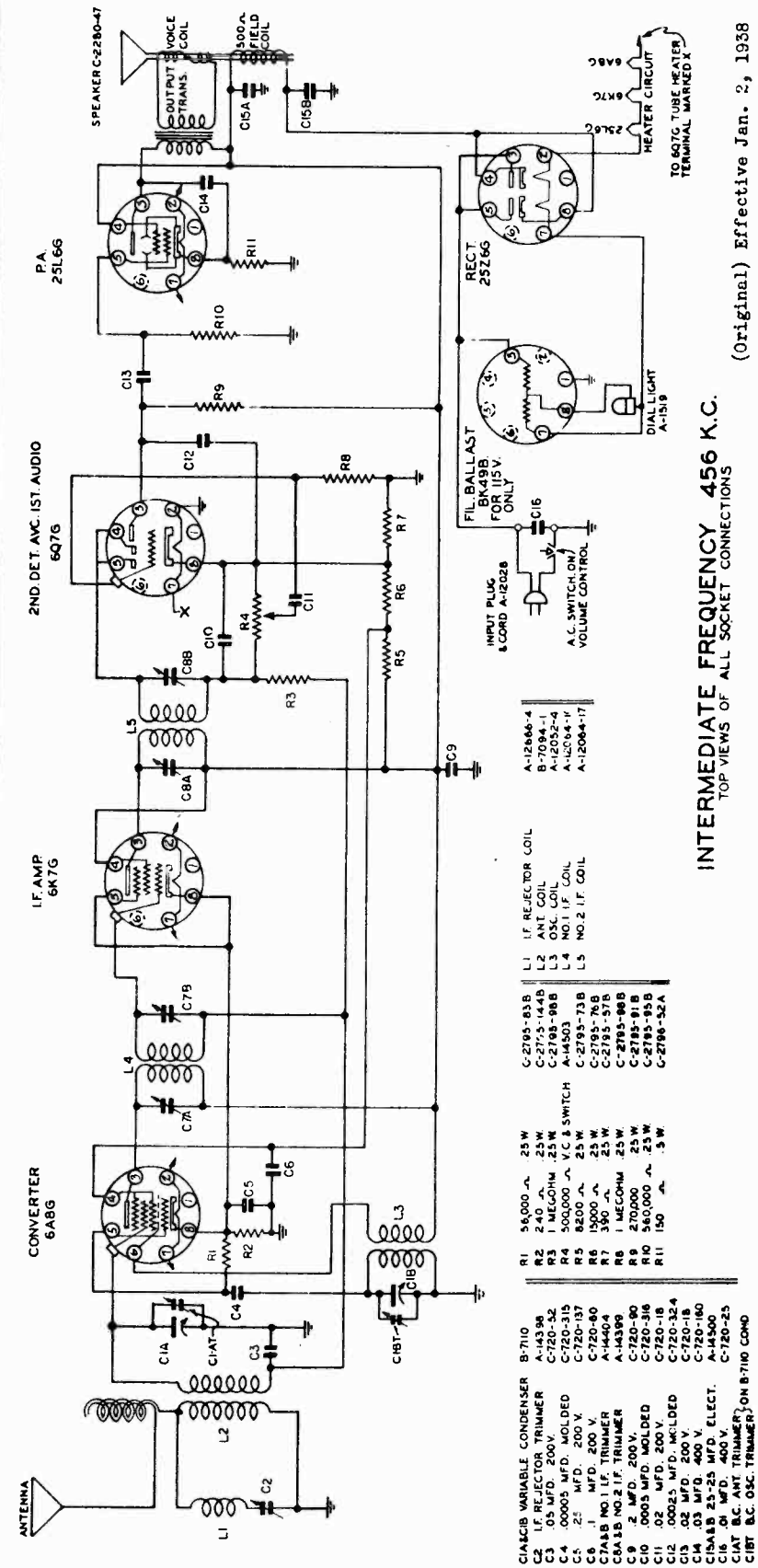
Position of Volume Control: Full with Antenna Disconnected

Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)

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	1st. Det-Oscillator	Volts	*	210	150	150	0	0	*	0
		Ohms	0	250000	250000	250000	55000	400	0	5
6F7	I-F Amplifier-2nd. Det.	Volts	*	225	100	40	0	0	*	0
		Ohms	0	250000	250000	**	0	1500	0	
41	Power Amplifier	Volts	*	300	305	0	0	*	-	-
		Ohms	0	**	**	1 meg.	500	0	-	-
80	Rectifier	Volts	0	310	310	5	-	-	-	-
		Ohms	0	0	0	0	-	-	-	-

MODELS 608,608B,608W,608G
608V,608R,608K
Schematic,Parts,Voltage

SPARKS WITHINGTON CO.



INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

(Original) Effective Jan. 2, 1938

VOLTAGE CHART

Line Voltage: 115 volts AC Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A8G	Converter	0	12	95	55	-5	95	6.5	3.5	0
6K7G	I.F.	-	19	95	95	3.5	-	12	3.5	0
6Q7G	2nd Det. AVC - 1st Audio	-	6.5	30	0	0	0	0	1.4	0
25L6G	P.A.	-	44	90	95	0	0	19	6	-
25Z6G	Rect.	-	69	115	125	115	-	44	125	-
BK49B	Fil. Ballast	0	-	115	-	-	-	69	74	-

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. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages. *AC volts.

Sparton

Superheterodyne Models

608 & 608B
608-W (Walnut)
608-G (Green)
608-V (Ivory)
608-R (Red)
608-K (Black)

MODELS 638-6, 688-6
Socket, Trimmers, Voltage Alignment

SPARKS WITHINGTON CO.

VOLTAGE CHART

MODELS 608, 608B, 608W, 608G
608V, 608R, 608K
Socket, Trimmers, Alignment

"A" Battery - Good

Position of Volume Control: Full with Antenna Disconnected

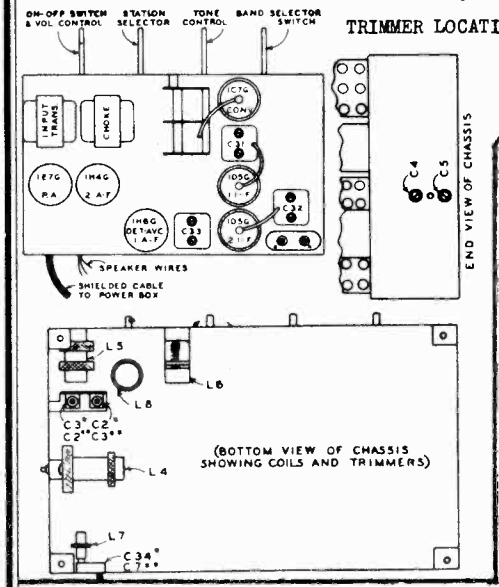
Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1C7G	Converter	-	0	110	45	15	72	2	-	-.3
1D5G	1st I.F. Amp.	-	0	110	45	-	-	2	-	-.3
1D5G	2nd I.F. Amp.	-	0	110	50	-	-	2	-	-.3
1H6G	Det. AVC	-	0	5	-.1	-.6	-.2	2	-	-
1H4G	A.F. Amp.	-	0	95	-	.2	-	2	-	-
1E7G	Power Amp.	-	0	105	6	6	105	1.9	110	-

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. All DC measurements made with 1000 ohms per volt voltmeter.
Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

ALIGNMENT (see note)

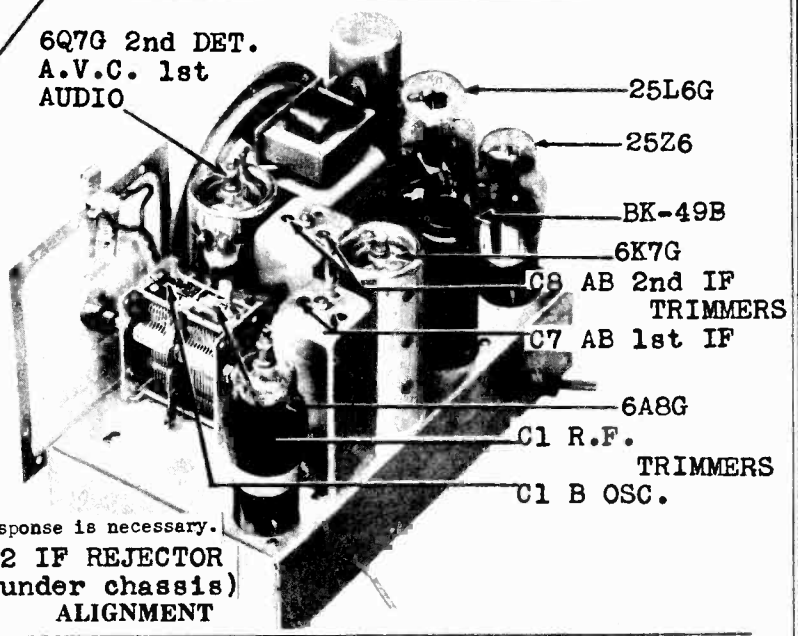
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C33 A,B	3rd I.F. Trans.
							C32 A,B	2nd I.F. Trans.
							C31 A,B	1st I.F. Trans.
2	Rejector	Ant.	150 mmf.	456	BC	Open	C34	Adjust to minimum
3	Broadcast Band	Ant.	150 mmf.	1500	BC	1500	C4 Osc.	
							C3 Ant.	
4		Ant.	150 mmf.	600	BC	600	C5 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
7	S.W. Band	Ant.	400 ohm	15 MC	SW	15 MC	C2 Ant.	
8	(Check operations 1 to 7 inclusive)							

NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.



TRIMMER LOCATIONS

MODELS 608, 608B, 608W, 608G, 608V, 608R, 608K.



*Accurate adjustment to point of least response is necessary.
NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

C2 IF REJECTOR (under chassis) ALIGNMENT

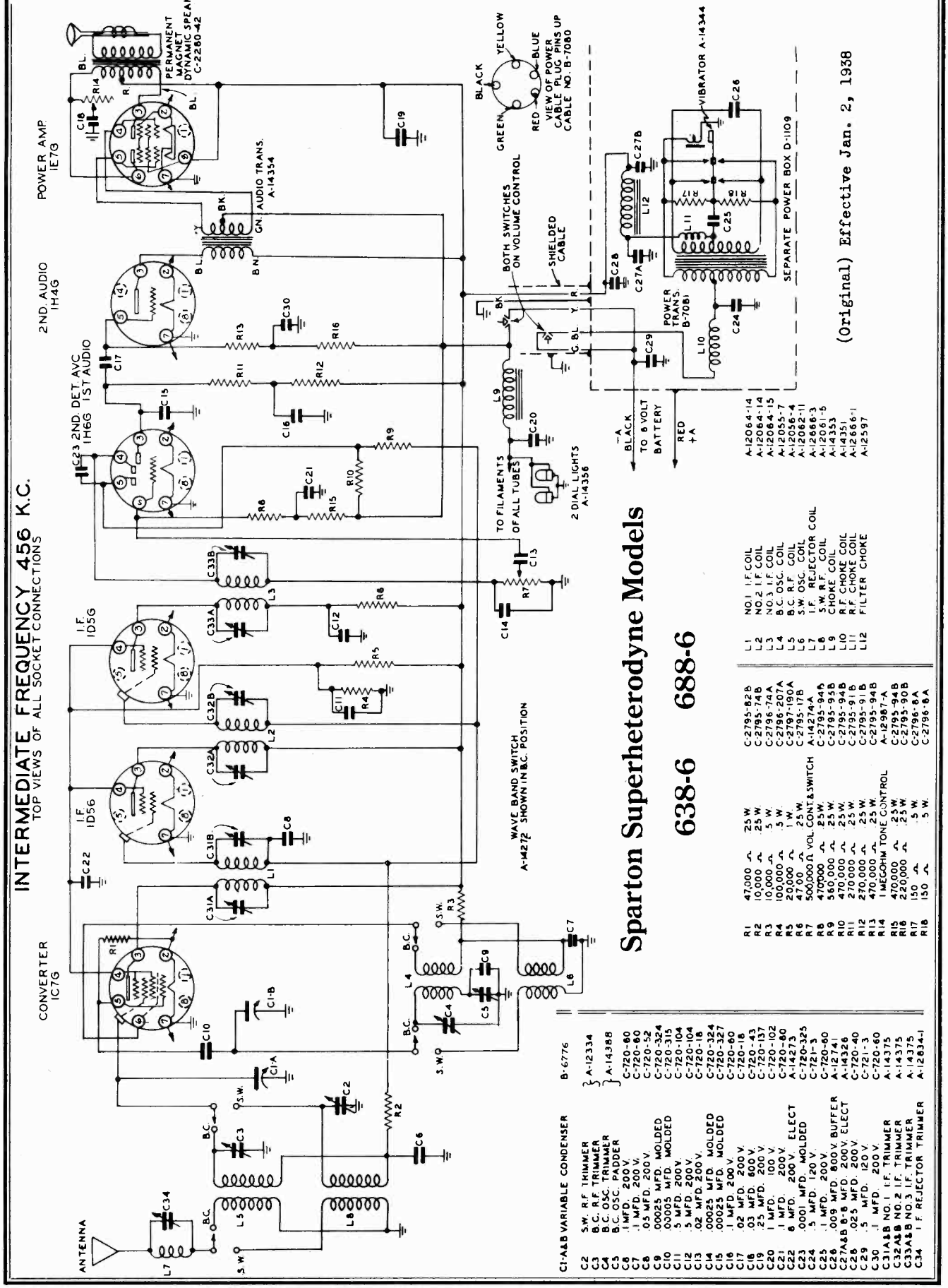
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Ant.	.1 mf.	456	BC	Open	C7A C7B	1st I.F. Trans.
							C8A C8B	2nd I.F. Trans.
2	Rejector	Ant.	150 mmf.	456	BC	closed	C2	Adjust to minimum*
3	Broadcast Band	Ant.	150 mmf.	1500	BC	1500	C-1AB osc.	
							C-1AT ant.	
4	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
5	(Check operations 1 to 4 inclusive)							

MODELS 638-6 and 688-6

MODELS 638-6, 688-6

Schematic, Parts

SPARKS WITHINGTON CO.



C1-A&B VARIABLE CONDENSER B-6776

C2	S.W. R.F. TRIMMER	A-12334
C3	B.C. R.F. TRIMMER	A-14388
C4	B.C. OSC. TRIMMER	
C5	B.C. OSC. PADDER	
C6	.1 MFD. 200 V.	C-720-60
C7	.1 MFD. 200 V.	C-720-60
C8	.05 MFD. 200 V.	C-720-52
C9	.00025 MFD. MOLDED	C-720-324
C10	.00005 MFD. MOLDED	C-720-315
C11	.5 MFD. 200 V.	C-720-104
C12	.5 MFD. 200 V.	C-720-104
C13	.02 MFD. 200 V.	C-720-18
C14	.00025 MFD. MOLDED	C-720-324
C15	.00025 MFD. MOLDED	C-720-327
C16	.1 MFD. 200 V.	C-720-60
C17	.02 MFD. 600 V.	C-720-18
C18	.03 MFD. 200 V.	C-720-43
C19	.25 MFD. 200 V.	C-720-137
C20	1 MFD. 200 V.	C-720-102
C21	1 MFD. 200 V. ELECT	C-720-60
C22	8 MFD. 200 V. ELECT	A-14273
C23	.0001 MFD. MOLDED	C-720-325
C24	.5 MFD. 120 V.	C-721-3
C25	.1 MFD. 200 V.	C-720-60
C26	.009 MFD. 800 V. BUFFER	A-12741
C27A&B	8-8 MFD. 200 V. ELECT	A-14326
C28	.025 MFD. 200 V.	C-720-40
C29	.5 MFD. 120 V.	C-721-3
C30	.1 MFD. 200 V.	C-720-60
C31A&B	NO. 1 I.F. TRIMMER	A-14375
C32A&B	NO. 2 I.F. TRIMMER	A-14375
C33A&B	NO. 3 I.F. TRIMMER	A-14375
C34	I.F. REJECTOR TRIMMER	A-12834-1

R1	47,000 Ω	.25 W.
R2	10,000 Ω	.25 W.
R3	10,000 Ω	.5 W.
R4	100,000 Ω	.5 W.
R5	20,000 Ω	1 W.
R6	47,00 Ω	.25 W.
R7	500,000 Ω VOL. CONT. & SWITCH	A-14274-A
R8	470,000 Ω	.25 W.
R9	560,000 Ω	.25 W.
R10	470,000 Ω	.25 W.
R11	270,000 Ω	.25 W.
R12	270,000 Ω	.25 W.
R13	470,000 Ω	.25 W.
R14	1 MEGOHM TONE CONTROL	A-12987-A
R15	470,000 Ω	.25 W.
R16	220,000 Ω	.25 W.
R17	150 Ω	.5 W.
R18	150 Ω	.5 W.

L1	NO. 1 I.F. COIL	C-2795-82B
L2	NO. 2 I.F. COIL	C-2795-74B
L3	NO. 3 I.F. COIL	C-2796-74A
L4	B.C. OSC. COIL	C-2796-207A
L5	B.C. R.F. COIL	C-2797-190A
L6	S.W. OSC. COIL	C-2795-17B
L7	I.F. REJECTOR COIL	A-14274-A
L8	S.W. R.F. COIL	C-2795-94A
L9	CHOKE COIL	C-2795-95B
L10	R.F. CHOKE COIL	C-2795-94B
L11	R.F. CHOKE COIL	C-2795-91B
L12	FILTER CHOKE	C-2795-91B
		C-2795-94B
		A-12987-A
		C-2795-94B
		C-2795-90B
		C-2796-8A
		C-2796-8A

	A-12064-14
	A-12064-14
	A-12064-15
	A-12055-7
	A-12056-4
	A-12062-11
	A-12666-3
	A-12061-5
	A-14353
	A-14351
	A-12666-1
	A-12597

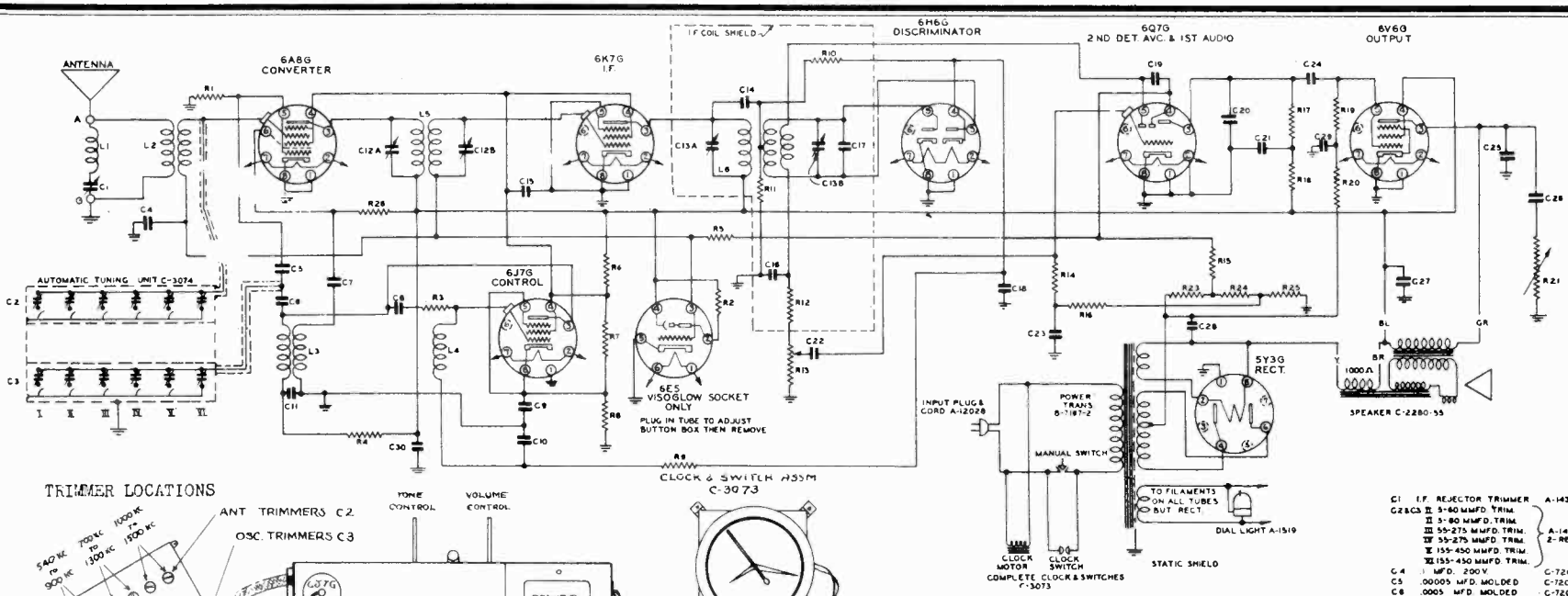
SPARKS WITHINGTON CO.

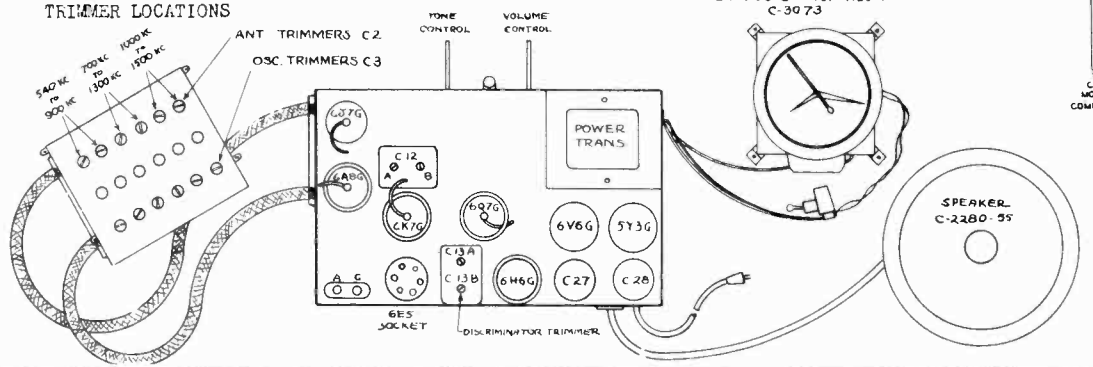
MODEL 738

Schematic, Parts

Socket, Trimmers

Voltage





INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

(Original) Effective Jan. 2, 1938

Sparton Superheterodyne Model 738

C1	I.F. REJECTOR TRIMMER		A-14398
C2&C3	I 5-80 MMFD. TRIM.		A-14448
	II 5-80 MMFD. TRIM.		2 REQ'D
	III 55-275 MMFD. TRIM.		
	IV 55-275 MMFD. TRIM.		
	V 155-450 MMFD. TRIM.		
	VI 155-450 MMFD. TRIM.		
C4	.1 MFD. 200 V.		C-720-60
C5	.00005 MFD. MOLDED		C-720-320
C6	.0005 MFD. MOLDED		C-720-355
C7	.008 MFD. 600 V.		C-720-15
C8	.0001 MFD. MOLDED		C-720-339
C9	.1 MFD. 200 V.		C-720-60
C10	.2 MFD. 200 V.		C-720-90
C11	.2 MFD. 400 V.		C-720-74
C12A&C12B	I.F. TRIMMER		A-14404
C13A&C13B	I.F. TRIMMER		A-14440
C14	.00005 MFD. MOLDED		C-720-320
C15	.05 MFD. 400 V.		C-720-57
C16	.00025 MFD. MOLDED		C-720-318
C17	.00007 MFD. MOLDED		C-720-348
C18	.1 MFD. 200 V.		C-720-60
C19	.0001 MFD. MOLDED		C-720-339
C20	.00025 MOLDED		C-720-319
C21	.1 MFD. 400 V.		C-720-61
C22	.05 MFD. 200 V.		C-720-54
C23	.1 MFD. 200 V.		C-720-60
C24	.05 MFD. 400 V.		C-720-46
C25	.008 MFD. 600 V.		C-720-154
C26	.08 MFD. 600 V.		C-720-155
C27	30 MFD. 300 V.		A-14072
C28	10 MFD. 450 V.		A-14073
C29	.2 MFD. 200 V.		C-720-90
C30	.05 MFD. 400 V.		C-720-57
R1	58 000 Ω .25 W.		C-2795-83B
R2	1 MEGOHM .25 W.		C-2795-98B
R3	100 000 Ω .25 W.		C-2795-86B
R4	56 000 Ω .25 W.		C-2795-83B
R5	470 000 Ω .25 W.		C-2795-94B
RC	10 000 Ω 2 W.		C-2798-183A
R7	82 00 Ω 5 W.		A-14322-4
R8	330 Ω .25 W.		C-2795-147B
R9	220 000 Ω .25 W.		C-2795-90B
R10	470 000 Ω .25 W.		C-2795-94B
R11	470 000 Ω .25 W.		C-2795-94B
R12	47 000 Ω .25 W.		C-2795-82B
R13	VOLUME CONTROL 250 000		A-14075-A1
R14	1 MEGOHM .25 W.		C-2795-98B
R15	1 MEGOHM .25 W.		C-2795-98B
R16	220 000 Ω .25 W.		C-2795-90B
R17	220 000 Ω .25 W.		C-2795-90B
R18	220 000 Ω .25 W.		C-2795-90B
R19	510 000 Ω .25 W.		C-2795-224B
R20	100 000 Ω .25 W.		C-2795-86B
R21	TONE CONTROL 500 000 Ω		A-14089-A
R23	150 Ω 2 W.		C-2798-32A
R24	24 Ω .25 W.		C-2795-120B
R25	27 Ω .25 W.		C-2795-121B
R26	22 000 Ω 5 W.		C-2796-7RA
L1	I.F. REJECTOR COIL		A-12886-5
L2	ANT. COIL		A-14805
L3	OSC. COIL		A-12055-19
L4	R.F. CHOKE		A-12888-4
L5	NO. 1 I.F. COIL		A-14802
L6	NO. 2 I.F. COIL		A-14803

VOLTAGE CHART

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A8G	Converter	0	0	250	100	-5	150	6.2*	0	-.1
6K7G	I.F.	0	0	250	100	0	250	6.2*	0	-.1
6H6G	Discriminator	0	0	.1	0	.1	0	6.2*	0	-
6J7G	A.F.C.	0	0	110	100	4	-	6.2*	4	0
6Q7G	Det.-AVC-1st A-F Amp.	0	0	50	0	0	0	6.2*	0	-.1
6V6G	Output	0	0	250	250	-.1	-	6.2*	0	-
5Y3G	Rectifier	340*	-	350*	-	350*	-	340*	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. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

MODEL 738 (Selectime)
Alignment
Selectronne Data

SPARKS WITHINGTON CO.

SPARTON RADIO

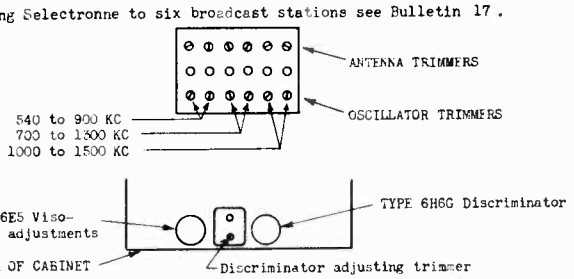
ADJUSTMENT OF
THE SPARTON SELECTRONNE
AND
ALIGNMENT OF
MODEL 738.

ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TRIMMER	REMARKS
1	I.F.	6A8 Grid	.1 mf.	456	C13A C12A C12B	2nd I.F. (Pri.) 1st I.F.
2	Discriminator	6A8 Grid	.1 mf.	456	C13B	Adjust to MAXIMUM with bakelite screwdriver.*
3	Rejector	Ant.	200 mmf.	456	C1	Adjust to minimum
4	Selectronne**	Ant.	200 mmf.	1500	C3 (1000 to 1500 KC) Osc. C2 (1000 to 1500 KC) R.F.	
5	Selectronne**	Ant.	200 mmf.	1000	C3 (700 to 1300 KC) Osc. C2 (700 to 1300 KC) R.F.	
6	Selectronne**	Ant.	200 mmf.	600	C3 (540 to 900 KC) Osc. C2 (540 to 900 KC) R.F.	
7	Check AFC by noting output on output meter, then short out AFC by grounding the grid return circuit of 6J7G control tube at a point between L4 R.F. choke and C10 .2 mf. condenser. If output changes appreciably touch up C13B (Discriminator trimmer) until there is no change in output as the short is alternately connected to and removed from the AFC circuit.	6A8 Grid	.1 mf.	1400	C3 (1400 KC) Osc. C2 (1400 KC) R.F.	
8	(Check operations 1 to 7 inclusive)					

* This Discriminator circuit is different than used in Models 1068, 1268, 1568, etc. Do not confuse.

**For adjusting Selectronne to six broadcast stations see Bulletin 17.



WARNING - Never attempt to adjust the Selectronne with the 6H6G Discriminator tube in the socket.

Unless the 6H6G Discriminator tube is removed when the Selectronne is adjusted, automatic frequency control will prevent correct trimmer adjustments, with the result that unsatisfactory reception of stations may occur. With the 6H6G Discriminator tube left in the socket, automatic frequency control action will bring in the station and close the Viso-Glo before the trimmers have been completely adjusted.

HOW TO ADJUST THE SPARTON SELECTRONNE IN THE MODEL 738 "SELECTIME"

WARNING: All final adjustments of the Selectronne trimmers should be made in the customer's home, with the receiver connected to the regular antenna system with which it will be used.

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.
2. Remove the Selectronne escutcheon plate from the front of the cabinet by means of the two screws. This exposes the steel plate with the slots for holding the station call letter tabs.
3. The six buttons of the Selectronne are arranged in three groups according to frequency limits - 540 to 900 kc., 700 to 1300 kc. and 1000 to 1500 kc. (See illustration also back cover of selectronne box). The six tabs corresponding to the six broadcast stations which have been chosen must be arranged in the steel plate so that the frequency (kilocycle) of each station will be included in the frequency limits of the proper group.

For example: A station having a frequency of 610 kc. should be placed in the 540 to 900 kc. group; a station at 950 should be placed in the 700 to 1500 kc. group, etc.

Note: Each group has considerable overlap to allow for the selection of six stations which may have frequency allocations comparatively close together.

4. Remove type 6H6G tube (Discriminator) from chassis (see illustration).
5. Adjust Selectronne trimmers for each one of the six stations as follows:

(A) Two trimmers are provided for each one of the six stations. They are reached through the two holes arranged in rows one above the other in the back cover of the Selectronne.

(B) Obtain 6E5 Viso-Glo from your dealer and insert in 6E5 socket for use as an indicating meter (This tube is not supplied with set).

(C) Now from the back of the cabinet, with an ordinary screw-driver adjust the oscillator trimmer (bottom hole) in the row corresponding to the proper station, until the station is heard. This station may be heard faintly until the remaining trimmer has been adjusted.

It is important that the correct station is heard with this adjustment and not some other network station carrying the same program. Screw this trimmer to the right or left until the station is loudest.

Care should be taken in turning the adjusting screws so that they will not become disengaged from the trimmers by being turned out too far.

(D) In the same manner adjust the antenna trimmer (top hole) to this same station.

Note: Perfect adjustment of these trimmers is easily obtained by observing the Viso-Glo tube so that every adjustment of the trimmers may be watched. Perfect adjustment is obtained when further turning of the trimmers will not result in any smaller shaded area between the green light sections of the Viso-Glo.

(E) Re-adjust the oscillator trimmer (bottom hole) while watching the Viso-Glo to see if the shaded area can be made smaller.

6. Repeat the procedure in paragraph 5 for each of the six stations.

7. When all trimmers have been properly adjusted, replace type 6H6G Discriminator tube and attach Selectronne escutcheon plate to front of cabinet.
8. Any of the six stations to which the SPARTON Selectronne has been adjusted, may now be instantly received simply by pushing the Selectronne button for the desired station with the Band Switch knob pushed in; that is, in the automatic position.

NOTE: In case all six of the buttons should become depressed through improper manipulation of the Selectronne, simply reach into the Selectronne box (from the back of the cabinet) through the side, and apply a slight pressure of the fingers under the latching bar which runs across the frame work in front of the trimmer box. This will immediately release all buttons.

IMPORTANT

Always check the discriminator circuit to see if it is in proper adjustment and adjust it if necessary before adjusting the Selectronne.

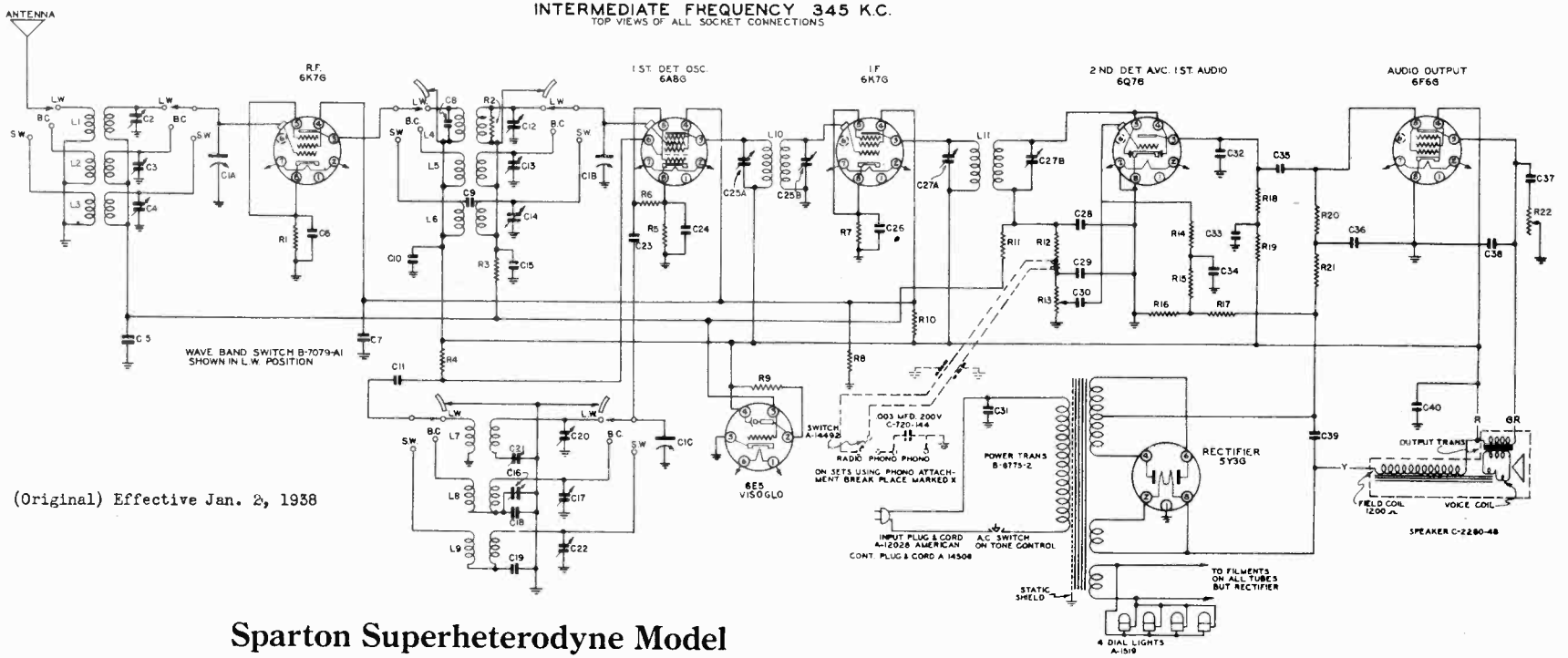
TO CHECK THE ADJUSTMENT OF THE DISCRIMINATOR CIRCUIT, note carefully the Viso-Glo, then pull Discriminator tube out and see if the Viso-Glo opens or closes. If it opens, the Selectronne is not adjusted right. If it closes, the Discriminator is not adjusted accurately.

IMPORTANT: The Type 6H6G Discriminator tube must be in its socket when adjusting the discriminator circuit, and out of its socket when adjusting the Selectronne trimmers.

TO ADJUST THE DISCRIMINATOR CIRCUIT, tune in a strong station so that the Viso-Glo closes as much as possible. Then put Discriminator tube in and insert an insulated (bakelite) screw driver in the hole nearest the back of the chassis in the aluminum can located between the 6H6G Discriminator tube and the 6E5 Viso-Glo. Turn the Discriminator circuit trimmer very slightly one way or the other until the Viso-Glo closes as far as possible. Then pull Discriminator tube out. The Viso-Glo should shot the same position. If it does not, adjust more accurately with Discriminator tube in socket.

CAUTION: The blade of the screw-driver positively must be an insulated (bakelite) one.

WARNING - Do not attempt to adjust the other trimmer in this last can or a trimmer in any of the other cans. Only adjust the trimmer nearest the back of the chassis and in the can located between the 6H6G and 6E5 tubes.



Sparton Superheterodyne Model 748-X

VOLTAGE CHART

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6K7G	R-F	0	6.3*	255	115	2	-	0	2	2
6A8G	Converter	0	6.3*	255	115	-6	150	0	5	0
6K7G	I-F	0	6.3*	255	115	4	-	0	4	0
6Q7G	Det-AVC-1st A-F Amp.	0	6.3*	55	-.5	-.5	-.5	0	0	-1
6F6G	Power Amplifier	0	6.3*	235	250	.5	1	0	0	-
5Y3G	Rectifier	0	345*	-	350*	-	350*	-	345*	-
6E5	Viso-Glo	6.3*	12	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. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

C1A C1B & C1C	VARIABLER COND.	B-7044
C2	L.W. ANT TRIMMER	A-14511-3
C3	B.C. ANT TRIMMER	
C4	S.W. ANT TRIMMER	
C5	.05 MFD. 200 V.	C-720-52
C6	.08 MFD. 200 V.	C-720-52
C7	.1 MFD. 200 V.	C-720-60
C8	.00025 MFD. MOLDED	C-720-319
C9	12 MMFD. COUPLER	C-720-354
C10	.1 MFD. 400 V.	C-720-61
C11	.006 MFD. 600 V.	C-720-17
C12	L.W. R.F. TRIMMER	A-14511-1
C13	B.C. R.F. TRIMMER	
C14	S.W. R.F. TRIMMER	
C15	.05 MFD. 200 V.	C-720-52
C16	B.C. OSC. PADDER	A-14388
C17	B.C. OSC. TRIMMER	
C18	.00035 MFD. MOLDED	C-720-329
C19	.006 MFD. MOLDED	C-720-351
C20	L.W. OSC. TRIMMER	A-14511-2
C21	L.W. OSC. PADDER	
C22	S.W. OSC. TRIMMER	
C23	.00005 MFD. MOLDED	C-720-320
C24	.05 MFD. 200 V.	C-720-52
C25A&B	NO. 1 I.F. TRIMMER	A-14376
C26	.05 MFD. 200 V.	C-720-52
C27A&B	NO. 2 I.F. TRIMMER	A-14490
C28	.00018 MFD. MOLDED	C-720-329
C29	.0001 MFD. MOLDED	C-720-325
C30	.01 MFD. 200 V.	C-720-146
C31	.05 MFD. 600 V.	C-720-157
C32	.00015 MFD. MOLDED	C-720-319*
C33	.1 MFD. 400 V.	C-720-61
C34	.1 MFD. 200 V.	C-720-60
C35	.05 MFD. 400 V.	C-720-57
C36	.1 MFD. 200 V.	C-720-60
C37	.03 MFD. 600 V.	C-720-13
C38	.002 MFD. 600 V.	C-720-56
C39	16 MFD. 450 V.	A-14073
C40	2C MFD. 300 V.	A-14072

R1	540 Ω .25 W.	C-2795-59B
R2	100,000 Ω .25 W.	C-2795-84B
R3	100,000 Ω .25 W.	C-2795-84B
R4	22,000 Ω .5 W.	C-2796-78A
R5	470 Ω .25 W.	C-2795-58B
R6	56,000 Ω .25 W.	C-2795-85B
R7	860 Ω .25 W.	C-2795-59B
R8	21,000 Ω 1 W.	C-2797-79A
R9	1 MEGOHM .25 W.	C-2795-98B
R10	15,000 Ω 2 W.	C-2796-76A
R11	1 MEGOHM .25 W.	C-2795-98B
R12	56,000 Ω .25 W.	C-2795-85B
R13	250,000 Ω Vol. CONTROL	A-14515
R14	360,000 Ω .25 W.	C-2795-95B
R15	1 MEGOHM .25 W.	C-2795-98B
R16	36 Ω CANDOHM	A-14188
R17	210 Ω CANDOHM	
R18	210,000 Ω .25 W.	C-2795-91B
R19	100,000 Ω .25 W.	C-2795-84B
R20	210,000 Ω .25 W.	C-2795-91B
R21	210,000 Ω .25 W.	C-2795-91B
R22	1 MEG. TONE CONT. & SWITCH	A-14171-A1

L1	L.W. ANT COIL	A-12034-6
L2	B.C. ANT COIL	A-14209-1
L3	S.W. ANT COIL	
L4	L.W. R.F. COIL	A-12056-6
L5	B.C. R.F. COIL	A-14210
L6	S.W. R.F. COIL	
L7	L.W. OSC. COIL	A-12298-4
L8	B.C. OSC. COIL	A-14213
L9	S.W. OSC. COIL	
L10	NO. 1 I.F. COIL	A-12064-9
L11	NO. 2 I.F. COIL	A-12064-22

MODEL 748X
MODELS 768,768X,778,778X
Socket,Trimmers,Alignment

SPARKS-WITHINGTON CO.

MODELS 768, 768-X, 778. 778-X. ALIGNMENT (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	1st. Det. Grid	.1 mf.	456	BC	Open	C35 A,B	2nd I.F. Trans.
							C34 A,B	1st I.F. Trans.
2	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
3		Ant.	200 mmf.	600	BC	600	C11 Pad	*
4	(Repeat operation 2)							
5	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
6	1st short wave band	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
7	(Check calibration at 1.95 MC and 6 MC.)							
8	2nd short wave band	Ant.	100 ohm 200 mmf. series	18 M.C.	2nd S.W.	18 MC.	C10 Osc.	Rock dial slightly while adjusting
							C7 RF	
							C4 Ant.	
9	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
10	(Check operations 1 to 9 inclusive)							

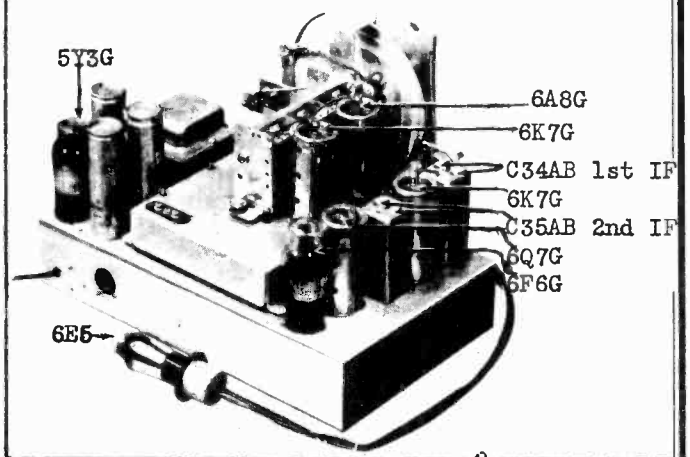
*Rock variable condenser slightly while adjusting for maximum output.

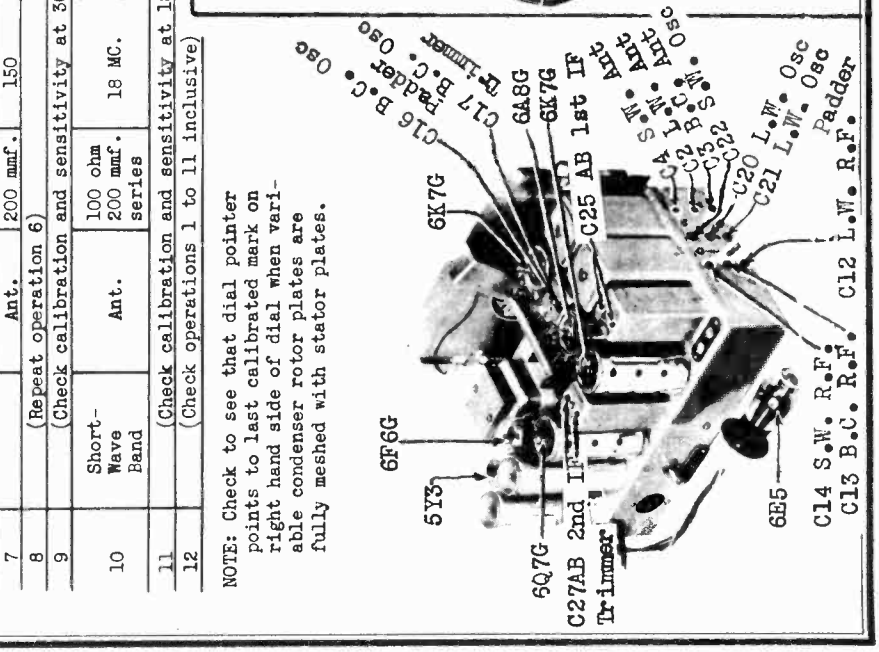
NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

MODEL 748-X ALIGNMENT (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	345	BC	Open	C27A C27B	2nd I.F. Trans.
							C25A C25B	1st I.F. Trans.
2	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C17 Osc.	
							C13 RF	
							C5 Ant.	
3		Ant.	200 mmf.	600	BC	600	C16 Pad	
4	(Repeat operation 2)							
5	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
6	Long-Wave Band	Ant.	200 mmf.	300	L.W.	300	C20 Osc.	
							C12 RF	
							C2 Ant.	
7		Ant.	200 mmf.	150	L.W.	150	C21 Pad	
8	(Repeat operation 6)							
9	(Check calibration and sensitivity at 300 KC and 150 KC)							
10	Short-Wave Band	Ant.	100 ohm 200 mmf. series	18 MC.	SW.	18 MC.	C22 Osc.	Rock dial slightly while adjusting
							C14 RF	
							C4 Ant.	
11	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
12	(Check operations 1 to 11 inclusive)							

NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.

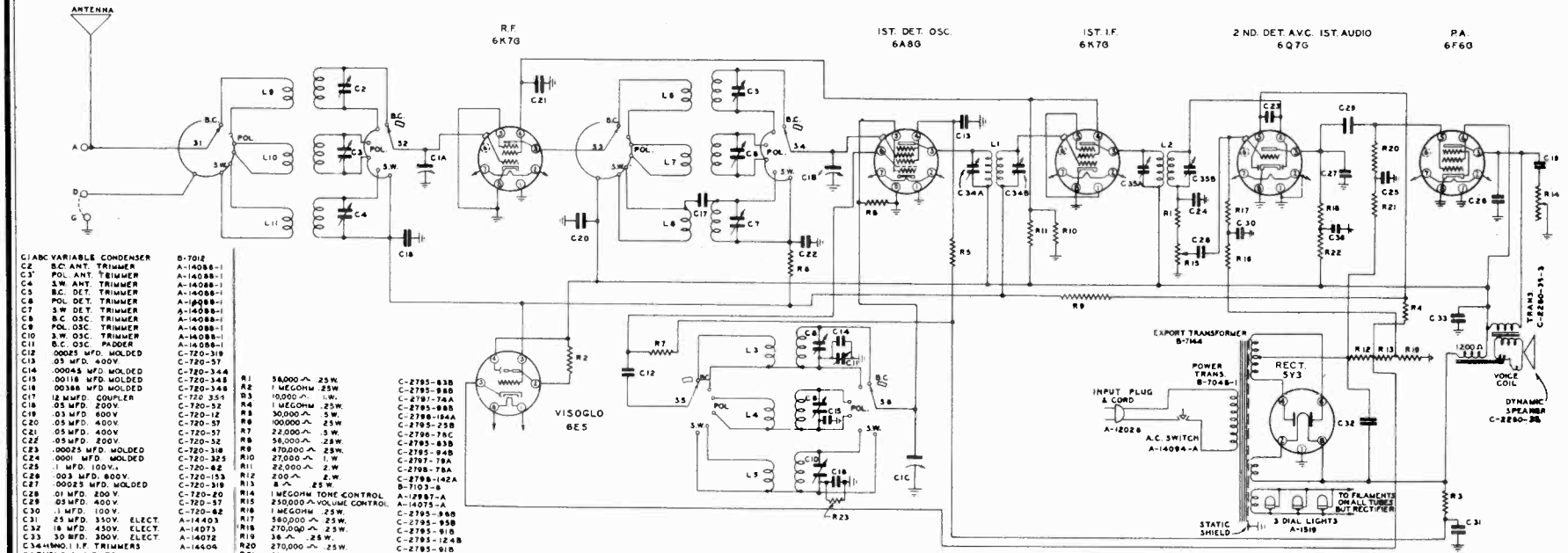




(Original) Effective Jan. 2, 1938

INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS



C1ABC	VARIABLE CONDENSER	B-7012
C2	B.C. ANT. TRIMMER	A-14088-1
C3	POL. ANT. TRIMMER	A-14088-1
C4	S.W. ANT. TRIMMER	A-14088-1
C5	B.C. DET. TRIMMER	A-14088-1
C6	POL. DET. TRIMMER	A-14088-1
C7	S.W. DET. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	S.W. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14086-1
C12	.00025 MFD. MOLDED	C-720-319
C13	.05 MFD. 400V.	C-720-57
C14	.00045 MFD. MOLDED	C-720-344
C15	.00118 MFD. MOLDED	C-720-348
C16	.00388 MFD. MOLDED	C-720-346
C17	12 MMFD. COUPLER	C-720-351
C18	.05 MFD. 200V.	C-720-52
C19	.03 MFD. 600V.	C-720-12
C20	.05 MFD. 400V.	C-720-57
C21	.05 MFD. 400V.	C-720-57
C22	.05 MFD. 200V.	C-720-52
C23	.00025 MFD. MOLDED	C-720-319
C24	.0001 MFD. MOLDED	C-720-325
C25	.1 MFD. 100V.,	C-720-82
C26	.003 MFD. 600V.	C-720-153
C27	.00025 MFD. MOLDED	C-720-319
C28	.01 MFD. 200 V.	C-720-20
C28	.05 MFD. 400 V.	C-720-57
C30	.1 MFD. 100 V.	C-720-82
C31	.25 MFD. 350V. ELECT.	A-14403
C32	16 MFD. 450V. ELECT.	A-14073
C33	30 MFD. 300V. ELECT.	A-14072
C34A&B	NO. 1 I.F. TRIMMERS	A-14404
C35A&B	NO. 2 I.F. TRIMMERS	A-14399
C36	.1 MFD. 400V.	C-720-81

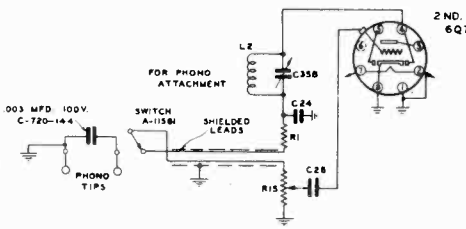
NO. FROM BACK OF SET
31 ANT. PRI. SECTION
32 ANT. SEC. SECTION
33 DET. PRI. SECTION
34 DET. SEC. SECTION
35 OSC. PLATE SECTION
36 OSC. GRID SECTION

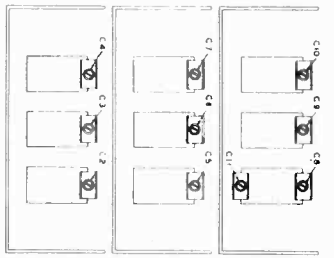
R1	56,000 Ω .25 W.	C-2795-83B
R2	1 MEGOHM .25 W.	C-2795-88B
R3	10,000 Ω 1 W.	C-2787-74A
R4	1 MEGOHM .25 W.	C-2795-88B
R5	30,000 Ω .5 W.	C-2798-184A
R6	100,000 Ω .25 W.	C-2795-25B
R7	22,000 Ω .5 W.	C-2796-78C
R8	56,000 Ω .28 W.	C-2795-83B
R9	470,000 Ω .25 W.	C-2795-94B
R10	27,000 Ω 1 W.	C-2797-78A
R11	22,000 Ω 2 W.	C-2798-78A
R12	200 Ω 2 W.	C-2798-142A
R13	8 Ω .25 W.	B-7103-8
R14	1 MEGOHM TONE CONTROL	A-12987-A
R15	250,000 Ω VOLUME CONTROL	A-14075-A
R16	1 MEGOHM .25 W.	C-2795-96B
R17	560,000 Ω .25 W.	C-2795-95B
R18	270,000 Ω .25 W.	C-2795-91B
R19	36 Ω .25 W.	C-2795-124B
R20	270,000 Ω .25 W.	C-2795-91B
R21	270,000 Ω .25 W.	C-2795-91B
R22	100,000 Ω .25 W.	C-2795-25B
R23	68,000 Ω .25 W.	C-2795-24B

L1	NO. 1 I.F. TRANS.	A-12084-12
L2	NO. 2 I.F. TRANS.	A-12084-17
L3	B.C. OSC. COIL	A-14241-1P
L4	POL. OSC. COIL	A-14241-2P
L5	S.W. OSC. COIL	A-14241-3
L6	B.C. DET. COIL	A-14242-BP
L7	POL. DET. COIL	A-14242-2P
L8	S.W. DET. COIL	A-14242-3
L9	B.C. ANT. COIL	A-14243-1P
L10	POL. ANT. COIL	A-14243-2P
L11	S.W. ANT. COIL	A-14243-3

Sparton Superheterodyne Models

768 778
768-X 778-X





VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6K7G	R.F.	0	0	250	100	0	-	6.1*	0	-1.
6A8G	1st Det. Osc.	0	0	250	109	-24	148	6.1*	0	-.2
6K7G	1st I.F.	0	0	250	100	0	-	6.1*	0	-.2
6Q7G	2nd Det. AVC - 1st Audio	0	0	49	-.2	-.2	-	6.1*	0	-.2
6F6G	P.A.	0	0	240	250	-.4	-	6.1*	0	-
5Y3	Rect.	0	330*	-	340*	-	340*	-	330*	-
6E5	Viso-Glo	6	1.9	-2.2	250	-3.3	0	-	-	-

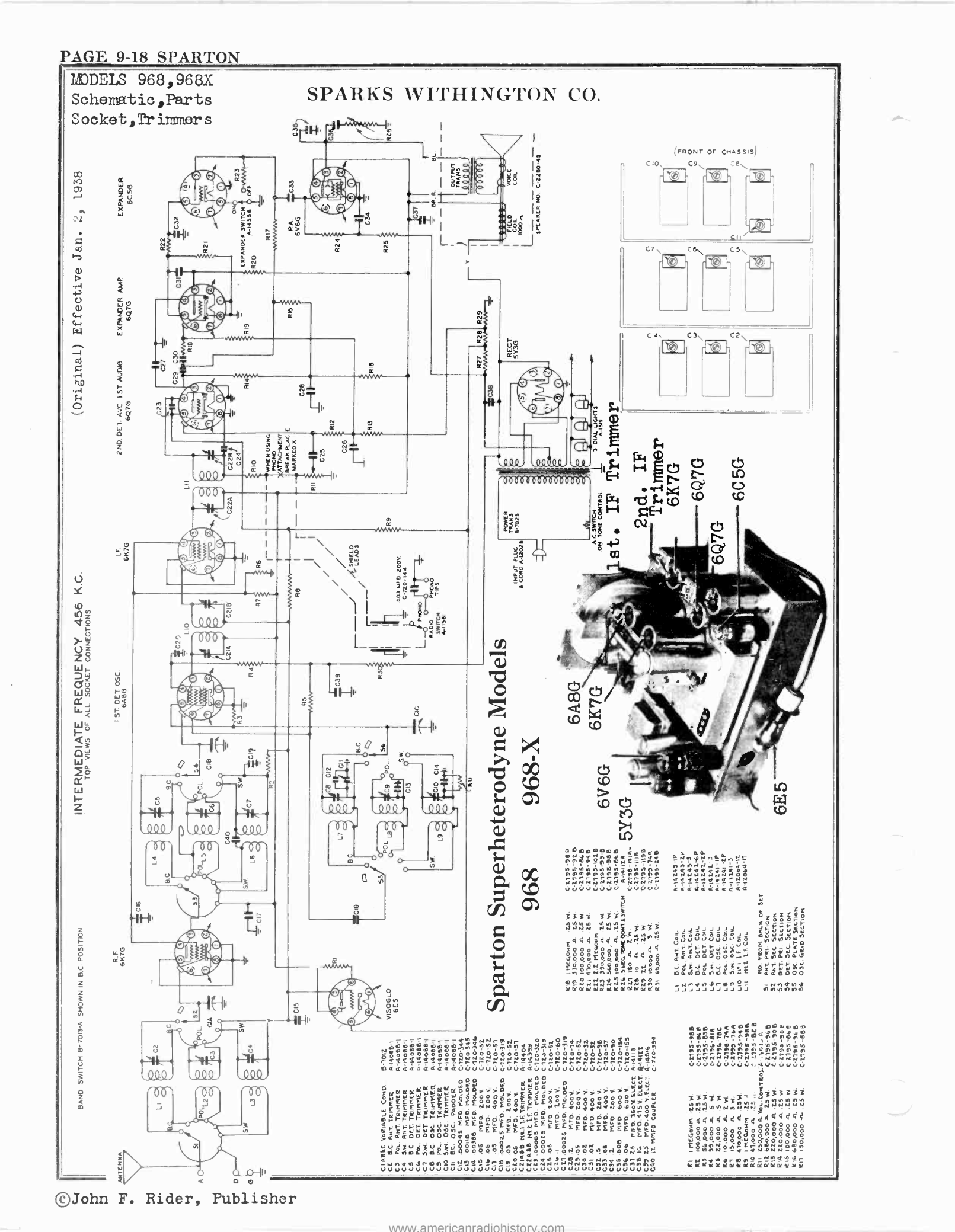
Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

MODELS 968,968X
Schematic,Parts
Socket,Trimmers

SPARKS WITHINGTON CO.

(Original) Effective Jan. 2, 1938

INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS



C1 B&C VARIABLE COND. B-7012
C2 P.C. ANT TRIMMER A-14086-I
C3 S.W. ANT TRIMMER A-14086-I
C4 S.W. ANT TRIMMER A-14086-I
C5 B.C. DET. TRIMMER A-14086-I
C6 POL. DET. TRIMMER A-14086-I
C7 S.W. DET. TRIMMER A-14086-I
C8 P.C. OSC. TRIMMER A-14086-I
C9 POL. OSC. TRIMMER A-14086-I
C10 S.W. OSC. TRIMMER A-14086-I
C11 B.C. OSC. PADDER A-14086-I
C12 .00045 MFD. MOLDED C-7201-344
C13 .0018 MFD. MOLDED C-7201-345
C14 .00368 MFD. MOLDED C-7201-346
C15 .05 MFD. 200 V. C-7201-52
C16 .05 MFD. 200 V. C-7201-52
C17 .05 MFD. 400 V. C-7201-51
C18 .00025 MFD. MOLDED C-7201-319
C19 .05 MFD. 200 V. C-7201-52
C20 .05 MFD. 400 V. C-7201-51
C21A&B .05 MFD. I.F. TRIMMER A-14394
C22A&B .05 MFD. I.F. TRIMMER A-14394
C23 .00005 MFD. MOLDED C-7201-320
C24 .00025 MFD. MOLDED C-7201-319
C25 .05 MFD. 200 V. C-7201-52
C26 .00025 MFD. MOLDED C-7201-319
C27A .2 MFD. 400 V. C-7201-56
C27B .05 MFD. 200 V. C-7201-52
C28 .02 MFD. 200 V. C-7201-52
C29 .01 MFD. 400 V. C-7201-32
C30 .02 MFD. 400 V. C-7201-32
C31 .01 MFD. 200 V. C-7201-31
C32 .1 MFD. 200 V. C-7201-36
C33 .05 MFD. 200 V. C-7201-52
C34 .2 MFD. 200 V. C-7201-50
C35 .008 MFD. 600 V. C-7201-184
C36 .04 MFD. 600 V. C-7201-185
C37 2.5 MFD. 350 V. ELECT. A-14113
C38 2.5 MFD. 475 V. ELECT. A-14112
C39 .25 MFD. 400 V. ELECT. C-7201-354
C40 I.F. MMFD COUPLER

R1 1 MEGOHM .25 W. C-2195-98B
R2 100,000 Ω .25 W. C-2195-84B
R3 1 MEGOHM .25 W. C-2195-98B
R4 39,000 Ω .5 W. C-2196-81A
R5 22,000 Ω .5 W. C-2196-78C
R6 10,000 Ω 2 W. C-2199-74A
R7 15,000 Ω 5 W. C-2199-76A
R8 47,000 Ω 2.5 W. C-2199-94B
R9 1 MEGOHM .25 W. C-2195-98B
R10 47,000 Ω .25 W. C-2195-82B
R11 250,000 Ω VOL. CONTROL A-1017-A
R12 680,000 Ω .25 W. C-2195-96B
R13 220,000 Ω .25 W. C-2195-90B
R14 100,000 Ω .25 W. C-2195-90E
R15 100,000 Ω .25 W. C-2195-84B
R16 680,000 Ω .25 W. C-2195-96B
R17 150,000 Ω .25 W. C-2195-88B

R18 1 MEGOHM .25 W. C-2195-98B
R19 330,000 Ω .25 W. C-2195-92B
R20 100,000 Ω .25 W. C-2195-84B
R21 470,000 Ω .25 W. C-2195-94B
R22 2.2 MEGOHM C-2195-102B
R23 390,000 Ω .25 W. C-2195-93B
R24 560,000 Ω .25 W. C-2195-95B
R25 100,000 Ω .25 W. C-2195-86B
R26 S.W.C. TONE SWITCH A-14113A
R27 10 Ω .25 W. C-2195-111B
R28 10 Ω .5 W. C-2195-111B
R29 22 Ω .25 W. C-2195-119B
R30 10,000 Ω 5 W. C-2199-74A
R31 68,000 Ω .25 W. C-2195-124B

L1 B.C. ANT. COIL A-14255-1P
L2 POL. ANT. COIL A-14243-2P
L3 S.W. ANT. COIL A-14243-3P
L4 POL. OSC. COIL A-14242-2P
L5 POL. DET. COIL A-14242-2P
L6 S.W. DET. COIL A-14242-3
L7 B.C. OSC. COIL A-14241-1P
L8 POL. OSC. COIL A-14241-2P
L9 S.W. OSC. COIL A-14241-3
L10 1ST I.F. COIL A-11244-11
L11 2ND I.F. COIL A-12064-11

NO. FROM BACK OF SKT
S1 ANT. PRI. SECTION
S2 ANT. SEC. SECTION
S3 DET. SEC. SECTION
S4 DET. PRI. SECTION
S5 OSC. PLATE SECTION
S6 OSC. GRID SECTION

MODELS 1068,1068X,1078
1078X

SPARKS WITHINGTON CO.

MODELS 968,968X
Voltage,Alignment

Socket,Trimmers,Alignment

MODEL 968, 968-X. VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6K7G	R.F.	0	0	290	95	0	-	6	0	-1
6A8G	Converter	0	0	290	78	-34	150	6	0	-.1
6K7G	I.F.	0	0	290	90	0	-	6	0	-2
6Q7G	2nd Det. A.V.C.	0	0	105	-.1	0	-.1	6	0	-.1
6Q7G	Expander Amp.	0	0	175	0	0	-	6	0	-.5
6C5G	Expander	0	0	6	0	.1	2	6	0	-
6V6G	P.A.	0	0	270	300	.5	10	6	0	-
5Y3G	Rect.	0	370*	-	380*	-	380*	0	370*	-
6E5	Viso-Glo	0	50	-.2	280	-3	6	-	-	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

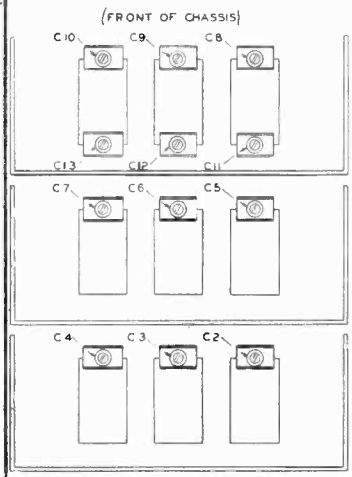
ALIGNMENT With expander - off (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456		Open	C21A C21B	1st I.F.
							C22A C22B	2nd I.F.
2	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
3		Ant.	200 mmf.	600	BC	600	C11 Pad	
4	(Repeat operation 2)							
5	(Check calibration and sensitivity at 600 KC, 900 KC and 1500 KC)							
6	1st short wave band	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
7	(Check calibration and Sensitivity at 6 MC. and 1.95 MC.)							
8	2nd short wave band	Ant.	100 ohm 200 mmf. series	18 MC.	2nd S.W.	18 MC.	C10 Osc.	
							C7 RF	
							C4 Ant.	
9	(Check calibration and sensitivity at 6 MC. and 18 MC.)							
10	(Check operations 1 to 9 inclusive)							

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

SPARTON SUPERHETERODYNE MODELS
1068 1078
1068-X 1078-X

TRIMMER LOCATIONS
(under chassis)



SPARTON SUPERHETERODYNE MODEL 1068,1078,1068X & 1078X

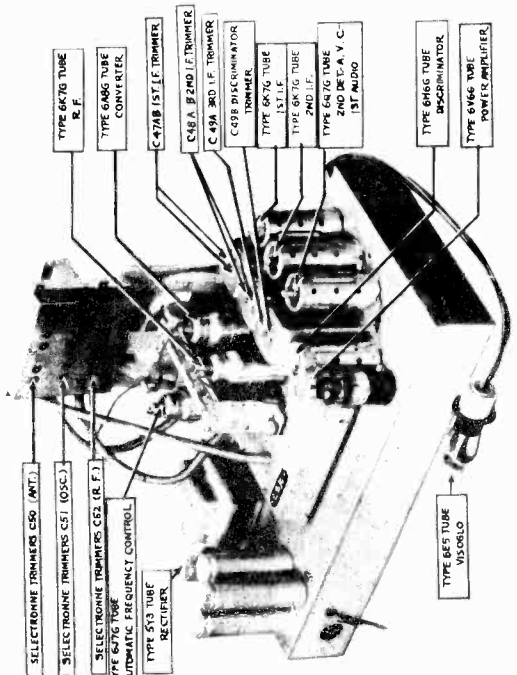
ALIGNMENT (see note)

Viso-Glo tube in socket
AFC Switch "OFF"

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C47 A,B	1st I.F. Trans.
							C48 A,B	2nd I.F. Trans.
2	Discrim.	Conv. Grid	.1 mf.	456	BC	Open	C48 A	3rd I.F. (Pri.)
							C49 B	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
4		Ant.	200 mmf.	600	BC	600	C11 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity 1500 KC, 900 KC and 600 KC) *							
7	1st Short Wave	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
8		Ant.	200 mmf.	1.95 MC.	1st S.W.	1.95 MC.	C12 Pad	
9	(Repeat operation 7)							
10	(Check calibration and sensitivity at 6 MC. and 1.95 MC.)							
11	2nd Short-Wave Band	Ant.	100 ohm 200 mmf. series	18 MC.	2nd S.W.	18 MC.	C10 Osc.	Rock dial slightly while adjusting
							C7 R.F.	
							C4 Ant.	
12		Ant.		6 MC.	2nd S.W.	6 MC.	C13 Pad	
13	(Repeat operation 11)							
14	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
15	(Check operations 1 to 14 inclusive)							

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

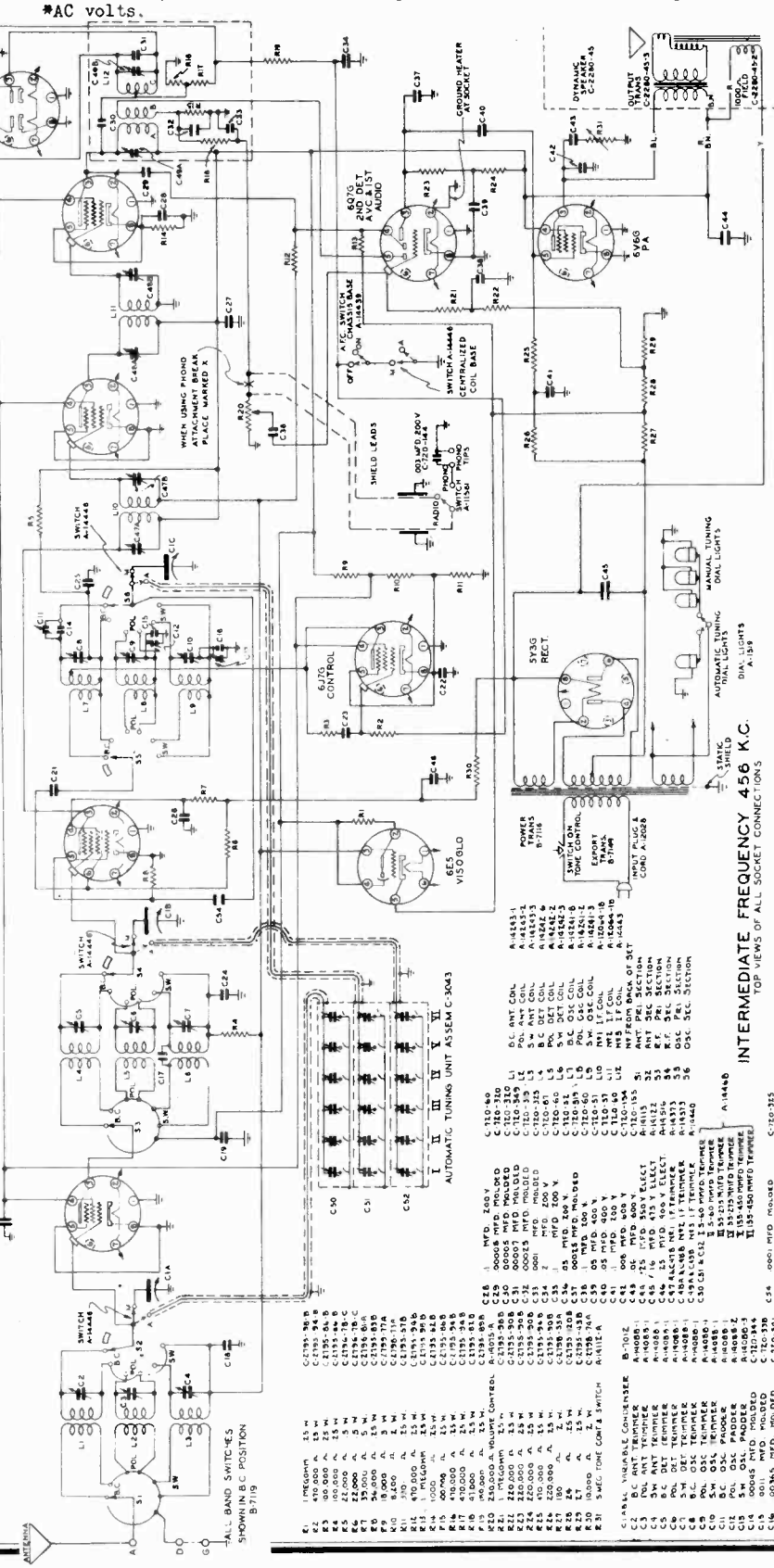
NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.



MODELS 1068,1068X,1078,1078X
Schematic,Parts,Voltage

SPARKS WITHINGTON CO.

Voltage readings are for schematic diagram Allow 15% + or - on all measurements.
Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.



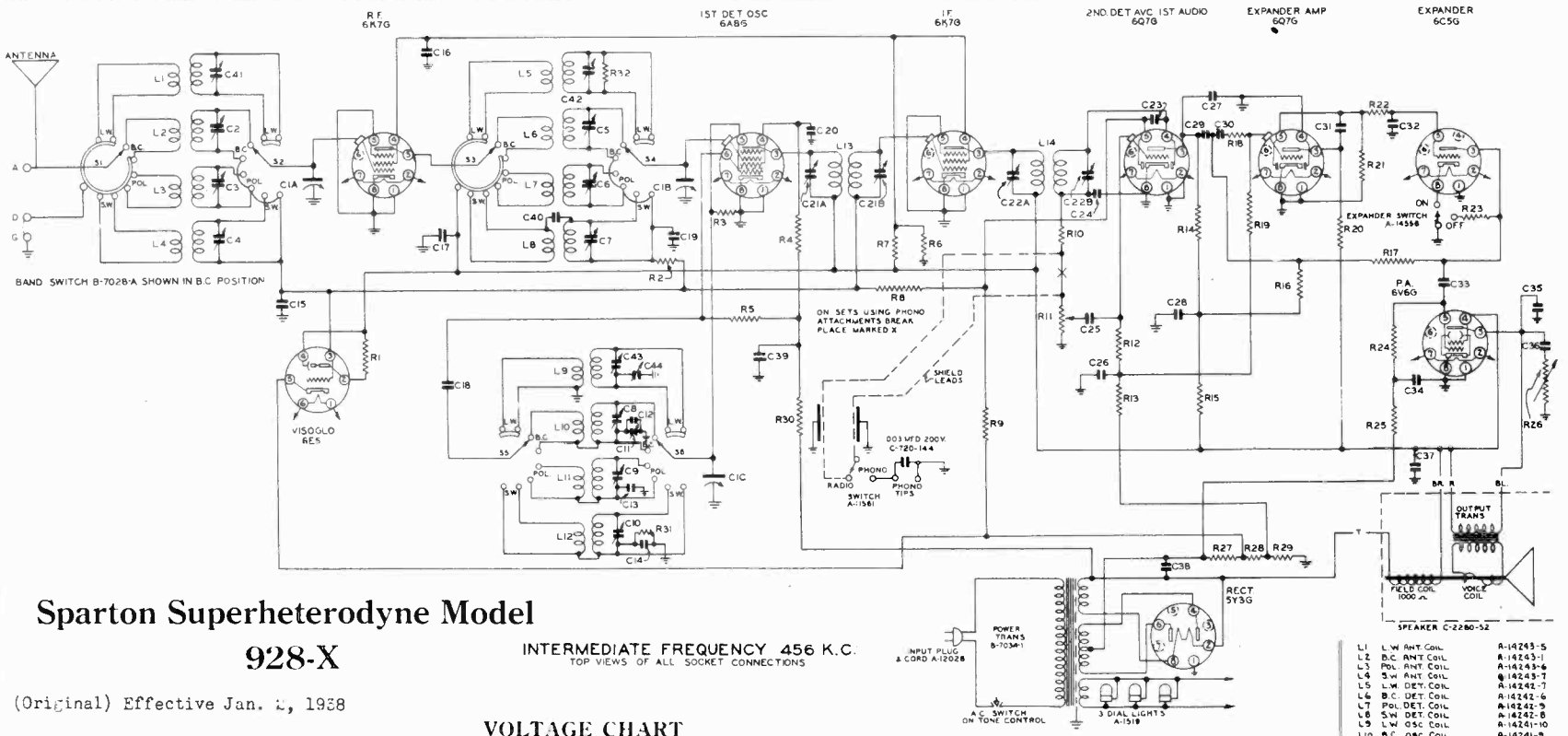
VOLTAGE CHART

Tube	Function	Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6K7G	R.F.	0	0	300	75	0	-	6.3	0	-.2
6A8G	Converter	0	0	300	91	-5.5	135	6.3	0	-.2
6K7G	I.F.	0	0	300	75	0	-	6.3	0	-2.6
6K7G	2nd I.F.	0	0	300	75	4	-	6.3	4.1	0
6H6G	Discriminator	0	0	.5	0	.5	-	6.3	0	-
6J7G	A.F.C.	0	0	300	85	4.5	-	6.3	4.4	0
6Q7G	2nd Det. AVC-1st audio	0	0	100	-.2	-.1	-	6.3	0	0
6V6G	P.A.	0	0	275	290	.5	.6	6.3	0	-
5Y3G	Rect.	-	350*	-	350*	-	350*	-	350*	-
6E5	Viso-Glo	6.3	50	-3	280	-4	0	-	-	-

Sparton Superheterodyne Models

1068 1078
1068-X 1078-X

(Original) Effective Jan. 2, 1938



Sparton Superheterodyne Model

928-X

(Original) Effective Jan. 2, 1938

INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS

VOLTAGE CHART

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6K7G	R.F.	0	0	290	95	0	–	6	0	-2
6A8G	Converter	0	0	290	78	-34	150	6	0	-.1
6K7G	I.F.	0	0	290	90	0	–	6	0	-2
6Q7G	2nd Det. A.V.C.	0	0	105	-.1	0	-.1	6	0	-.1
6Q7G	Expander Amp.	0	0	175	0	0	–	6	0	-.5
6C5G	Expander	0	0	6	0	.1	2	6	0	–
6V6G	P.A.	0	0	270	300	.5	10	6	0	–
5Y3G	Rect.	0	370*	–	380*	–	380*	0	370*	–
6E5	Viso-Glo	0	50	-.2	280	-3	6	–	–	–

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. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

C1A,B&C	VARIABLE COND.	B-7012
C2	B.C. ANT. TRIMMER	A-14088-1
C3	POL. ANT TRIMMER	A-14088-1
C4	SW. ANT TRIMMER	A-14088-1
C5	B.C. DET. TRIMMER	A-14088-1
C6	POL. DET. TRIMMER	A-14088-1
C7	SW. DET. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	SW. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14088-1
C12	.00045 MFD. MOLDED	C-720-344
C13	.0071 MFD. MOLDED	C-720-352
C14	.0036 MFD. MOLDED	C-720-353
C15	.05 MFD. 200 V.	C-720-52
C16	.05 MFD. 200 V.	C-720-52
C17	.05 MFD. 400 V.	C-720-57
C18	.0005 MFD. MOLDED	C-720-319
C19	.05 MFD. 200 V.	C-720-52
C20	.05 MFD. 400 V.	C-720-57
C21A&B	N°1 I.F. TRIMMER	A-14404
C22A&B	N°2 I.F. TRIMMER	A-14399
C23	.00005 MFD. MOLDED	C-720-320
C24	.00025 MFD. MOLDED	C-720-319
C25	.05 MFD. 200 V.	C-720-52
C26	.1 MFD. 200 V.	C-720-60
C27	.0005 MFD. MOLDED	C-720-319
C28	.2 MFD. 400 V.	C-720-74
C29	.05 MFD. 200 V.	C-720-52
C30	.01 MFD. 400 V.	C-720-32
C31	.02 MFD. 400 V.	C-720-32
C32	.5 MFD. 200 V.	C-720-98
C33	.05 MFD. 400 V.	C-720-57
C34	.2 MFD. 200 V.	C-720-90
C35	.008 MFD. 600 V.	C-720-154
C36	.06 MFD. 600 V.	C-720-155
C37	25 MFD. 350 V. ELECT.	A-14113
C38	16 MFD. 475 V. ELECT.	A-14122
C39	25 MFD. 400 V. ELECT.	A-14516
C40	12 MMFD COUPLER	E-720-354
C41	L.W. ANT. TRIMMER	A-14088-1
C42	L.W. DET. TRIMMER	A-14088-1
C43	L.W. OSC. TRIMMER	A-14088-1
C44	L.W. OSC. PADDER	A-14088-3

L1	L.W. ANT. COIL	A-14243-5
L2	B.C. ANT. COIL	A-14243-1
L3	POL. ANT. COIL	A-14243-6
L4	S.W. ANT. COIL	A-14243-7
L5	L.W. DET. COIL	A-14242-7
L6	B.C. DET. COIL	A-14242-6
L7	POL. DET. COIL	A-14242-9
L8	S.W. DET. COIL	A-14242-8
L9	L.W. OSC. COIL	A-14241-10
L10	B.C. OSC. COIL	A-14241-9
L11	POL. OSC. COIL	A-14241-11
L12	S.W. OSC. COIL	A-14241-12
L13	N°1 I.F. COIL	A-12064-12
L14	N°2 I.F. COIL	A-12064-17

N° FROM BACK OF SET
S1 ANT PRI. SECTION
S2 ANT SEC. SECTION
S3 DET PRI. SECTION
S4 DET SEC. SECTION
S5 OSC PRI. SECTION
S6 OSC SEC. SECTION

R1	1 MEGOHM .25 W.	C-2195-98B
R2	100,000 Ω .25 W.	C-2195-86B
R3	56,000 Ω .25 W.	C-2195-83B
R4	39,000 Ω .5 W.	C-2196-81A
R5	22,000 Ω .5 W.	C-2196-78C
R6	10,000 Ω 2 W.	C-2198-74A
R7	15,000 Ω 3 W.	C-2195-76A
R8	470,000 Ω .25 W.	C-2195-94B
R9	1 MEGOHM .25 W.	C-2195-98B
R10	47,000 Ω .25 W.	C-2195-82B
R11	250,000 Ω VOL CONTROL	A-14015-A
R12	680,000 Ω .25 W.	C-2195-96B
R13	220,000 Ω .25 W.	C-2195-90B
R14	220,000 Ω .25 W.	C-2195-90B
R15	100,000 Ω .25 W.	C-2195-86B
R16	680,000 Ω .25 W.	C-2195-96B
R17	150,000 Ω .25 W.	C-2195-88B
R18	1 MEGOHM .25 W.	C-2195-98B
R19	330,000 Ω .25 W.	C-2195-92B
R20	100,000 Ω .25 W.	C-2195-86B
R21	470,000 Ω .25 W.	C-2195-94B
R22	2.2 MEGOHM	C-2195-102B
R23	390,000 Ω .25 W.	C-2195-93-B
R24	560,000 Ω .25 W.	C-2195-33B
R25	100,000 Ω .25 W.	C-2195-86B
R26	5 MEG. TONE CONT. & SWITCH	A-14112-A
R27	180 Ω 2 W.	C-2196-141A
R28	10 Ω .25 W.	C-2195-111B
R29	22 Ω .25 W.	C-2195-119B
R30	19,000 Ω 5 W.	C-2199-76A
R31	68,000 Ω .25 W.	C-2195-78B
R32	100,000 Ω .25 W.	C-2195-86B

MODEL 678A
Selectronne Adjustments

SPARKS WITHINGTON CO.

MODEL 928X
Socket, Trimmers, Alignment

MODEL 928-X

ALIGNMENT (see note)

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C34A C34B	1st I.F. Trans.
							C35A C35B	2nd I.F. Trans.
2	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
3		Ant.	200 mmf.	600	BC	600	C11 Pad	
4	(Repeat operation 2)							
5	Long-Wave Band	Ant.	200 mmf.	400	L.W.	400	C39 Osc.	
							C38 R.F.	
							C37 Ant.	
6		Ant.	200 mmf.	150	L.W.	150	C40 Pad	
7	(Repeat operation 5)							
8	(Check calibration and sensitivity at 400 KC and 150 KC)							
9	1st short wave band	Ant.	100 ohm 200 mmf. series	7 MC.	1st S.W.	7 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
10	(Check calibration and sensitivity at 7 MC and 2.5 MC)							
11	2nd short-wave band	Ant.	100 ohm 200 mmf. series	21 MC.	2nd S.W.	21 MC.	C10 Osc.	
							C7 RF	
							C4 Ant.	
12	(Check calibration and sensitivity at 8 MC. and 21 MC.)							
13	(Check operations 1 to 12 inclusive)							

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

HOW TO ADJUST THE SPARTON SELECTRONNE IN THE MODEL 678-A

WARNING: All final adjustments of the Selectronne trimmers should be made in the customer's home, with the receiver connected to the regular antenna system with which it will be used.

1. Select six favorite nearby Broadcast Stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. Remove the Selectronne escutcheon plate from the front of the cabinet by means of the two screws. This exposes the steel plate with the slots for holding the station call letter tabs.

3. The six buttons of the Selectronne are arranged in three groups according to frequency limits - 540 to 900 kc., 700 to 1500 kc. and 1000 to 1500 kc. (See illustration also back cover of Selectronne box). The six tabs corresponding to the six broadcast stations which have been chosen must be arranged in the steel plate so that the frequency (kilocycle) of each station will be included in the frequency limits of the proper group.

For example: A station having a frequency of 610 kc. should be placed in the 540 to 900 kc. group; a station at 950 should be placed in the 700 to 1500 kc. group, etc.

Note: Each group has considerable overlap to allow for the selection of six stations which may have frequency allocations comparatively close together.

4. Adjust Selectronne trimmers for each one of the six stations as follows:

(A) Two trimmers are provided for each one of the six stations. They are reached through the two holes arranged in rows one above the other in the back cover of the Selectronne.

(B) Tune in the station in the usual way using manual tuning, watching the Vise-Glo so that the station will be perfectly "tuned in".

(C) Turn the "manual-automatic" switch knob to the "automatic" position.

(D) Push in the Selectronne button which corresponds to the station just tuned in.

(E) Now from the back of the cabinet, with an ordinary screw-driver adjust the oscillator trimmer (bottom hole) in the row corresponding to the proper station, until the same station that was tuned in manually is heard. This station may be heard faintly until the remaining trimmer has been adjusted.

It is important that the same station is heard with this adjustment and not some other network station carrying the same program. Screw this trimmer to the right or left until the station is loudest.

Care should be taken in turning the adjusting screws so that they will not become disengaged from the trimmers by being turned out too far.

(F) In the same manner adjust first the antenna trimmer (top hole) to this same station.

Note: Perfect adjustment of these trimmers is easily obtained by removing the Vise-Glo tube and socket from its clamp and turning the tube toward the back of the cabinet so that every adjustment of the trimmers may be watched in the Vise-Glo. Perfect adjustment is obtained when further turning of the trimmers will not result in any smaller shaded area between the green light sections of the Vise-Glo.

(G) Re-adjust the oscillator trimmer (bottom hole) while watching the Vise-Glo to see if the shaded area can be made smaller.

(H) Check the above adjustments by turning the "manual-automatic" switch to the "manual" position and without touching the manual tuning controls, observe if the Vise-Glo shows any difference in the amount of shaded area in the tube as compared to the shaded area with the switch knob in the "automatic" position. If the shaded area is larger with the switch in the "automatic" position, re-adjust the Selectronne trimmers until the shaded area is equal to that obtained with the switch knob in the "manual" position.

5. Repeat the procedure in paragraph 4 for each of the six stations.

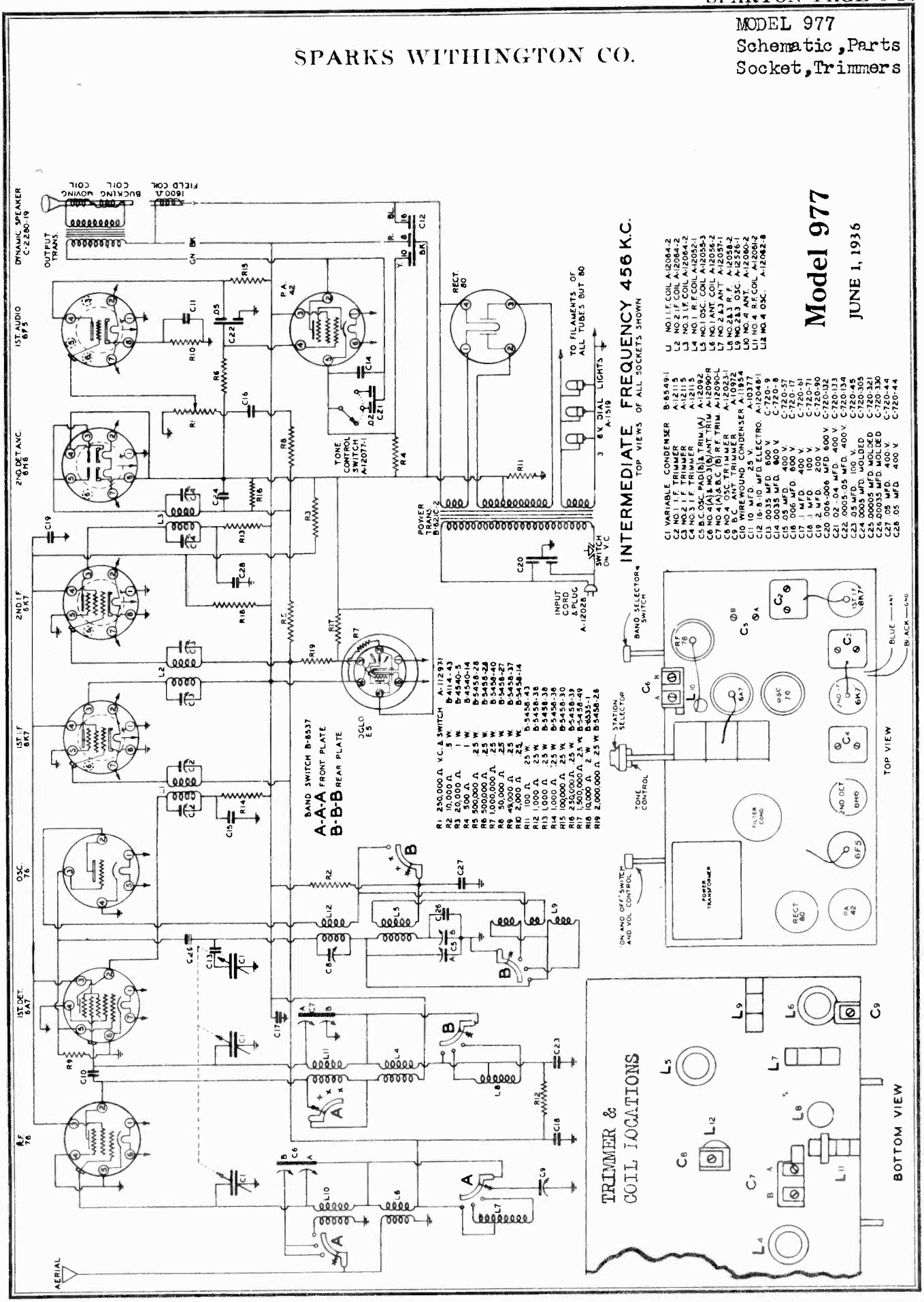
6. When all trimmers have been properly adjusted, replace Vise-Glo tube and socket in clamp, and attach Selectronne escutcheon plate to front of cabinet.

7. Any of the six stations to which the SPARTON Selectronne has been adjusted, may now be instantly received simply by pushing the Selectronne button for the desired station with the switch knob in the automatic position.

Note: In case all six of the buttons should become depressed through improper manipulation of the Selectronne, simply reach into the Selectronne box (from the back of the cabinet) and apply a slight pressure of the fingers under the latching bar which runs across the frame work in front of the trimmer box. This will immediately release all buttons.

MODEL 977
Schematic, Parts
Socket, Trimmers

SPARKS WITHINGTON CO.



MODEL 977
Voltage, Resistance
Alignment

SPARKS-WITHINGTON CO.

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 No. 1 (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 "low tap" across voice coil of speaker.

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 C4, C3 and C2 which are reached from the top of the chassis. (See Fig 21).

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 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 to obtain a signal of 1350 kilocycles.

(3) Turn the station selector of the receiver to 1350 kilocycles and without disturbing the setting of the test oscillator or the station selector, adjust condensers C5A, C7B and C9 in the order given.

(4) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C5B, at the same time the station selector knob is moved back and forth to obtain maximum deflection of the output meter.

(5) Retune test oscillator and receiver to 1350 kilocycles and check the adjustments of condensers C5A, C7B and C9.

(6) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Band No. 4 (6.5 to 20 Megacycles).

(1) Turn the band selector switch to the third short wave band (blue section of the dial).

(2) Disconnect "antenna" lead of test oscillator from antenna terminal, remove the 150 mmf. condenser and replace with a 400 ohm non-inductive resistor dummy antenna and connect to grid cap of Type 78 R.F. tube.

(3) Tune test oscillator and receiver to 18 megacycles and adjust condenser C8 and condenser C7A.

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 15,000 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.

(4) Disconnect the "antenna" of the test oscillator from the grid cap of the Type 78 (Type 6K7 in Model 966) R.F. tube and, using the 400 ohm resistor in series, connect to the antenna terminal.

(5) Adjust condenser C6A. Note: Due to the inter-action between the various circuits, it is necessary to move the station selector knob slightly while adjusting these trimmers in order to realize the maximum possible gain.

(6) Retune the test oscillator and receiver to 9 megacycles and check sensitivity and calibration.

D. Alignment of Band No. 3 (3.2 to 8.0 Megacycles).

(1) Turn the band selector switch to the second short wave band (red section of the dial).

(2) Tune test oscillator and receiver to 7.2 megacycles.

(3) Adjust condenser C6B.

(4) Tune test oscillator and receiver to 3.6 megacycles and check calibration and sensitivity.

E. Alignment of Band No. 2 (1.3 to 3.8 Megacycles).

Note: There are no adjustable condensers for this band. However, it is advisable to check the calibration of the dial and the general operation of the receiver at both 1.7 megacycles and 3 megacycles. CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

VOLTAGE-RESISTANCE CHART

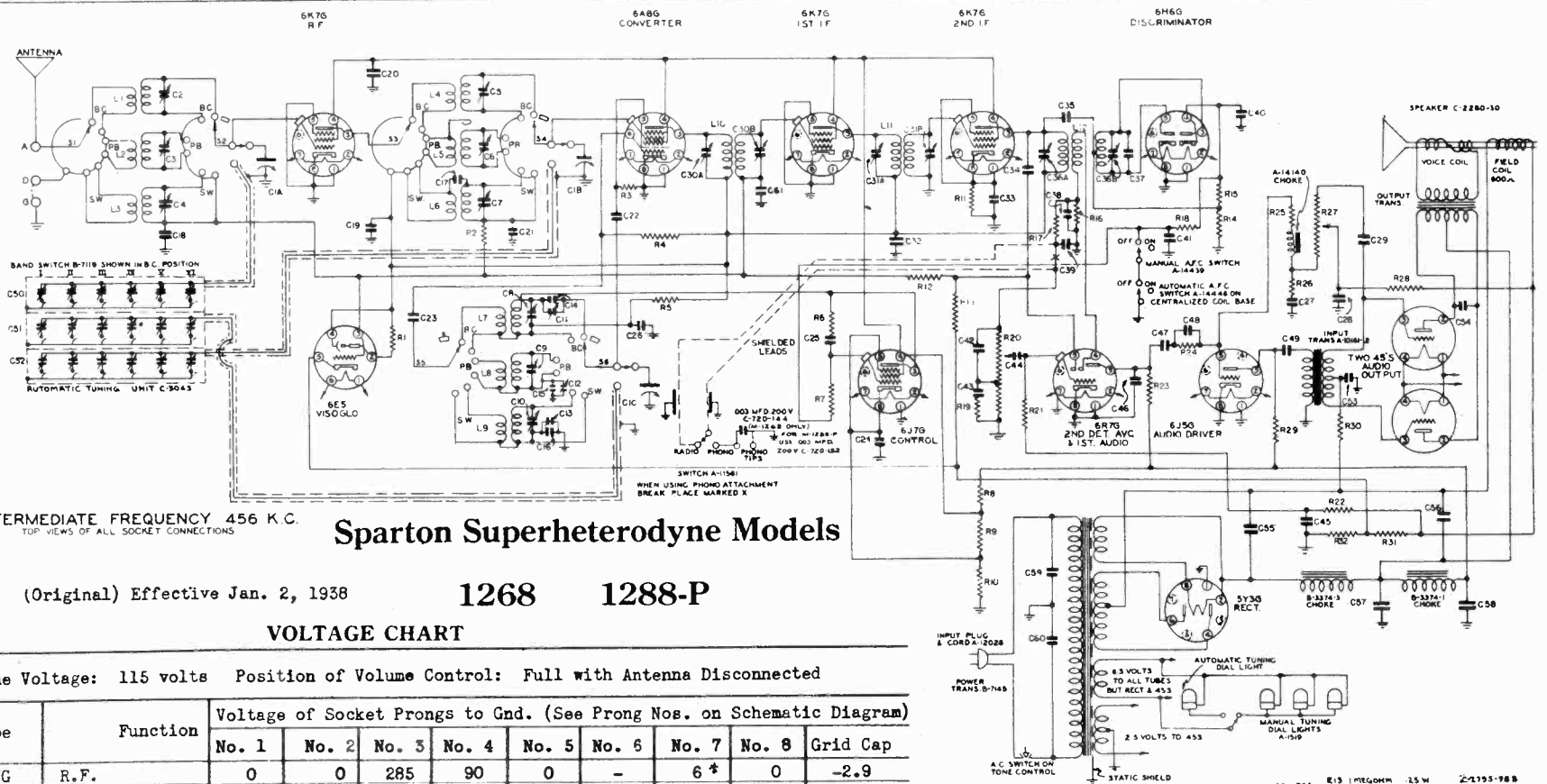
Line Voltage: 120 volts

Position of Volume Control: Full with Antenna Disconnected

Position of Band Selector Switch: Broadcast

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)									
		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
78	R-F Amplifier	Volts	*	260	110	0	0	*	-	-	0
		Ohms	0	30000	20000	0	0	0	-	-	750000
6A7	1st. Detector	Volts	*	250	120	0	0	0	*	-	0
		Ohms	0	30000	20000	0	50000	0	0	--	750000
76	Oscillator	Volts	*	260	0	0	*	-	-	-	-
		Ohms	0	40000	50000	0	0	-	-	-	-
6K7	1st. I-F Amplifier	Volts	0	*	260	100	0	-	*	0	0
		Ohms	0	0	30000	20000	0	-	0	0	750000
6K7	2nd. I-F Amplifier	Volts	0	*	280	110	0	-	*	0	0
		Ohms	0	0	30000	20000	0	-	0	0	750000
6H6	2nd. Det- A.V.C.	Volts	0	*	0	0	0	-	*	0	-
		Ohms	0	0	300000	0	300000	-	0	100	-
6F5	1st A-F Amplifier	Volts	0	*	-	180	-	-	*	0	0
		Ohms	0	0	-	300000	-	-	0	2000	250000
42	Power Amplifier	Volts	*	310	315	0	0	*	-	-	-
		Ohms	0	30000	30000	500000	600	0	-	-	-
80	Rectifier	Volts	0	380	380	0	-	-	-	-	-
		Ohms	32000	0	0	34000	-	-	-	-	-
6E5	Viso-Glo	Volts	*	50	0	250	0	*	-	-	-
		Ohms	0	1 meg.	1 meg.-	30000	100	0	-	-	-

* Zero or 6 volts depending on twist of heater hook-up wire at sockets.



INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS

Sparton Superheterodyne Models

(Original) Effective Jan. 2, 1938 **1268** **1288-P**

VOLTAGE CHART

Line Voltage: 115 volts Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6K7G	R.F.	0	0	285	90	0	-	6 *	0	-2.9
6A8G	Converter	0	0	285	90	-2	165	6 *	0	-.1
6J7G	A.F. Control	0	0	255	90	4	0	6 *	4.5	0
6K7G	1st I.F.	0	0	285	90	0	-	6 *	0	-3
6K7G	2nd I.F.	0	0	285	90	40	-	6 *	4	0
6R7G	Det. AVC	0	6.3*	125	-.1	0	-6.5	0	0	0
6H6G	Discriminator	0	6.3*	1	0	.2	0	0	0	-
6J5G	2nd Audio	0	6.3*	165	0	.1	0	0	0	-
45	Power Amp.	1	300	48	1	-	-	-	-	-
45	Power Amp.	1	300	48	1	-	-	-	-	-
5Y3G	Rect.	0	340*	-	375*	-	375*	-	340*	-
6E5	Viso-Glo	0	50	-.2	280	4	6	-	-	-

Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

MODELS 1268,1288P
Socket,Trimmers
Alignment

SPARKS WITHINGTON CO.

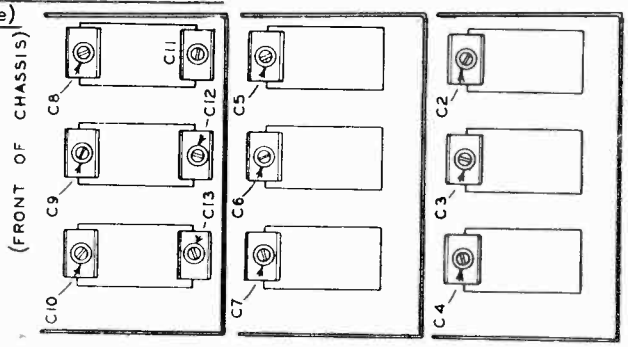
AFC Switch "OFF"
Viso-Glo Tube in Socket

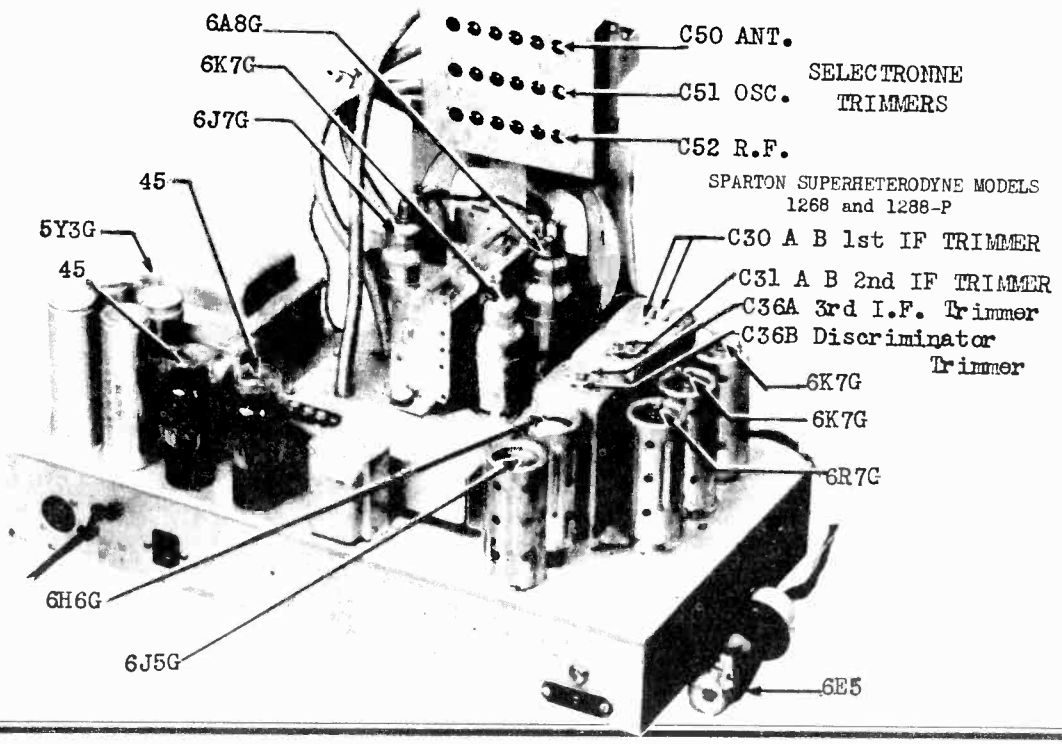
ALIGNMENT (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C30 A,B	1st I.F. Transformer
							C31 A,B	2nd I.F. Transformer
							C36A	3rd I.F. Trans. (Pri.)
2	Discrim.	Conv. Grid	.1 mf.	456	BC	Open	C36B	Adjust for minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
4		Ant.	200 mmf.	600	BC	600	C11 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) *							
7	1st Short-Wave Band	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
8		Ant.	200 mmf.	1.95 MC.	1st S.W.	1.95 MC.	C12 Pad	
9	(Repeat operation 7)							
10	(Check calibration and sensitivity at 6 MC and 1.95 MC)							
11	2nd Short Wave Band	Ant.	100 ohm 200 mmf. series	18 MC.	2nd S.W.	18 MC.	C10 Osc.	Rock dial slightly while adjusting
							C7 RF	
							C4 Ant.	
12		Ant.		6 MC.	2nd S.W.	6 MC.	C13 Pad	
13	(Repeat operation 11)							
14	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
15	(Check operations 1 to 14 inclusive)							

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

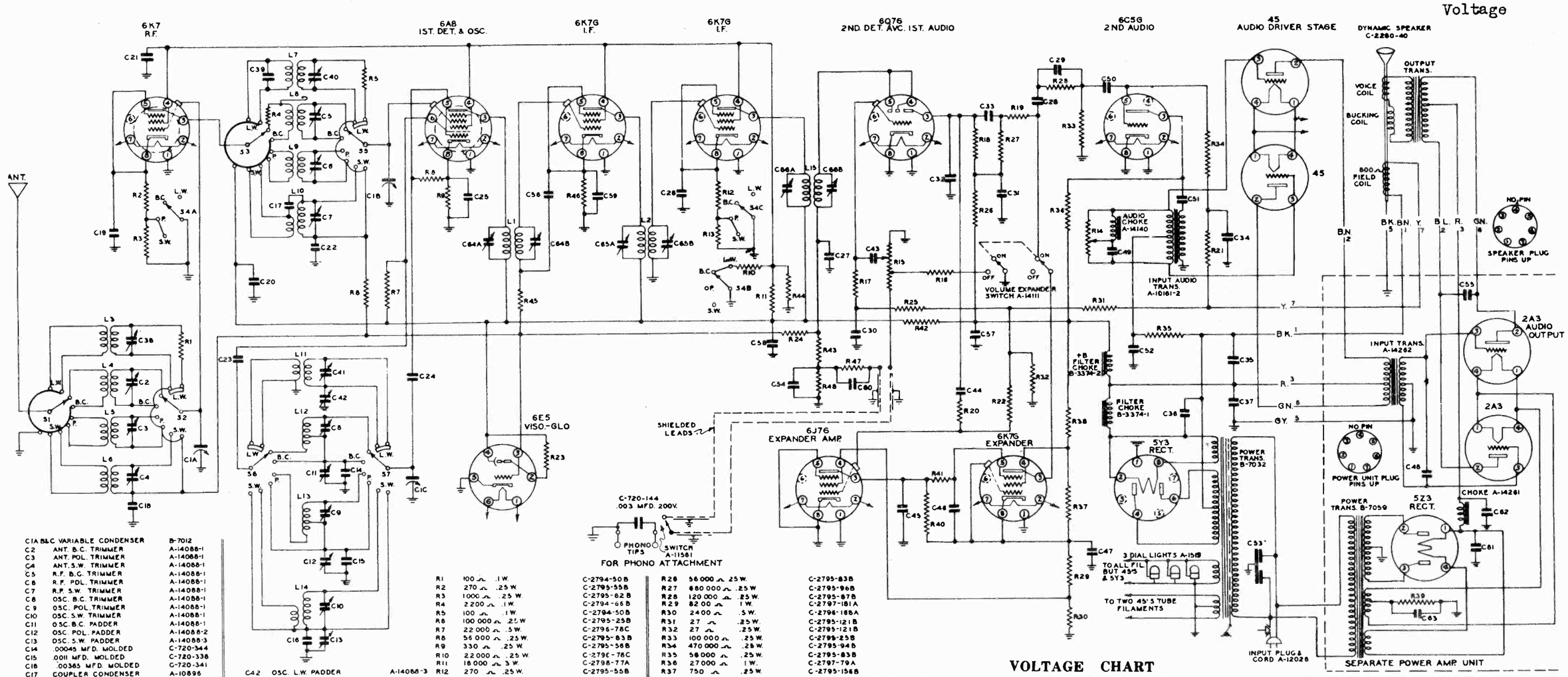
NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.





MODEL 1567
Schematic, Parts
Voltage

SPARKS WITHINGTON CO.



C1A B&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-10896
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	.006 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. 100 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	16 MFD. 400 V. ELECT.	A-14138
C36	16 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-720-318
C40	R.F. L.W. TRIMMER	A-14088-1
C41	OSC. L.W. TRIMMER	A-14086-1

L1	NO.1 I.F. COIL	A-12064-2
L2	NO.2 I.F. COIL	A-12064-2
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
L15	NO. 3 I.F. COIL	A-14254

NO. FROM BACK OF SET
S1 ANT. PRI. SECTION
S2 ANT. SEC. SECTION
S3 R.F. PRI. SECTION
S4A R.F. BIAS SECTION
S4B SCREEN SECTION
S4C I.F. BIAS SECTION
S5 R.F. SEC. SECTION
S6 OSC. PRI. SECTION
S7 OSC. SEC. SECTION

R1	100 Ω .1W.	C-2794-50B
R2	270 Ω .25 W.	C-2795-55B
R3	1000 Ω .25 W.	C-2795-62B
R4	2200 Ω .1W.	C-2794-66B
R5	100 Ω .1W.	C-2794-50B
R6	100 000 Ω .25 W.	C-2795-25B
R7	22 000 Ω .5W.	C-2796-78C
R8	56 000 Ω .25 W.	C-2795-83B
R9	330 Ω .25 W.	C-2795-56B
R10	22 000 Ω .25 W.	C-2796-78C
R11	18 000 Ω 3 W.	C-2798-77A
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	1 MEGOHM .25 W.	C-2795-98B
R23	1 MEGOHM .25 W.	C-2795-98B
R24	1 MEGOHM .25 W.	C-2795-98B
R25	470 000 Ω .25W.	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-2796-168A
R31	27 Ω .25 W.	C-2795-12B
R32	27 Ω .25 W.	C-2795-12B
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 Ω .25 W.	C-2795-156B
R38	27000 Ω 2 W.	C-2798-193A
R39	700 Ω 7 W.	A-14263
R40	470 000 Ω .25 W.	C-2795-94B
R41	1 MEGOHM .25 W.	C-2795-98B
R42	910 Ω 2 W.	C-2798-158A
R43	56 000 Ω .25 W.	C-2795-83B
R44	47 000 Ω 1 W.	C-2797-82A
R45	100 000 Ω .25 W.	C-2795-25B
R46	10 000 Ω .25 W.	C-2795-74B
R47	470 000 Ω .25 W.	C-2795-94B
R48	220 000 Ω .25 W.	C-2795-90B

C42	OSC. L.W. PADDER	A-14088-3
C43	.05 MFD. 200 V.	C-720-52
C44	.006 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	.002 MFD. 200 V.	C-720-143
C49	.01 MFD. 200 V.	C-720-20
C50	.01 MFD. 200 V.	C-720-20
C51	.2 MFD. 400 V.	C-720-88
C52	.3 MFD. 200 V.	C-720-91
C53	.006-.006 MFD. 600 V.	C-720-150
C54	.0001 MFD. MOLDED	C-720-325
C55	.02 MFD. 1000	C-720-146
C56	.1 MFD. 100 V.	C-720-62
C57	25 MFD. 325 V. ELECT	A-14184
C58	.1 MFD. 400 V.	C-720-61
C59	.1 MFD. 100 V.	C-720-62
C60	.002 MFD. MOLDED	C-720-312
C61	16 MFD. 450 V. ELECT.	A-14073
C62	16 MFD. 425 V. ELECT.	A-14260
C63	25 MFD. 100 V. ELECT.	A-14259
C64	NO. 1 I.F. TRIMMER	A-14373
C65	NO. 2 I.F. TRIMMER	A-14373
C66	NO. 3 I.F. TRIMMER	A-14375

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 1567
INTERMEDIATE FREQUENCY 456 K.C.

Line Voltage: 115 volts
Symphonic Expander Control: Off

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

° 500 volt scale
°° Direct Current
°°° 1 volt scale
* 0 or 6.1 volts
** 50 volt scale
*** 100 volt scale

VOLTAGE CHART

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	*	260	88	0	-	*	0	0
6A8	1st. Det-Oscillator	0	*	275	105	0	260	*	0	0
6K7G	1st. I-F Amplifier	0	*	265	85	0	-	*	0	0
6K7G	2nd. I-F Amplifier	0	*	270	90	0	-	*	0	0
6Q7G	2nd. Det-AVC-1st. A-F Amplifier	0	*	38**	0	0	-	*	0	0
6J7G	Expander Amplifier	0	*	70***	16	0	-	*	0	0
6K7G	Symphonic Expander	0	*	0	80	20°	72	*	72	72
6C5G	2nd. A-F Amplifier	0	*	270	-	0	-	*	0	-
45	Audio Driver	1.24	300	34**	1.24	-	-	-	-	-
45	Audio Driver	1.24	300	34**	1.24	-	-	-	-	-
2A3	Power Amplifier	54°°	370	0	54°°	-	-	-	-	-
2A3	Power Amplifier	54°°	370	0	54°°	-	-	-	-	-
5Y3G	Rectifier (Upper Chassis)	0	0	-	370	-	370	-	0	-
5Z3	Rectifier (Lower Chassis)	1°°°	350	350	5	-	-	-	-	-
6E5	Viso-Glo	6.1	12	0	260	0	0	-	-	-

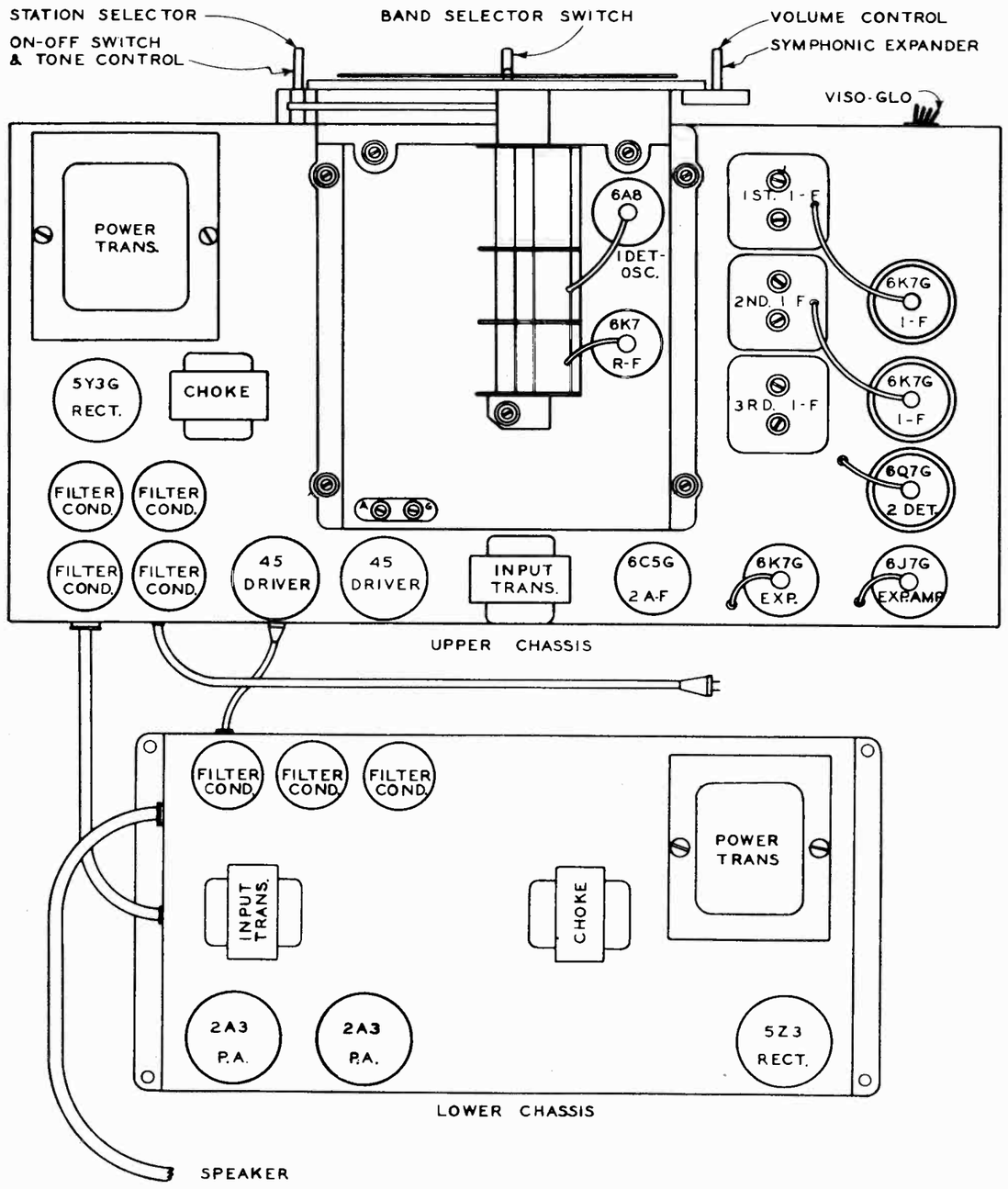
(ORIGINAL) EFFECTIVE OCT 28, 1936

SPARKS WITHINGTON CO.

MODEL 1567
Socket, Chassis

Model 1567

CHASSIS DIAGRAM



MODELS 676(Late) 686, D686
H686
Schematic, Parts, Socket
Trimmers, Voltage, Resistance
Alignment

SPARKS WITHINGTON CO.

CONVENTIONAL ALIGNMENT

SEE SPECIAL SECTION
VOLUME VIII

IF trimmers at 172.5 KC. Generator at 1350 KC, peak maximum, Generator at 600 KC, adjust oscillator tracking gang condenser. Repeat adjustments.

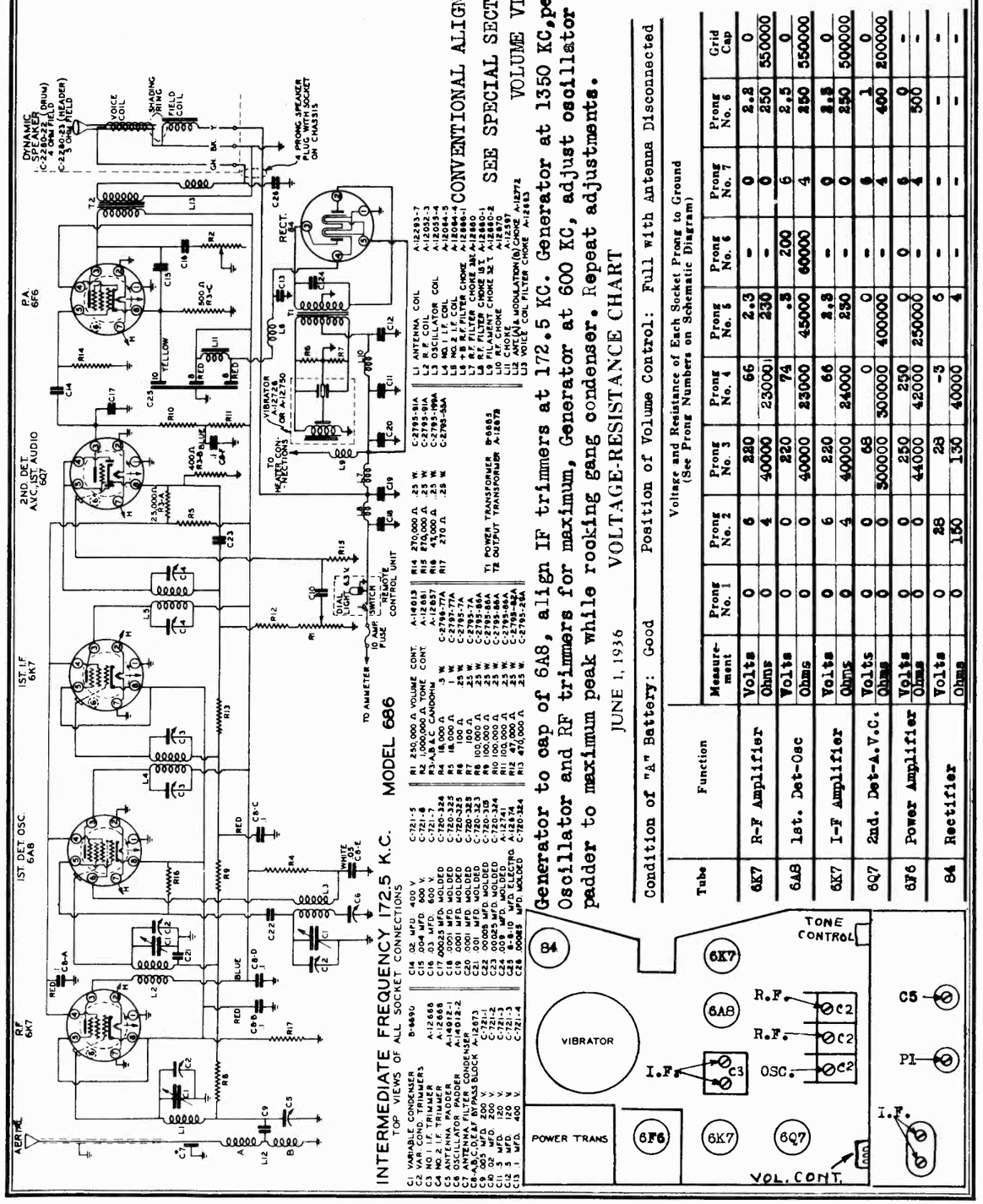
Generator to cap of 6A8, align IF trimmers for maximum. Oscillator and RF trimmers for maximum peak while rocking gang condenser. Repeat adjustments.

VOLTAGE-RESISTANCE CHART

JUNE 1, 1936

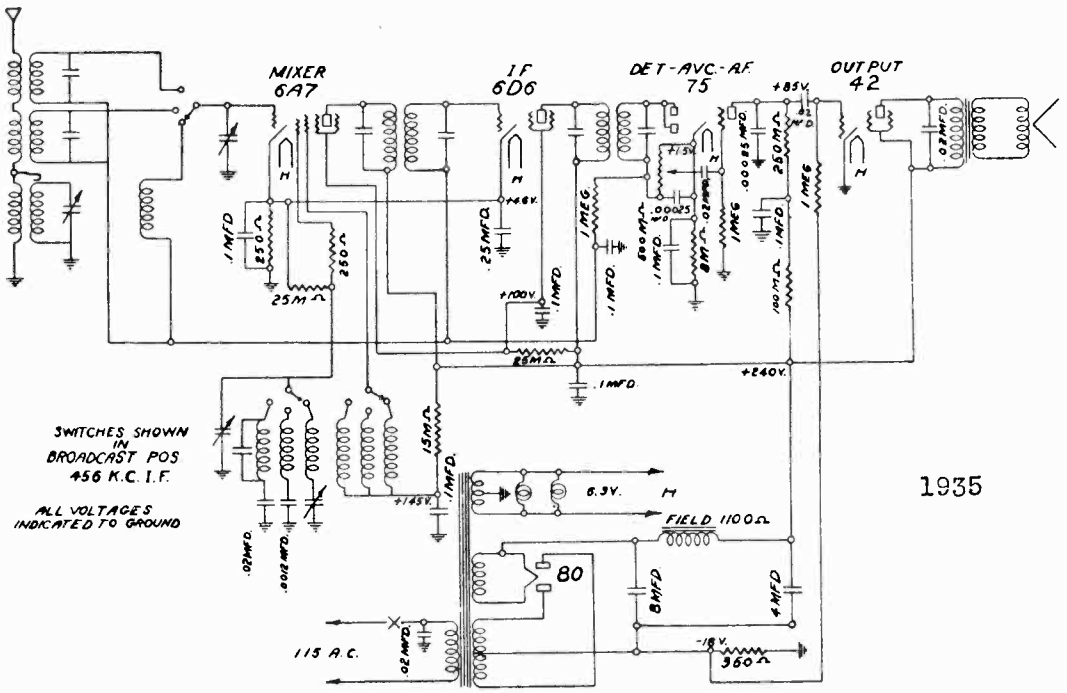
Condition of "2" Battery: Good Position of Volume Control: Full with Antenna Disconnected

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. 6	Grid Cap
		Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)									
6K7	R-F Amplifier	Volts	0	6	220	66	2.3	-	0	2.2	0
		Ohms	0	4	40000	230001	230	-	0	250	550000
6A8	1st. Det-Osc	Volts	0	0	220	74	.5	200	6	2.5	0
		Ohms	0	0	40000	23000	45000	60000	4	250	550000
6K7	I-F Amplifier	Volts	0	6	220	66	2.3	-	0	2.5	0
		Ohms	0	4	40000	24000	250	-	0	250	500000
6Q7	2nd. Det-A.V.C.	Volts	0	0	68	0	0	-	6	1	0
		Ohms	0	0	500000	300000	400000	-	4	400	200000
6F6	Power Amplifier	Volts	0	0	250	250	0	0	6	0	-
		Ohms	0	0	44000	42000	250000	-	4	500	-
84	Rectifier	Volts	0	28	28	-5	6	-	-	-	-
		Ohms	0	150	130	40000	4	-	-	-	-



MODEL 100
Chassis X-8
Schematic, Socket
Voltage, Trimmers

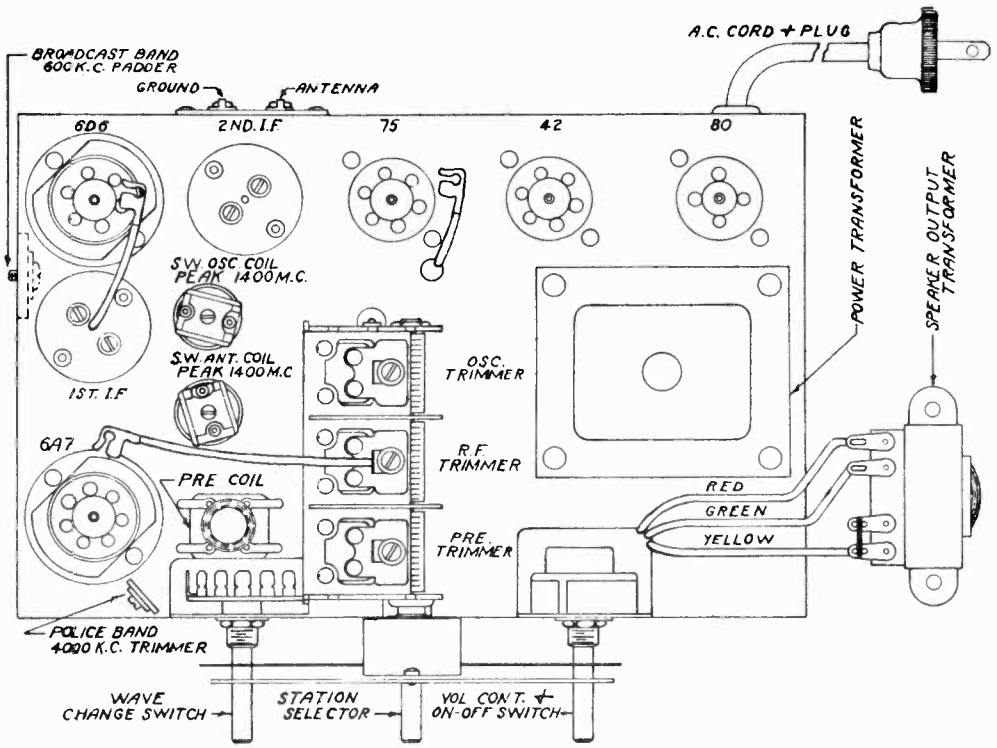
SPIEGEL, INC.



1935

Five Tube A.C. Superheterodyne

X8



Five Tube A.C. All Wave Superheterodyne X8

This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5000 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5800 to 15,200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

ALIGNMENT DATA AND SERVICING

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the center and front trimmers of the gang condenser to peak. The center gang section tunes the R.F. or grid coil of the 6A7 tube and the front condenser section tunes the pre-selector stage circuit.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the left hand end of the chassis near the 6D6 tube.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located on the top of the chassis. Set the test oscillator to 14,000 KC. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and about midway between the 1st I.F. Transformer and the 6A7 tube. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly designed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency.

Important: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. The two police band coils are under the chassis, but the antenna coil trimmer for this band is on top of the chassis and is located at the left front corner along side of wave band switch.

Important: This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). **Never plug into a DC outlet.**

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator ouput as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

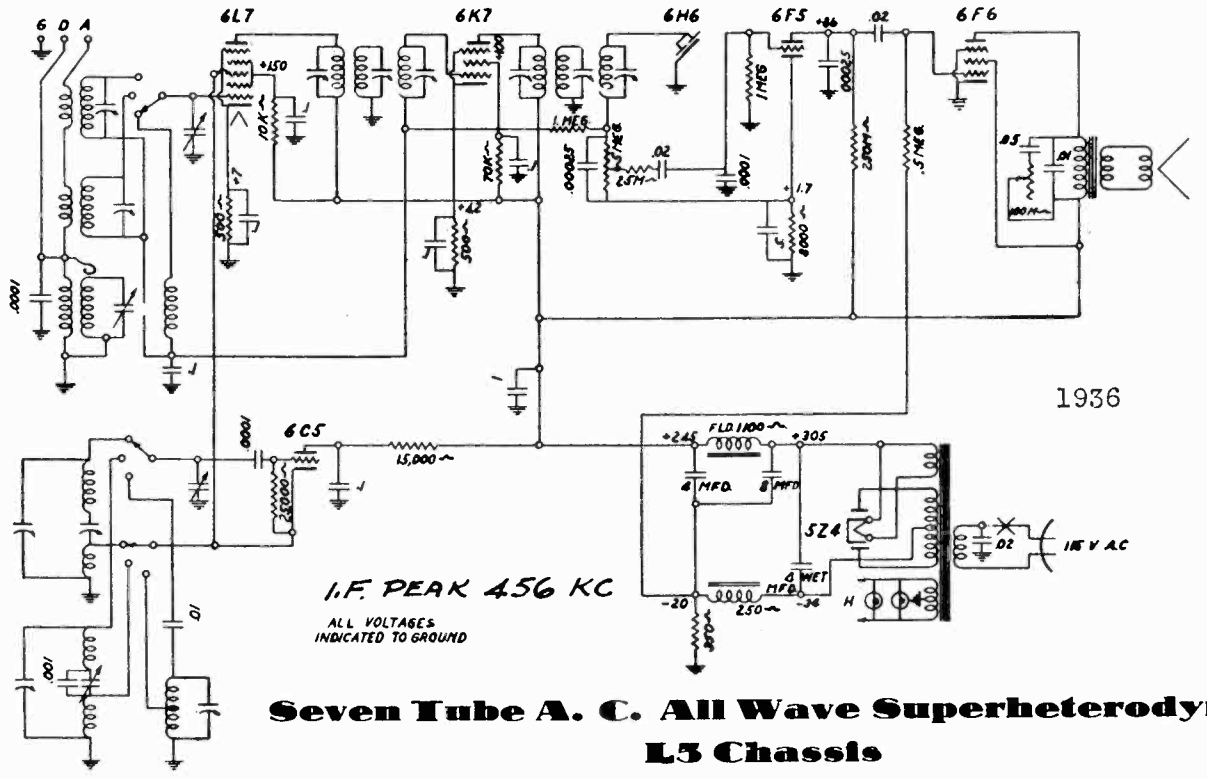
I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

PARTS LIST

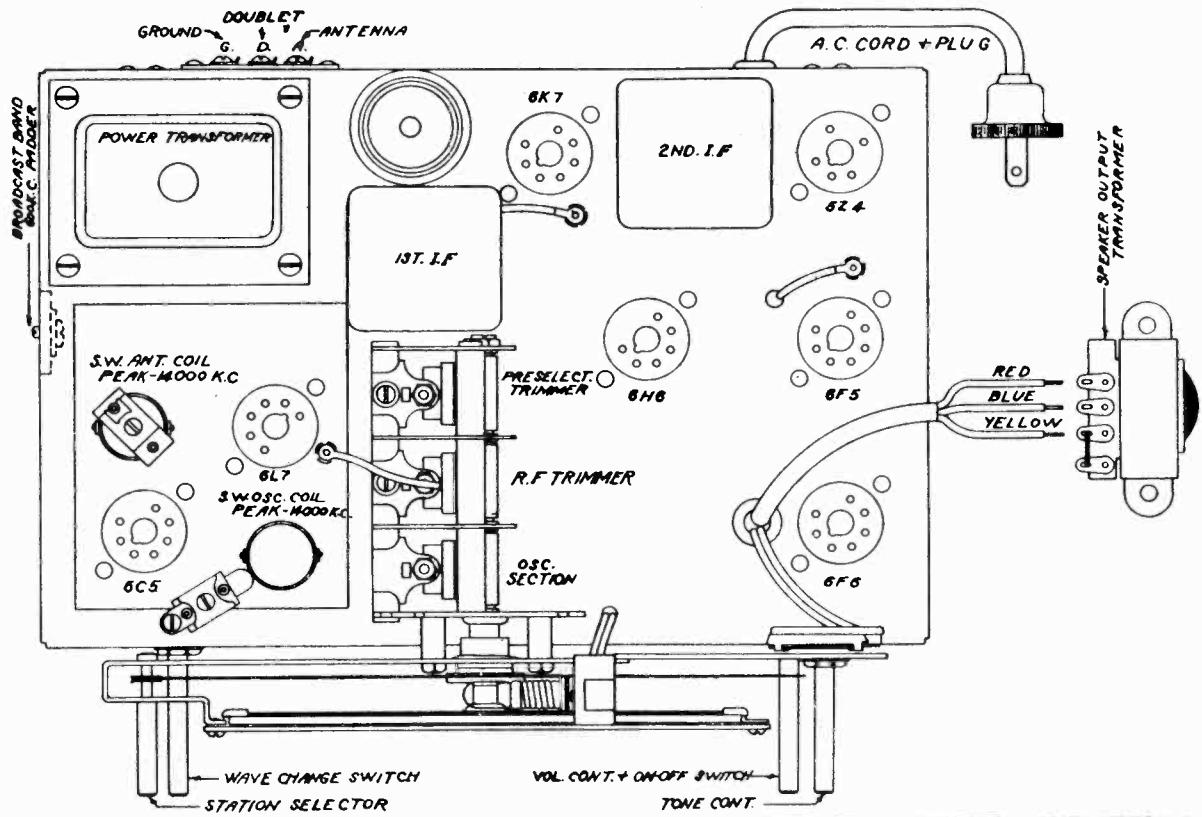
Part No.	Description	Part No.	Description
P168	25,000 Ohm ½ Watt Resistor	P160	Elect. Condenser
P165	25,000 Ohm 1 Watt Resistor	P170	350 Ohm Resistor
P280	100,000 Ohm ½ Watt Resistor	P173	Oscillator Coil
P139	250,000 Ohm ½ Watt Resistor	P176	A.C. Plug & Cord
P162	1 Megohm ½ Watt Resistor	P182	Speaker Output Transformer
P143	.02 Mfd. 400 Volt Condenser	P189	1st I.F. Transformer
P142	.1 Mfd. 200 Volt Condenser	P190	2nd I.F. Transformer
P276	.1 Mfd. 400 Volt Condenser	P617	Padding Condenser
P141	.25 Mfd. 200 Volt Condenser	G560	Short Wave Antenna Coil
P478	.0012 Mfd. 200 Volt Condenser	G561	Short Wave Oscillator Coil
P147	.00025 Mica Condenser	P193	Pre-Selector Coil
P435	6" Speaker Cone Only	P306	Power Transformer
P438	Speaker Field Coil	G562	Police Band Antenna Coil
G564	Spider & Voice Coil Unit—Complete 6" Dynamic Speaker	G563	Police Band Oscillator Coil
		P642	3 Gang Condenser
P634	Knob	P630	Volume Control & "On-Off" Switch
P639	Dial Glass	P622	Wave Change Switch
P632	Dial & Scale—Complete	P136	250 Ohm ½ Watt Resistor
P124	Pilot Light	P168	8,000 Ohm ½ Watt Resistor
		P258	15,000 Ohm ½ Watt Resistor

MODELS 120,140
Chassis L-5
Schematic, Voltage
Socket, Trimmers

SPIEGEL, INC.



Seven Tube A. C. All Wave Superheterodyne
L5 Chassis



L5

Seven Tube A. C. All Wave Superheterodyne

This receiver is designed to operate over three tuning ranges: the broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5000 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5800 to 15,200 Kilocycles (KC) (18.5 to 52 meters). This latter range is the one which includes the four internationally assigned bands —the 19, 25, 31 and 49 meter bands.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6L7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all six I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the oscillator trimmer to peak. This trimmer is mounted on the oscillator coil and is located directly under the 6C5 socket. (This adjustment must be made from the bottom of the chassis.) After this has been carefully done, the next step is to adjust the center and rear trimmers of the gang condenser to peak. The center gang section tunes the R.F. or grid coil of the 6L7 tube and the rear condenser section tunes the pre-selector stage circuit.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located in the left end of the chassis. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). **Never plug into a DC outlet.**

If it is found that in returning to 1400 KC the pointer is accurately on scale, the only readjustments that should be made (in this recheck) are the center and rear trimmers of the gang condenser. If the pointer is found off scale it may be corrected and put on scale by realignment of the oscillator trimmer. Alignment of the pointer can **only** be corrected by adjustment of the oscillator trimmer.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band. and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers located on the top of the chassis. The R.F. trimmer is located directly on top of the R.F. or Antenna coil and the oscillator trimmer is mounted on the chassis near the front of the oscillator coil. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band. connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The next operation is to adjust the R.F. and oscillator trimmers for peak at 14,000 KC and as the inherent design of the circuit has been expressly engineered for simplicity in servicing, no other adjustments are necessary for aligning this band.

Note: In order to prevent alignment on the image frequency, it is suggested that alignment be started with the antenna coil trimmer screwed down tightly. To check this adjustment, readjust the pointer to 13100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13100 KC is found to be stronger than the signal at 14000 KC, it signifies that alignment was incorrectly made on the image frequency.

Important: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND In preparing the test oscillator for alignment of this band. connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the oscillator circuit trimmer to peak. The oscillator trimmer is mounted on the oscillator coil, which is located underneath the chassis. The oscillator coil is wound with enamel wire and is mounted to the front edge of the chassis. After this has been carefully done, the next step is to adjust the antenna trimmer to peak. The antenna trimmer is attached to the antenna coil; also mounted underneath the chassis and wound with enamel wire. The antenna coil is located nearest the power transformer. Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser. This padding condenser is mounted on the underside of the chassis, directly underneath the gang condenser. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section.

Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, the only readjustment that should be made (in this recheck) is the trimmer on the enamel wire antenna coil located underneath the chassis near the power transformer. If the pointer is found off scale, it may be corrected and put on scale by readjustment of the oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

Important: There are only three trimmer adjustments necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band; otherwise, the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. An approximate normal minimum oscillating voltage for the plate of the 6C5 (oscillator tube) at 115 volt line potential is as follows:

Broadcast Band	600 KC	124 Volts
	1400 KC	106 Volts
Foreign Band	6000 KC	137 Volts
	14000 KC	140 Volts
Police Band	1700 KC	128 Volts
	4000 KC	110 Volts

Another way of ascertaining whether the tube is oscillating is to ground the grid of the 6C5. If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

Provisions have been made in this receiver for all types of antennas.

REGULAR ANTENNA Use a standard outside antenna of at least 50 feet including lead-in. Connect to antenna post marked **"A."**

In remote locations that are far away from powerful broadcasting stations, a longer antenna may be used for increased receiving range. Antennas as long as 150 to 200 feet may be employed in "dead spots." (Longer antennas increase sensitivity and decrease selectivity slightly.)

PARTS LIST

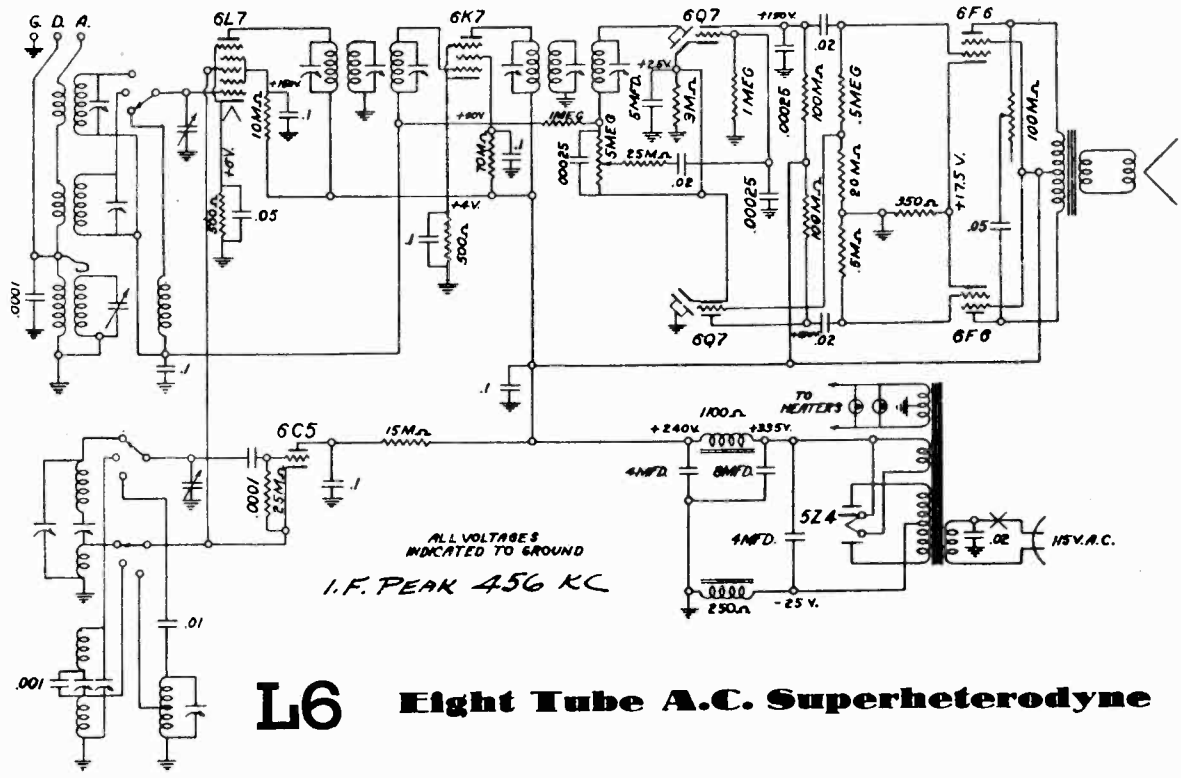
Part No.	Description
G730	Police Band Antenna Coil
G731	Police Band Oscillator Coil
P178	A.C. Cord & Plug
P170	350 Ohm Resistor
P278	500 Ohm ¼ Watt Resistor
P168	8,000 Ohm ¼ Watt Resistor
P673	10,000 Ohm ½ Watt Resistor
P258	15,000 Ohm ¼ Watt Resistor
P188	25,000 Ohm ¼ Watt Resistor
P675	70,000 Ohm ¼ Watt Resistor
P139	250,000 Ohm ¼ Watt Resistor
P137	500,000 Ohm ¼ Watt Resistor
P182	1 Megohm ¼ Watt Resistor
P480	.0001 Mica Condenser
P147	.00025 Mica Condenser
P335	.01 Mfd. 400 Volt Condenser
P150	Elect. Condenser
P670	3 Gang Condenser
P617	Padding Condenser
P878	Pre Selector Coil
P657	1st I.F. Transformer
P658	2nd I.F. Transformer
P656	Oscillator Coil
P669	Power Transformer
P182	Output Transformer
P485	Choke
P659	Wave Change Switch
P660	Volume Control & "On-Off" Switch
P661	Tone Control
G728	Short Wave Antenna Coil
G729	Short Wave Oscillator Coil
P143	.02 Mfd. 400 Volt Condenser
P148	.05 Mfd. 200 Volt Condenser
P334	.05 Mfd. 400 Volt Condenser
P142	.1 Mfd. 200 Volt Condenser
P278	.1 Mfd. 400 Volt Condenser
P474	4 Mfd. 430 Volt Condenser
P672	.001 Mica Condenser
P478	.0012 Mfd. 200 Volt Condenser
P304	5 Mfd. Elect. Condenser
P733	12" Speaker Field Coil
P683	12" Speaker Cone & Voice Coil Assembly 12" Dynamic Speaker
P688	Dial Glass
P648	Dial & Scale—Complete
P634	Knob
P124	Pilot Light

MODELS 130,134,146,190
Chassis L-6
Schematic, Voltage
Socket, Trimmers

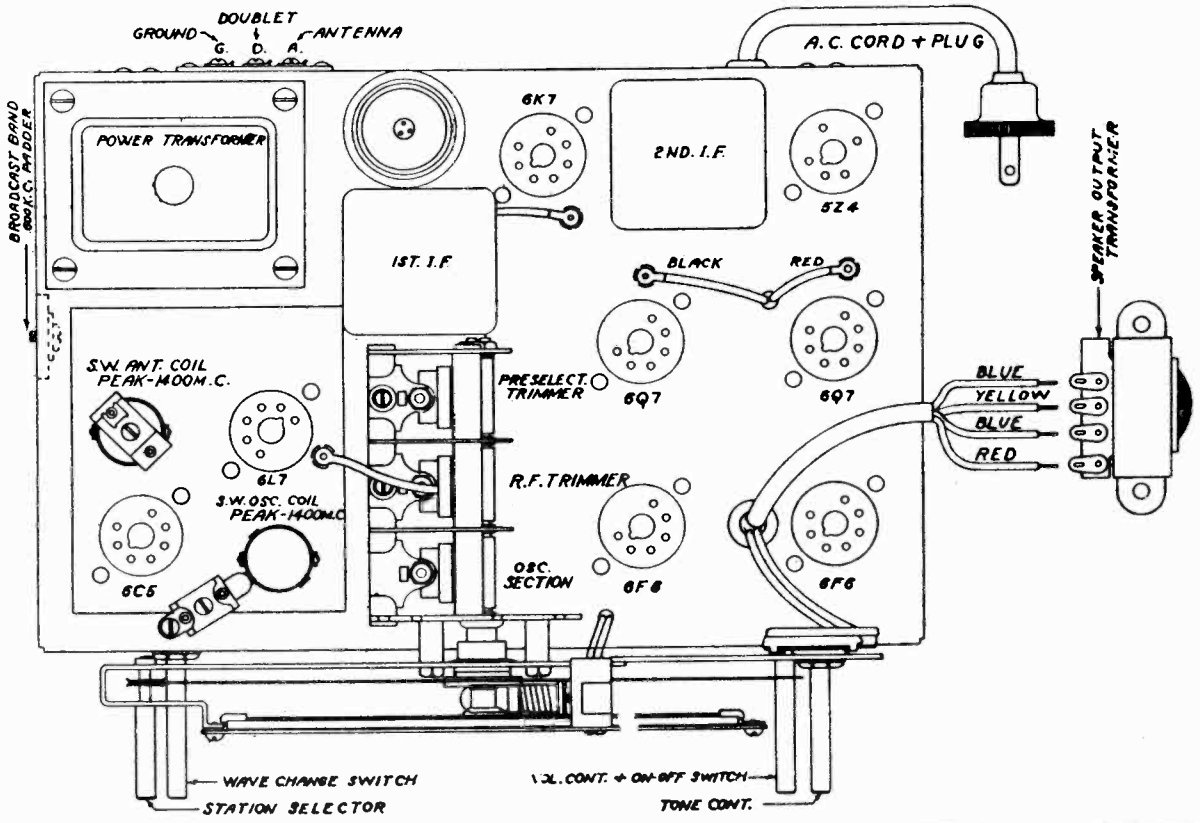
SPIEGEL, INC.

1936

FOR ALIGNMENT
SEE INDEX



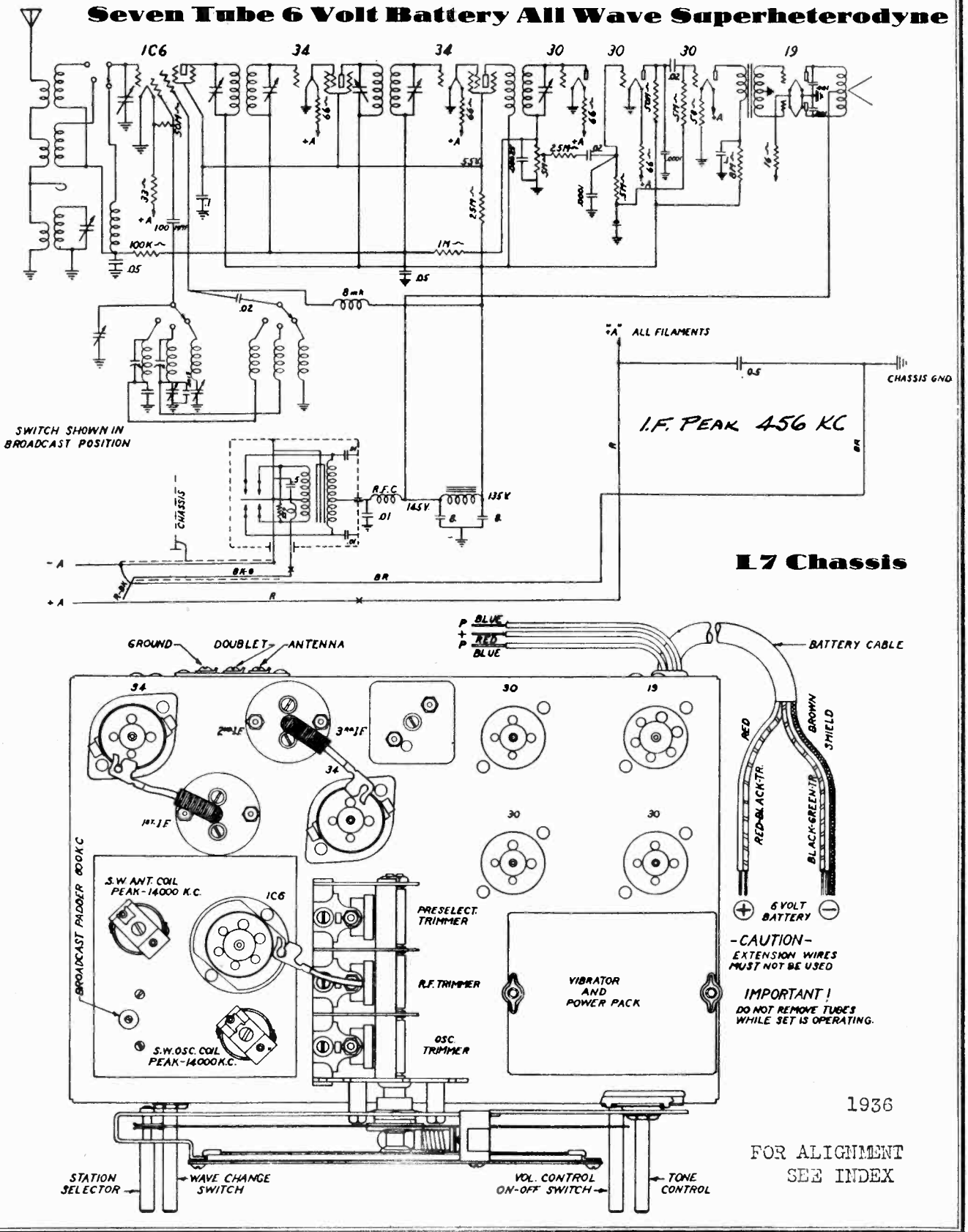
L6 Eight Tube A.C. Superheterodyne



MODELS 144,152,178
Chassis L-7
Schematic,Voltage
Socket,Trimmers

SPIEGEL, INC.

Seven Tube 6 Volt Battery All Wave Superheterodyne

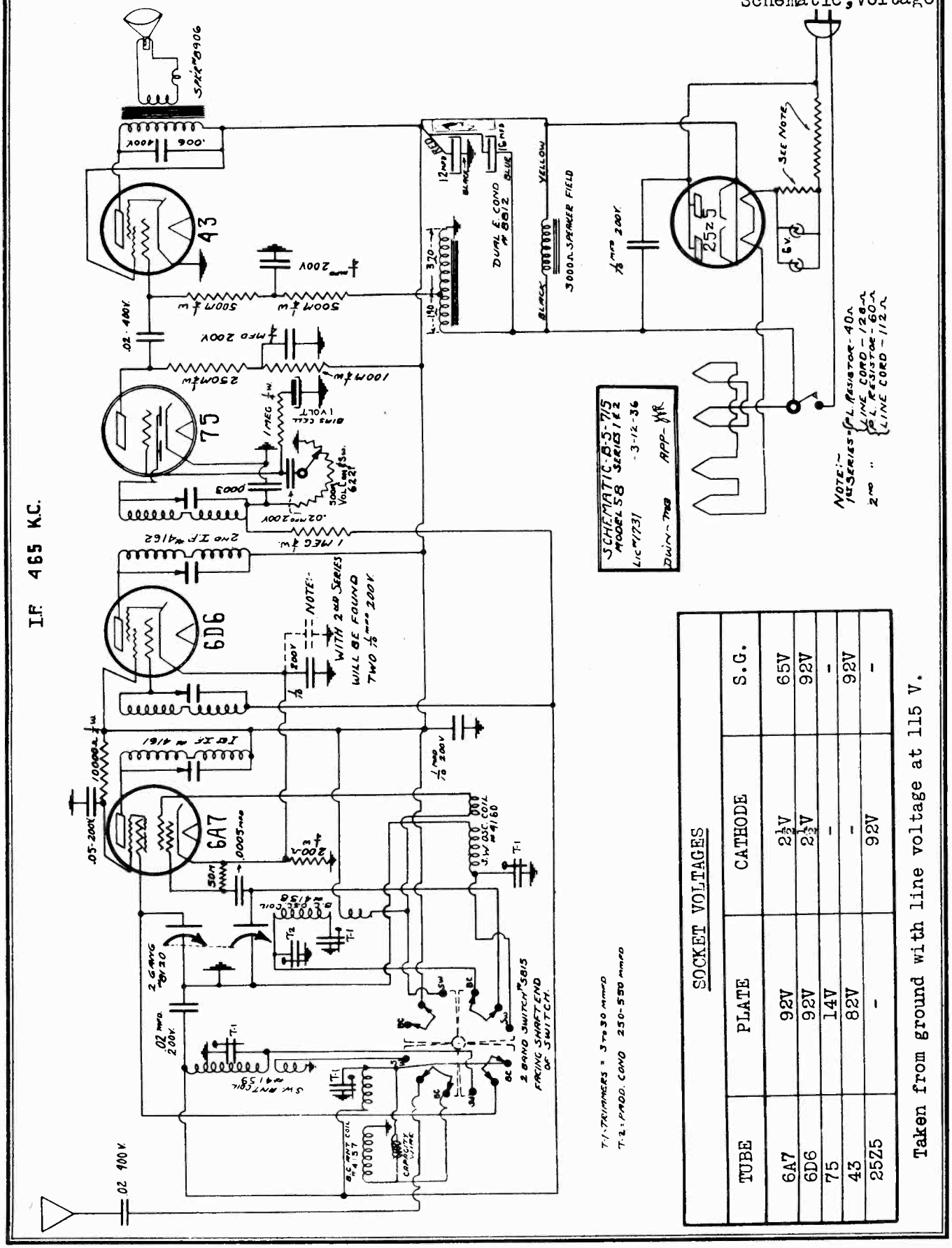


1936

FOR ALIGNMENT SEE INDEX

SPIEGEL, INC.

MODEL 132
Chassis 58
Schematic, Voltage



SOCKET VOLTAGES

TUBE	PLATE	CATHODE	S.G.
6A7	92V	2½V	65V
6D6	92V	2½V	92V
75	14V	-	-
43	82V	-	92V
25Z5	-	92V	-

Taken from ground with line voltage at 115 V.

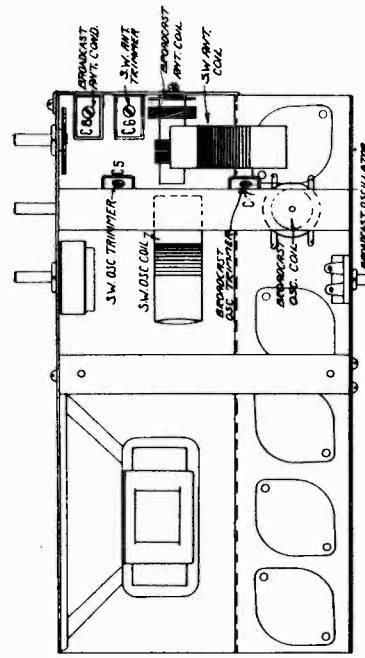
MODEL 132
Chassis 58
Alignment, Socket
Trimmers, Parts

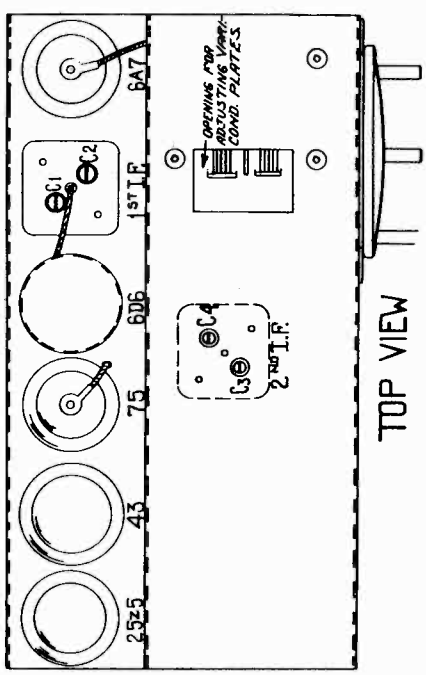
SPIEGEL, INC. CO.

Part No.	PRICES SUBJECT TO CHANGE WITHOUT NOTICE — Description	Price
7601	Bias Cell - 1 Volt	.20
4157	Coil - Antenna B.C.	.56
4158	Coil - Oscillator B.C.	.35
4159	Coil - Antenna S.W.	.40
4160	Coil - Oscillator S.W.	.40
4161	Coil - 1st. I.F. Complete with can and grid cap	.90
4162	Coil - 2nd. I.F. Complete with can and grid cap	.90
4330	Choke - 560 ohm, tapped at 190 ohms	1.00
5525	Cord - line, 128 ohms	.64
5527	Cord - line, 112 ohms	.64
8120	Condenser - variable, 2 gang	2.25
8812	Condenser - 16-12 Mfd. Electrolytic - 200 volt	1.00
8216	Condenser - Padding 250-550 Mmfd.	.20
3127	Condenser - Trimmer 3-30 Mfd.	.18
2219	Condenser - .1 Mfd. 200 Volt	.16
3513	Condenser - .02 Mfd. 200 Volt	.16
3517	Condenser - .02 Mfd. 400 Volt	.20
2183	Condenser - .05 Mfd. 200 Volt	.16
2475	Condenser - .25 Mfd. 200 Volt	.16
3515	Condenser - .006 Mfd. 400 Volt	.24
8304	Condenser - .0003 Moulded Mica	.12
3410	Condenser - .00005 Moulded Mica	.12
6221	Control - Volume and switch - 500M ohms	.92
4063	Dial card - calibrated	.55

REPLACEMENT PARTS LIST

4014	Dial hand and screw	.10
4057	Drive disc - 1/4" hub (pyralin)	.30
4056	Dial glass	.15
7112	Knob - plain	.15
7113	Knob - coded (specify colors)	.17
1919-A	Lamp - dial - 6 volt (brown bead)	.12
3340	Resistor - 200 ohms - 1/4 Watt	.12
2765	Resistor - 10M ohms - 1/4 Watt	.12
1843	Resistor - 50M ohms - 1/4 Watt	.12
3327	Resistor - 100M ohms - 1/4 Watt	.12
3355	Resistor - 250M ohms - 1/4 Watt	.12
3328	Resistor - 500M ohms - 1/4 Watt	.12
3335	Resistor - 1 Megohm - 1/4 Watt	.12
3361	Resistor - 40 ohm candohm	.20
3362	Resistor - 60 ohm candohm	.20
2746	Socket - 6 prong	.14
2747	Socket - 7 prong	.14
4030	Socket - pilot light (slotted)	.14
8906	Speaker - 5" - 3,000 ohms	3.75
5815	Switch - 2 band	.60
6600	Tube shield - base	.04
6601	Tube shield - shell	.06
6602	Tube shield - top	.04
2463	Wire - 20 Ft. antenna roll	.20





THE ALIGNMENT PROCEDURE

The following alignment instructions are given with the assumption that the service station has a signal generator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be a 0 to 3 volt AC meter connected across the voice coil of the speaker or preferably an output meter connected in the plate circuit of the 42 power tube in series with an 8 MFD paper condenser.

The schematic circuit of the set will be found on the back side of the chassis.

1. THE I.F. STAGES

The I.F.'s are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6A7 tube.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers number C1, C2, C3, C4. (See pictorial diagram).

The sensitivity of the I.F. stages will be 25 microvolts for a 50 milliwatt output.

Always use as low an output as possible from the signal generator in making the various adjustments.

2. ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the tuning knob to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can easily be lined up by removing the dial glass to get at the screw holding the dial hand.

1. Turn wave band switch all the way to the right for the Short Wave Band.
2. Tune dial hand to 17 megacycles.
3. NOTE: FOR ADJUSTMENT AT 17 MEGACYCLES THE OUTPUT FROM THE SIGNAL GENERATOR MUST NOT BE COUPLED DIRECT TO THE ANTENNA LEAD OF THE SET. FOR TRUE ALIGNMENT STRETCH OUT THE RADIO ANTENNA LEAD IN SUCH A MANNER THAT IT WILL PICK UP THE SO CALLED "WILD" SIGNAL OF 17 MEGACYCLES EMITTING FROM THE GENERATOR. IT IS ALSO IMPORTANT THAT THIS SIGNAL ONLY BE STRONG ENOUGH TO JUST BE HEARD.
4. When the above set-up is arranged peak oscillator condenser C5 to the 17 megacycle weak signal.
5. After adjusting the oscillator trimmer, peak the S.W. antenna condenser C6 to 17 megacycles.

NOTE: After adjusting the short wave band at 17 megacycles, the signal generator output to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 MC.

Increase oscillator signal by "opening up" the attenuator. Move the dial back and forth at 16.9 MC.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 MC.

Reduce signal voltage from generator, go back to 17 MC and slightly correct this last trimmer adjustment.

3. THE BROADCAST BAND

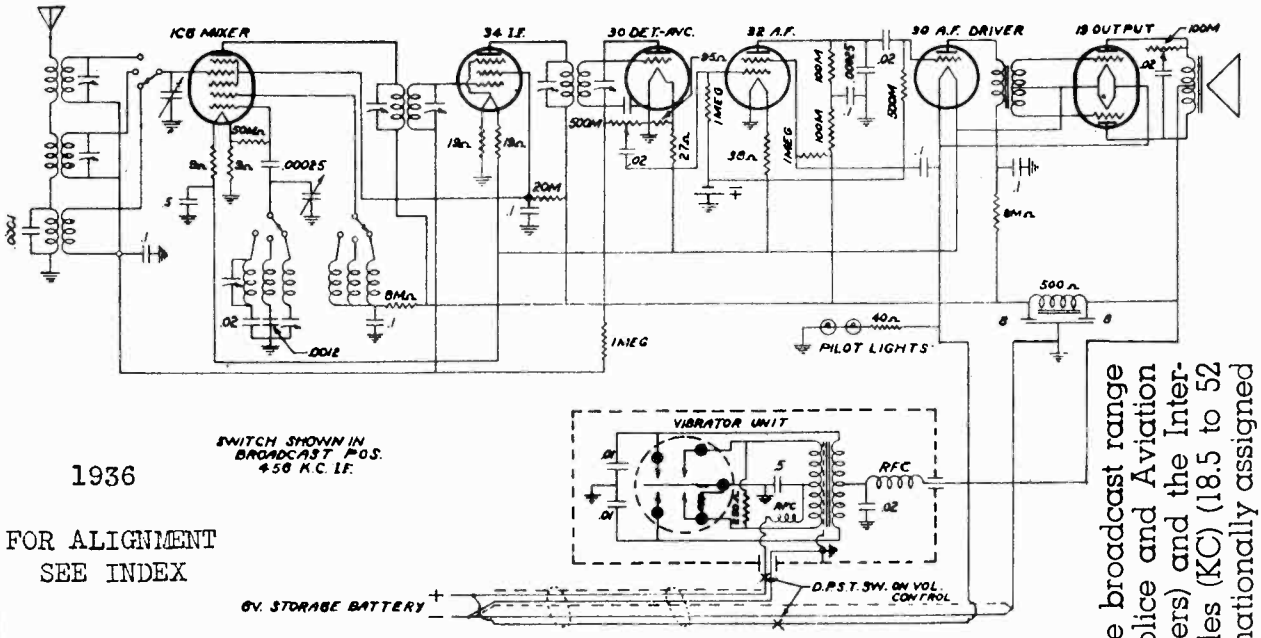
1. Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale). The signal generator may be coupled direct to the antenna lead on this band, through a standard 200 MMFD Condenser.
2. Peak oscillator trimmer C7 to 1400 KC from the signal generator.
3. Peak antenna trimmer C8 to 1400 KC after adjusting oscillator.
4. Set dial hand to 550 KC and adjust oscillator padding condenser C9 to 550 KC.
5. Recheck dial at 1400 KC as in Section 1.
6. Points in the middle of the dial may be checked and if necessary the plates of the back section (oscillator) of the variable condenser may be bent for alignment.

4. NOTES

1. Seal all trimmers after their final adjustment.
2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.
3. Refer to the chart included for the voltages at the tube sockets.

SPIEGEL, INC.

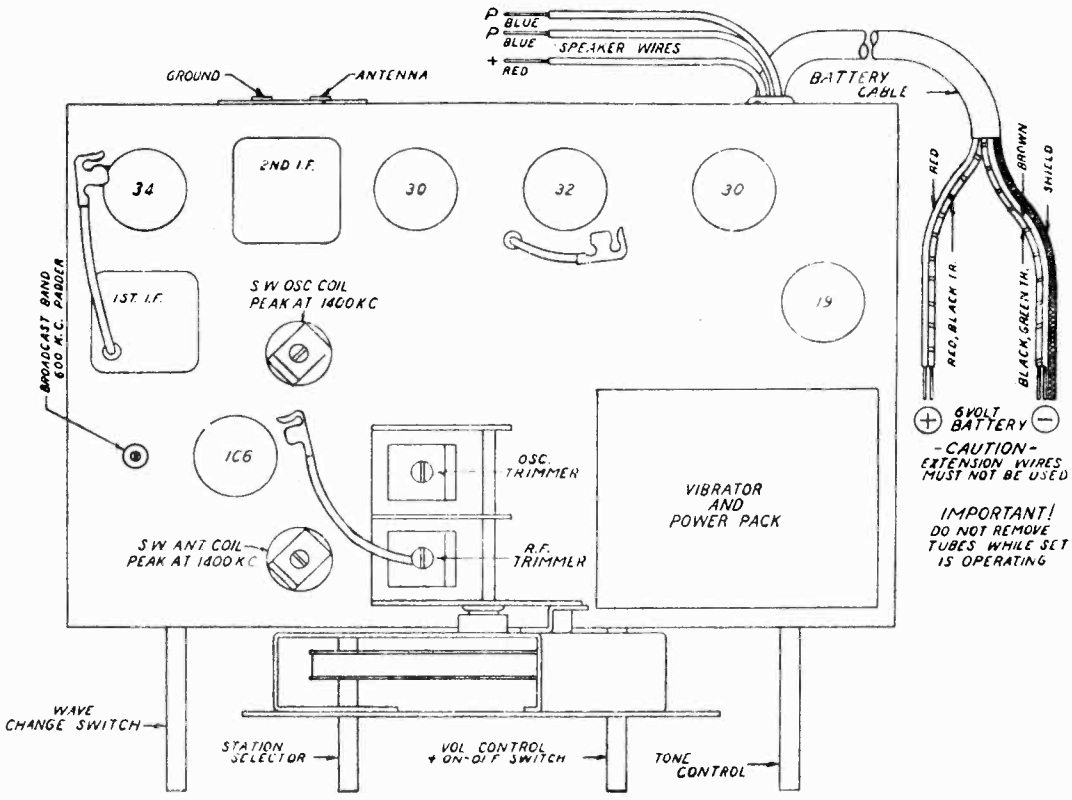
MODELS 167,182,183
Chassis Z-5
Schematic, Socket
Trimmers



SWITCH SHOWN IN BROADCAST POS. 456 K.C. I.F.

1936

FOR ALIGNMENT SEE INDEX



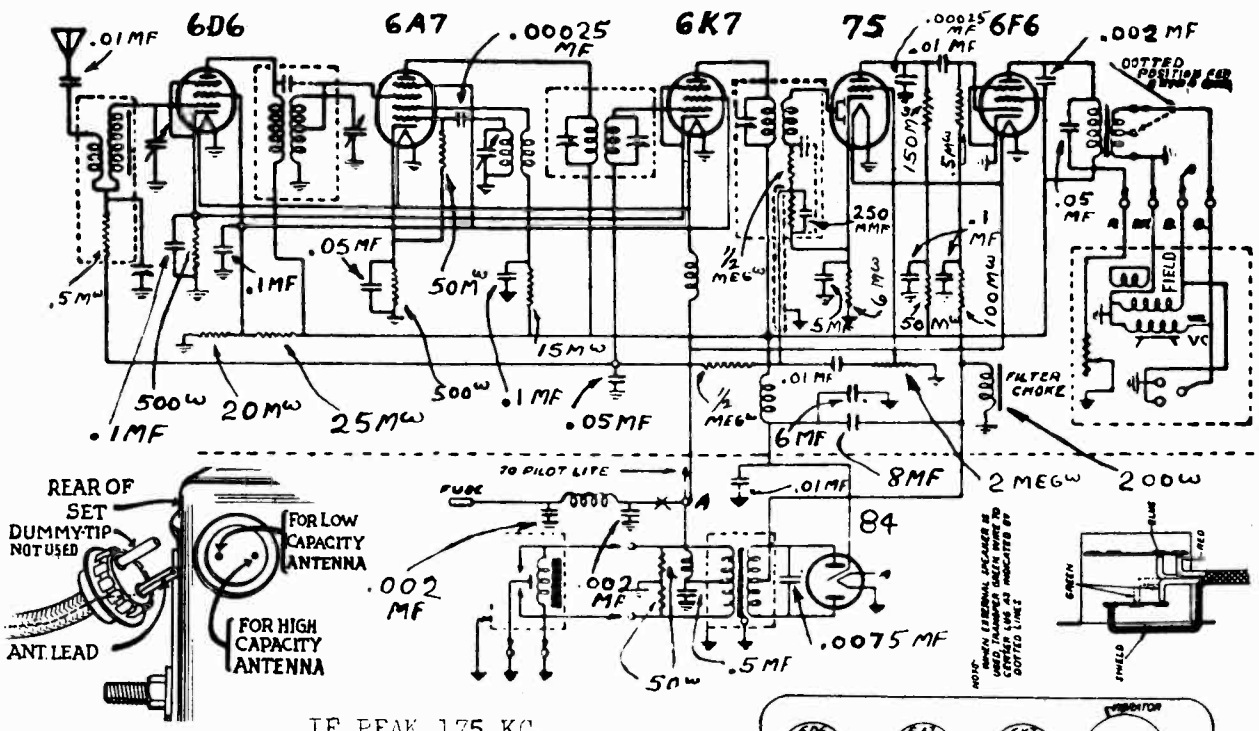
Six Tube 6 Volt Battery Superheterodyne
Z5 Chassis

This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

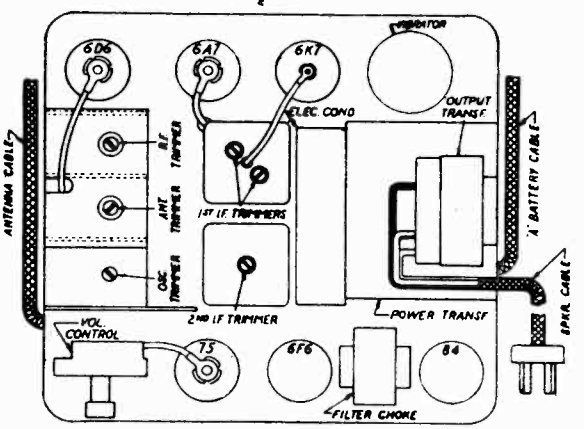
MODELS 186,5300,6800
Chassis U-6
Schematic,Socket
Trimmers,Alignment

SPIEGEL, INC.

1936



IF PEAK 175 KC.



ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 175, 600 and 1400 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) transformers should be aligned properly as the first step.

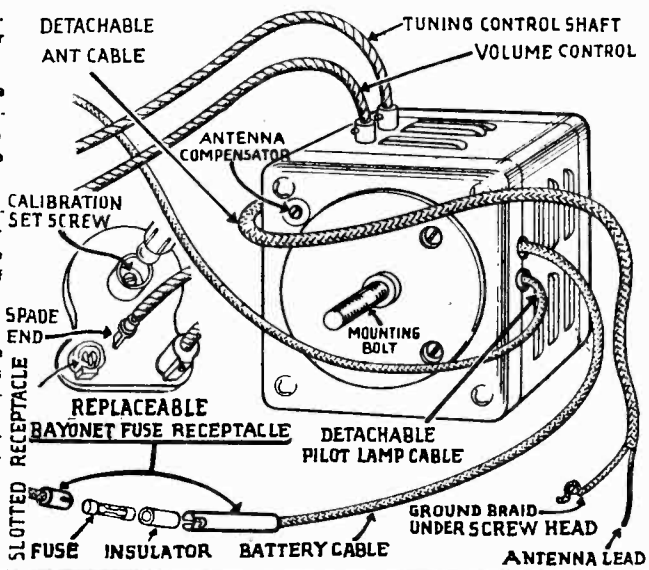
I.F. ALIGNMENT Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the R.F. antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

LOW FREQUENCY PADDING Next, reset the dial pointer on the control head and the test oscillator to 600 K.C., adjust the antenna compensator condenser to peak. This adjustment is best reached from the bottom of the chassis and the location of the condenser will be found near the volume control.

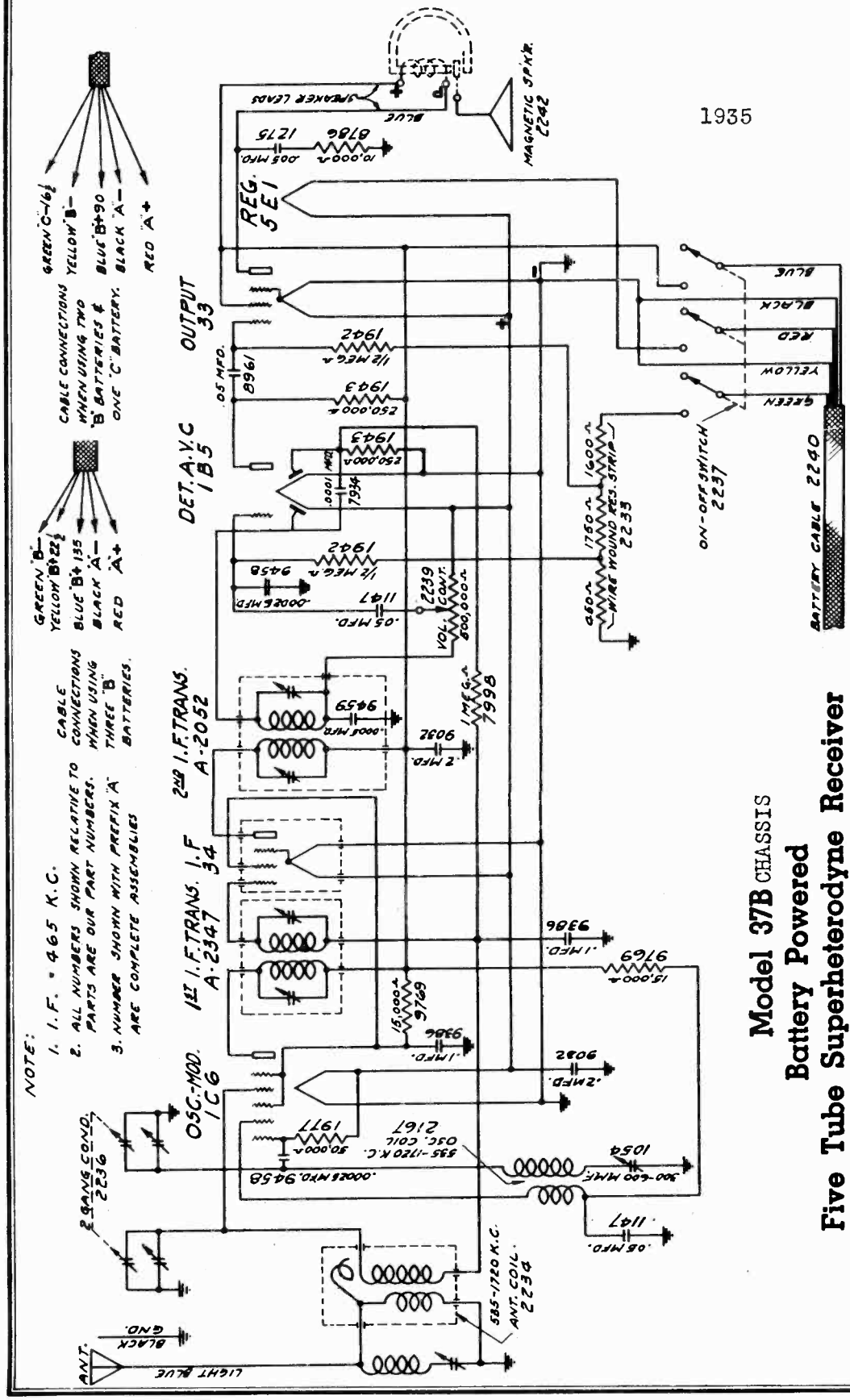
The adjustment of the antenna compensator should again be gone over after the auto set has been again installed in the car, to compensate for the difference that may exist in the capacity of the car antenna and the .0001 mfd. capacitor used with the test oscillator.



SPIEGEL, INC.

MODELS 150,188,1910
Chassis 37-B
Schematic,Parts
Alignment

1935



FREQUENCY RANGE - 1720 to 535 KC.

CONVENTIONAL ALIGNMENT - see special section.

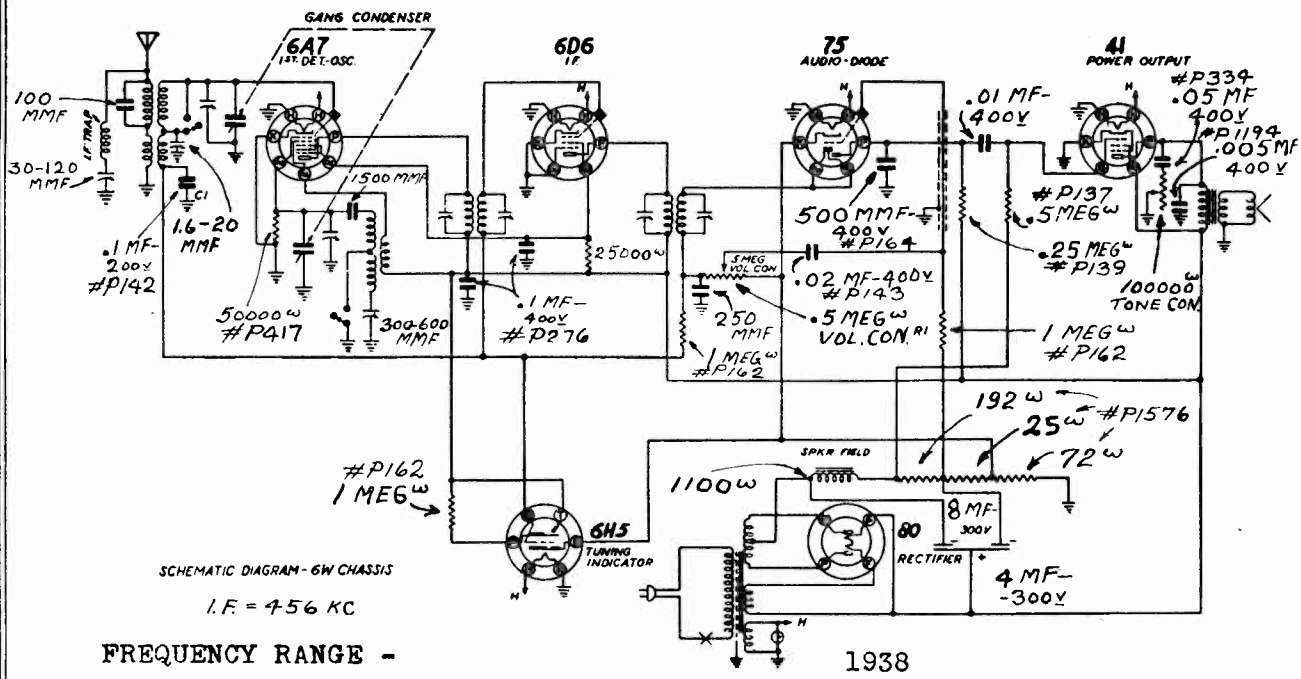
Peak IF transformers at 465 KC. BROADCAST BAND - Dial and generator to 1715 KC, trim oscillator (REAR SECT) to maximum peak. Dial and generator to 1400 KC, adjust antenna trimmer to maximum peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. (BOTTOM OF CHASSIS, REAR)

Adjust antenna wave trap at 465 KC. (BOTTOM OF CHASSIS, WITH COIL ON IT)

MODELS 2000,2001
2050,2051
Chassis 6-W

SPIEGEL, INC.

Schematic, Socket
Trimmers, Parts
Alignment



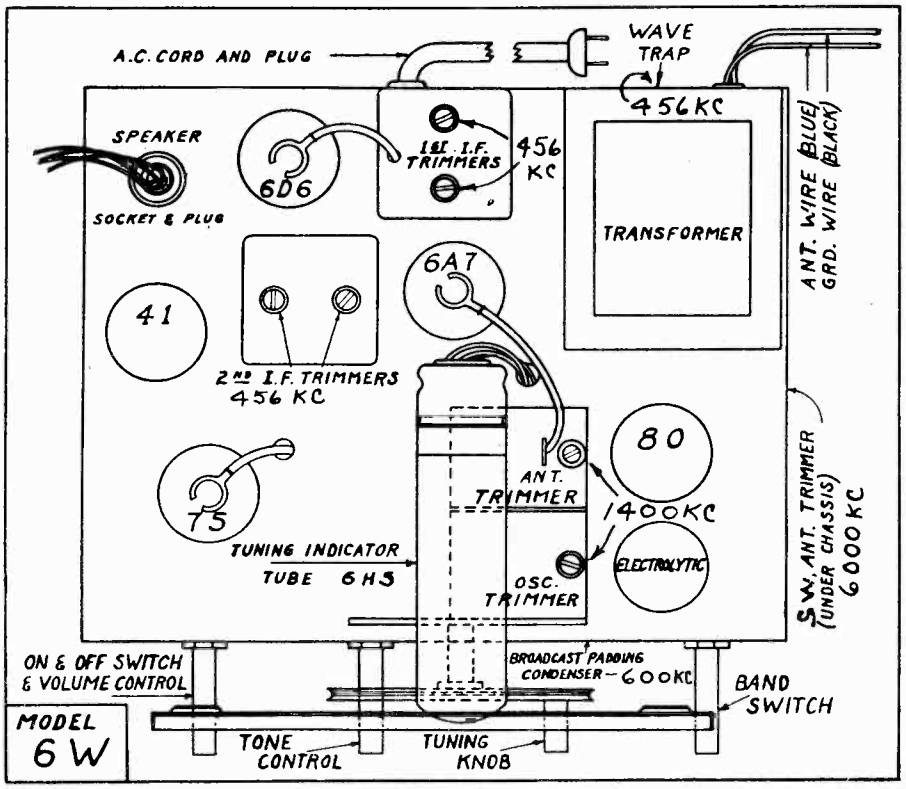
FREQUENCY RANGE -
535 to 1750 KC
5600 to 18100 KC

1938

CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION VO. VIII

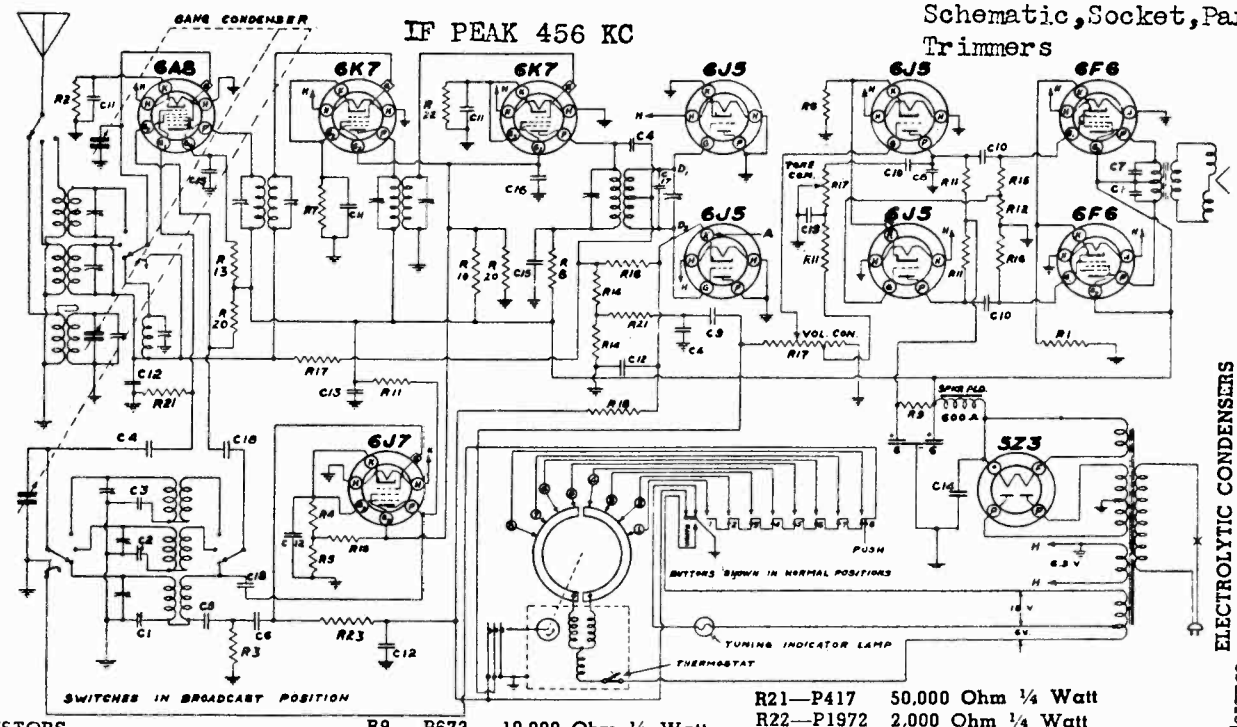
6 Tube AC Superheterodyne
6W Chassis

P1368	4 Prong Socket
P1277	Type 41 Socket
P521	Type 75 Socket
P492	Type 80 Socket
P506	Type 6A7 Socket
P536	Type 6D6 Socket
P617	Padding Condenser
P1576	Candohm Resistor
P1577	Trimmer Cond. with Bracket
P1578	Gang Condenser
P1663	Dial Pointer
P1641	Dial Scale
P1642	Tone Control
P334	.05 Mfd. 400V Condenser
P1643	Escutcheon
P1672	Selector Knob
P1673	Tone Knob
P1674	Volume Knob
P1675	Band Switch Knob
P166	25,000 Ohm ¼ Watt Resistor
P417	50,000 Ohm ¼ Watt Resistor
P162	1 Megohm ¼ Watt Resistor
P139	250,000 Ohm ¼ Watt Resistor
P137	500,000 Ohm ¼ Watt Resistor
P817	.00025 Mfd. Mica Condenser
P336	.005 Mfd. Mica Condenser
P1194	.005 Mfd. 400V Condenser
P142	.1 Mfd. 200V Condenser
P164	.01 Mfd. 400V Condenser
P276	.1 Mfd. 400V Condenser
P916	1st I.F. Transformer Coil
P1579	Volume Control and Switch
P143	.02 Mfd. 400V Condenser
P1580	Band Change Switch
P1581	Oscillator Coil
P1582	Antenna Coil
P1557	Riveted Mica Condenser
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P914n	Power Transformer
P929	AC Cord and Plug
P1591	Elec. Condenser
P917	2nd I.F. Transformer
P1455	Tube Shield
P1645	Magic Eye Socket & Cable Assembly
P1574	.0015 Mica Condenser



SPIEGEL, INC.

MODELS 2058,2059(1938)
4054(1937)
Chassis 11-S
Schematic,Socket,Parts
Trimmers



ELECTROLYTIC CONDENSERS
C14—P1937 .25 Mid. Wet Electrolytic
P1939—Dual 6 Mid. 450 W. V.

RESISTORS

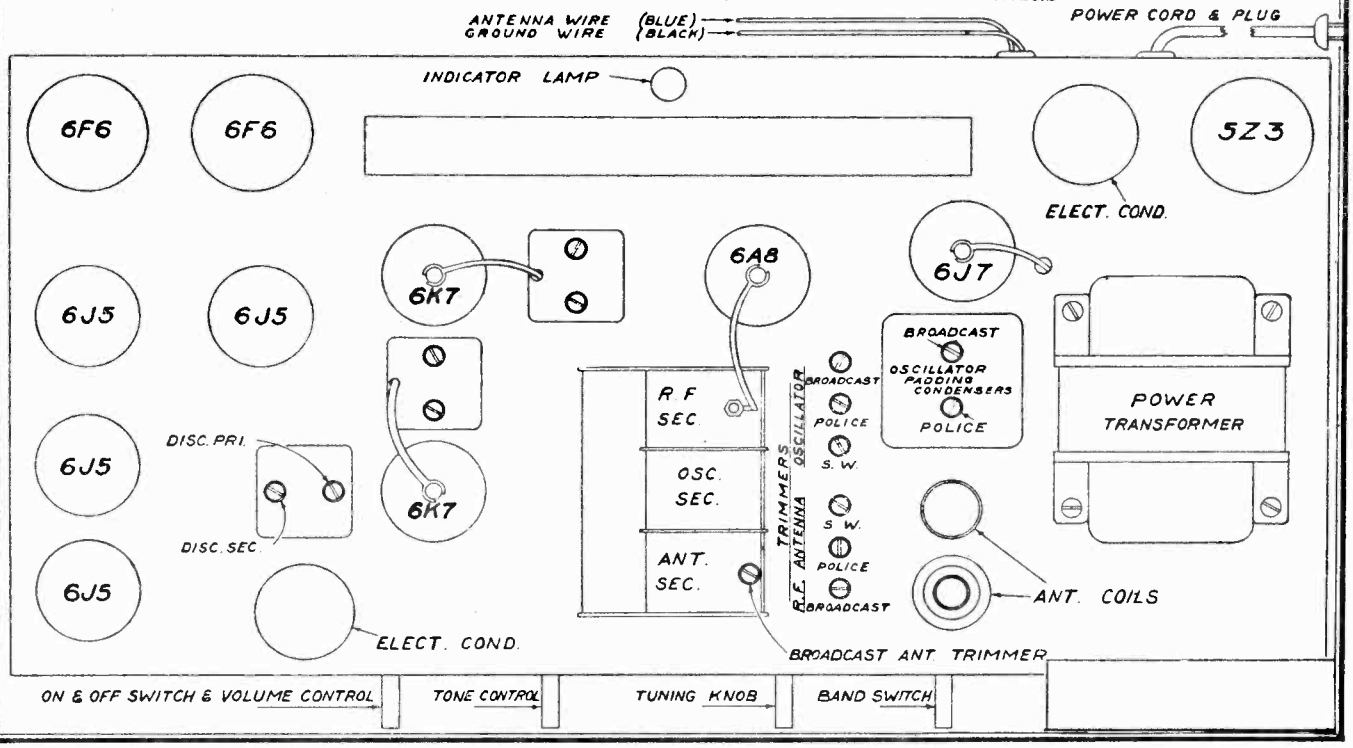
R1 —P1818	210 Candohm Resistor	10% Tolerance
R2 —P1942	250 Ohm ¼ Watt	10% Tolerance
R3 —P1950	350 Ohm ¼ Watt	10% Tolerance
R4 —P279	500 Ohm ¼ Watt	
R5 —P1951	650 Ohm ¼ Watt	5% Tolerance
R6 —P1729	750 Ohm ¼ Watt	
R7 —P1973	1,000 Ohm ¼ Watt	10% Tolerance
R8 —P1216	5,000 Ohm ¼ Watt	
R9 —P673	10,000 Ohm ½ Watt	
R10—P1944	15,000 Ohm 2 Watt	
R11—P166	25,000 Ohm ¼ Watt	
R12—P1943	35,000 Ohm ¼ Watt	10% Tolerance
R13—P1952	50,000 Ohm ½ Watt	
R14—P139	250,000 Ohm ¼ Watt	
R15—P1843	455,000 Ohm ¼ Watt	10% Tolerance
R16—P137	500,000 Ohm ¼ Watt	
R17—P162	1,000,000 Ohm ¼ Watt	
R18—P310	4,000,000 Ohm ¼ Watt	
R19—P1949	15,000 Ohm ½ Watt	
R20—P165	25,000 Ohm 1 Watt	
R21—P417	50,000 Ohm ¼ Watt	
R22—P1972	2,000 Ohm ¼ Watt	10% Tolerance
R23—P280	100,000 Ohm ¼ Watt	

PAPER CONDENSERS

C3 —P1947	.004 Mfd.	400 V.	
C7 —P904	.002 Mfd.	600 V.	
C9 —P164	.01 Mfd.	400 V.	
C10—P334	.05 Mfd.	400 V.	
C11—P148	.05 Mfd.	200 V.	
C12—P142	.10 Mfd.	200 V.	
C13—P1789	.25 Mfd.	400 V.	
C15—P276	.10 Mfd.	400 V.	
C16—P141	.25 Mfd.	200 V.	
C18—P1193	.002 Mfd.	400 V.	

MICA CONDENSERS

C4 —P480	.0001 Mfd.	
C5 —P1044	.0002 Mfd.	
C6 —P672	.001 Mfd.	
C8 —P336	.0005 Mfd.	
C17—P1044.	0002 Mfd.	5% Tolerance
C19—P1683	.004 Mfd.	



MODELS 2058,2059,4054
Chassis 11-S
Alignment,Notes

SPIEGEL, INC.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure, after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum push in the white button until it locks. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the first four I.F. trimmers to peak or maximum reading on the output meter.

After the first two I.F. transformers have been tuned, the discriminator transformer should be aligned. This is a critical adjustment and must be performed with care.

First — connect a 0-200 micro ammeter between the ungrounded cathode of the 6J5G tube serving as a diode rectifier, and ground. This cathode is indicated as point "A" in the circuit diagram. Then place a .0001 mfd. mica condenser across the secondary of the discriminator transformer. These terminals are indicated as points "D1" and "D2" on the circuit diagram. This condenser is used to detune completely the secondary circuit during the following primary adjustment.

The primary is tuned by impressing an I.F. signal on the converter (6A8-G) grid and adjusting the trimmer marked "DISC. PRI." on the chassis layout diagram, to give maximum audio output. Signal strength should be the same as in an ordinary aligning operation. For this particular receiver about 30-micro volts of I.F. signal is required for standard output. (50 milliwatts). At this point it would be well to go over the adjustments of the two other I.F. transformers and bring the entire system to maximum sensitivity. Now without further adjustments of either the frequency setting of the signal generator or the I.F. transformer trimmers the "DISC. SEC." trimmer should be tuned.

After removing the .0001 mfd. mica condenser from the 6J5G grids "D1 and D2" increase the I.F. signal input to the maximum that the signal generator will supply (at least 100,000 micro volts). Then, with the volume control turned down to limit the audio output, slowly turn the "DISC. SEC." trimmer until a sudden, sharp drop in current as indicated by the micro ammeter is seen. The meter will now probably read in reverse and off scale. The trimmer should be reversed and the meter reading brought to zero. If a metallic screw driver is used it will be necessary, continually, to lift the screw driver away from the trimmer screw after each slight adjustment to observe the meter reading.

It is sometimes convenient to use an offset of "remote zero" setting of the micro ammeter in making this adjusiment so that the zero current setting is higher on the scale than the conventional zero point.

After the current has been brought to zero by the above described method the I.F. alignment and discriminator tuning is completed and the R.F. tracking may be done.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through at .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

CONTROLS AND OPERATION

RIGHT HAND KNOB **(Three Position Wave Band Selecting Switch)**—Turned to the right, it is set for Standard Broadcast Band; turned to the extreme left, it is set for Foreign and American Short Wave Reception; when in the center position, it is set for reception of Police, Aviation, Amateurs, and Ships at Sea.

SHORT WAVE TUNING

When tuning short wave stations, the selector knob must be turned more slowly and carefully, due to the sharp selectivity of the receiver in these bands. If you tune rapidly, many stations will be skipped entirely. When a response is heard, work the dial a little from left to right until you hit a point where the station comes in at maximum volume. This critical tuning is necessary if results are to be expected. It may require a little patient experimenting to become accustomed to short wave tuning. The use of a short wave "log" will be of great assistance in picking up short wave stations. Such logs are available from any of the leading radio magazines. They list the location, frequency and operating time schedules of short wave stations all over the world.

LEFT HAND KNOB **(Manual Volume Control and "On-Off" Switch**—Turn the left hand knob to the extreme right. The switch will click and the dial will become illuminated. Wait about one-half minute for the tubes to become heated.

LEFT CENTER KNOB **(Continuous Variable Tone Control**—The tone control permits tonal regulation to meet individual musical taste. When turned completely to the right the normal proportion of high to low notes is obtained. Upon turning the control from the extreme right position toward the center a gradually increasing emphasis of the low notes is noted. Further, increase in this direction serves to elimtnate the more extreme "highs" which result in a greater apparent bass increase. A very useful application of this particular type of tone control is its ability to compensate for apparent lack of base at low volume levels. If when listening to a musical program at a low volume level the tone control is set at a position half way between its extreme settings a very pleasing effect is obtained.

SPIEGEL, INC.

MODELS 2058, 2059, 4054
Chassis 11-S
Electric Tuning Data

11S Chassis

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner.
The electric tuner is made up of three integral units:

PUSH BUTTON SWITCH: The push button switch consists of one (1) white button (extreme left), and eight (8) brown buttons whose numerical sequence is reckoned from left to right. The white button is provided for converting the set from automatic electric push button tuning to manual knob tuning. The brown buttons are provided for automatic electric tuning.

SELECTOR MECHANISM: The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

ELECTRIC MOTOR: The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch and a silent gear train. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

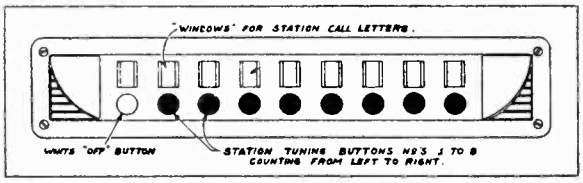


Fig. 1

The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the white button; tune in the station of the **lowest frequency,** using the station selector knob. Now hold the white button in and press in button number one (1), next to the white button. (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call block and insert into the window directly above button number one. Now release button number one by pressing the white button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call into the window of button number two.

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button insert the word "OFF" found in the call letter sheet.

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the white button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above. If by chance all of the buttons are pressed in, they may be released by pressing any one button all the way in.

To change from electric tuning to manual selecting, simply press in the white button. When the white button is in, the set may be tuned as a conventional receiver. **Note:** If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast the station last selected by button will automatically tune in by itself.

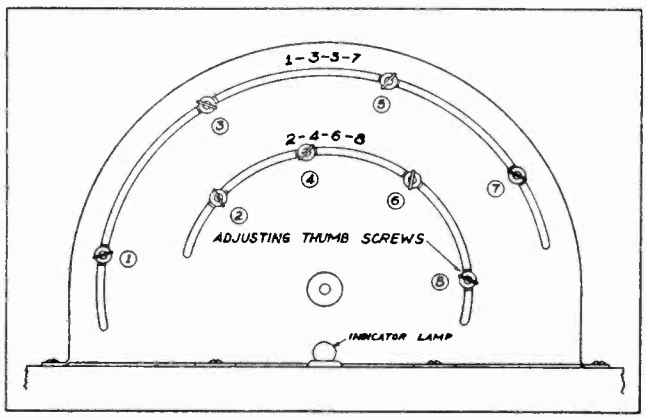


Fig. 2

NOTE: The white push button must be pressed in, in order to tune the set manually.

RIGHT CENTER KNOB **(Station Selector)**—Rotate the indicator needle slowly over a narrow range of the dial at a point where the desired station is located, until the station is received with maximum volume; then re-adjust the volume control to the proper level. **Never** use the station selector to adjust volume as this practice results in distorted tone quality and deficient bass response. The Volume Control **only** is to be used for this purpose. For maximum clarity the indicator needle should be adjusted to the center of the area covered by the station being tuned.

MODELS 2080,2081
Chassis 147(1938)
MODELS 5006,5052,6544,6568
Chassis 14-127ES(1936)

SPIEGEL, INC.

Schematic,Socket,Trimmers
Alignment,Parts

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an ouput meter is used, it should be connected across the voice coil terminals of the speaker. Use ¼ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

RF. (See above diagram for location of trimmers.) Using 200 mmf condenser in series with the generator, feed 1660 kc to antenna lead and adjust broadcast oscillator trimmer for top frequency. Set generator to 1400 kc, tune receiver and adjust the *two* antenna trimmers. Set generator to 600 kc, tune receiver to signal and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being set in order to secure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frequency. Set generator to 5000 kc, tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 15,750 kc—screw trimmer down tight, then unscrew to *second* peak. Set generator to 15,000 kc, tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**

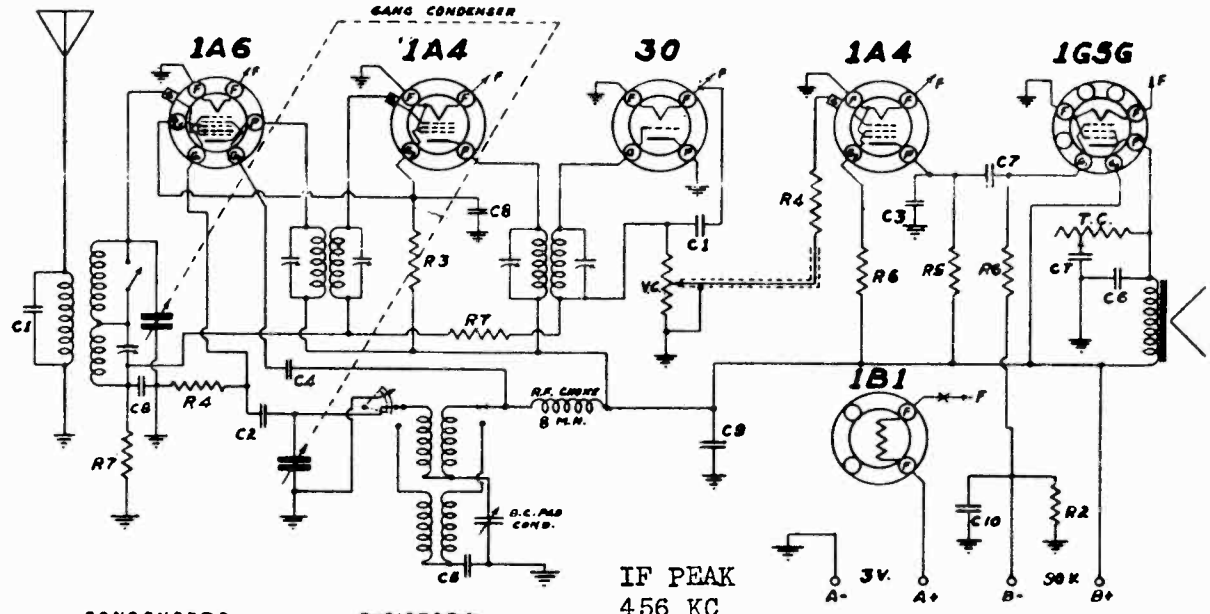
Part No.	Req.	Description
2163		Cable, Drive, Approx. 20"
3351	1	Cond. 8 MF. 225 V. Reg. Wet El.
3774		Schematic Diagram
3775		Tube Sticker
2560	1	Condenser, Padder
2597	4	Condenser, Trimmer, 1-10
1611	1	Condenser, Trimmer, 5-35
3157	1	Condenser, Trimmer
1286	1	Condenser, Mica, .00025
2780	1	Condenser, Mica, .00005
2741	1	1 Condenser, Mica, 1330
2872	1	Variable Condenser
576	2	Condenser, .02, 400 V., Paper
572	2	Condenser, .1, 200 V., Paper
565	1	Condenser, .01, 200 V., Paper
581	1	Cond., .005, 600 V., Paper
2792	1	Condenser, .2, 200 V., Paper
2793	1	1 Cond., .006, 600 V., Paper
3352	1	Condenser, .2, 400 V., Paper
575	1	Condenser, .1, 400 V., Paper
624	2	Resistor, 1/3 W., 1 Meg.
2731	1	Resistor, 1/3 W., 500 M.
2730	1	Resistor, 1/3 W., 200 M.
631	2	Resistor, 1/3 W., 50 M.
617	1	Resistor, 1/3 W., 20 M.

Part No.	Req.	Description
3353	1	Resistor, 2 W., 250 Ohm
2689	2	Resistor, 1/3 W., 100 Ohm
2883	1	Resistor, 1/3 W., 5 M.
2882	1	Resistor, 1/3 W., 15 Ohm
2881	1	Resistor, 1/3 W., 400 M.
2880	1	Resistor, 1/3 W., 100 M.
636	1	Resistor, 1/3 W., 40 M.
2724	1	Switch, Band
2837	1	Coil, Antenna
2772	1	Coil, Oscillator
2845	1	Coil, B. C. Antenna
3343	1	Transformer, Power
3344	1	Transformer, 1st I. F.
3345	1	Transformer, 2nd I. F.
3375	1	Cond. Elec. 16 MF., 400 V
2908	1	Spring, Drive Cable
3374	1	Indicator
2378	1	Pointer
2726	1	Control, Vol. & Switch
2737	1	Control, Tone
1732	1	A. C. Cord
3778	1	Book, Instruction
2897	1	Escutcheon Tuning Tube
2981	1	Tuning Tube Cable
3710	1	Speaker, 8"
3377	1	Escutcheon

Schematic, Socket, Trimmers, Alignment

SPIEGEL, INC.

MODELS 2154, 2155 (1938)
MODELS 4500, 4502, 4504, 4550, 4512, 4514 (1937)
Chassis 6-Q



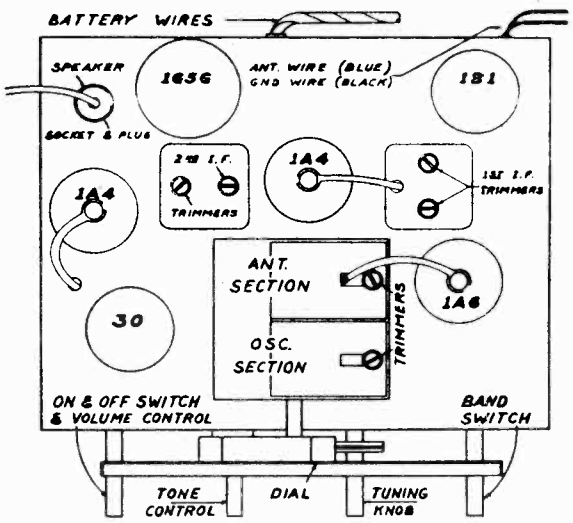
IF PEAK
456 KC

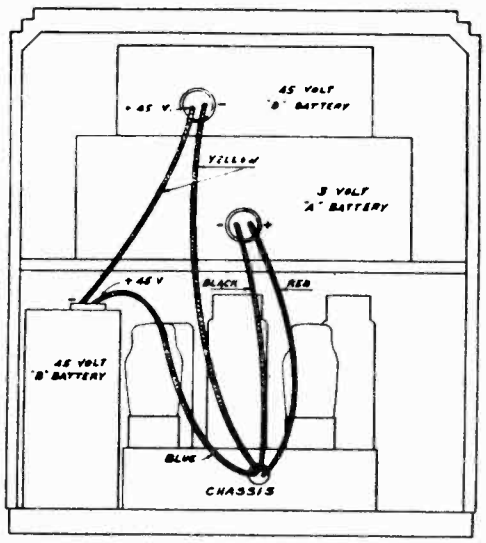
CONDENSERS		
No.	MFD.	
1	.0001	MICA
2	.00025	"
3	.0005	"
4	.001	"
5	.0015	"
6	.002	200 VOLTS
7	.01	200 "
8	.05	200 "
9	.25	
10	10.0	ELECT. 25 V.

RESISTORS		
No.	OHMS	WATTS
1	50.	1/2
2	535. ± 5%	1/2
3	10,000.	1/3
4	50,000.	1/2
5	200,000.	1/2
6	1. MEG.	1/2
7	2. MEG.	1/2

V.C. - VOLUME CONTROL - 1 MEGOHM.
T.C. - TONE CONTROL - 100,000 OHMS.
SWITCHES IN BROADCAST POSITION.

FREQUENCY RANGE -
535 to 1730 KC
2.2 to 6.5 MC





IF ALIGNMENT - Wave change Sw. in BC position. Gang condenser at minimum, generator at 456 KC, output to 1A6 CG thru .05 MFD condenser, Generator grounded to receiver, align four trimmers of IF transformers.

BROADCAST - Generator connected to antenna lead thru 200 MMFD condenser, and set at 1400 KC. Gang condenser at minimum. Trim oscillator then Antenna trimmers. Pad the oscillator circuit at 600 KC while rocking gang condenser.

SHORT WAVE - Generator at 6000 KC, start rotating gang condenser from HF end, when signal is heard, adjust antenna trimmer (SW) for maximum peak.

Repeat all adjustments for maximum performance.

MODELS 2212-2215,2254-2257 incl.
2280,2281 Chassis 145E(1938)
MODELS 6712,6716,6766,6772
5218.Chassis 14-129(1936)

SPIEGEL, INC.

Schematic,Socket,Trimmers
Alignment,Parts

6T7G Detector—automatic volume cont
first audio amplifier
6L5G Phase inverter
1H4G Bias rectifier

6D8G Oscillator-translator
6S7G Intermediate frequency amp
33 Power output

3585

Symbol	Part No.	Description
C1	2872	350 MMF Variable
C2,3	2597	1-10 trimmer
C4	1611	3-35 trimmer
C5	2560	360 MMF padder
C6	2741	1330 MMF padder
C7	2793	.006±5%
C8,17	565	.01 200V
C9	3579	.01 1600V
C10,12,14	3003	.5 160V
C11	3575	8 MF 250WV
C13	563	.05 400V
C15	2780	50 MMF mica
C16	2792	.2 200V
C18	3574	8 MF 150WV
C19,22		IF trimmers
C20,30,32	572	.1 200V
C21	3574	16 MF 200 WV
C23	581	.005 600V
C24	566	.5 200V
C25	579	.25 200V
C26,27	680	.05 200V
C28	1286	250 MMF mica
C29,33,34,35	576	.02 400V
C31	1285	100 MMF mica
R1	631	50M 1/3 w
R2	617	20M 1/3 w
R3	2689	100 ohms±10%
R4	609	15M 1/3 w
R5,10,11,23	624	1 Meg.
R6	3571	2 Meg. TC
R7	3580	10 ohms±5%
R8	631	50M 1/3 w

Symbol	Part No.	Description
R9	3418	500M VC with DPST Switch
R12	2688	60M 1/3 w ±10%
R13,16	3581	3M 1/3 w ±10%
R17	602	250M 1/3 w
R18	3582	75M 1/3 w ±10%
R19	2599	1 Meg. ±10%
R20	603	100M 1/3 w
R21,22	615	500M 1/3 w
	3412	#1 IF transformer
	3465-1	#2 IF transformer
	3573	Power transformer
	3416	Filter choke
	2724	Band switch
	2771	Antenna coil
	2772	Oscillator coil
	L-1020	Choke coil
	2845	B.C. Antenna coil
	3421	Vibrator
	2378	Pointer
	1408	Pointer screw
	2163	Drive cable
	3268	8 Prong socket
	2165	7 Prong socket
	2221	6 Prong socket
	1489	5 Prong socket
	833	4 Prong socket
	3426	Pilot lamp
	3431	Battery connector
	3586	8" PM Dynamic speaker
	3660	6" PM Dynamic speaker

six volt
storage battery

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

IF. Connect generator ground to received ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer; same for first IF, applying signal to grid of 6D8G. (See above diagram for location of tubes and transformers.)

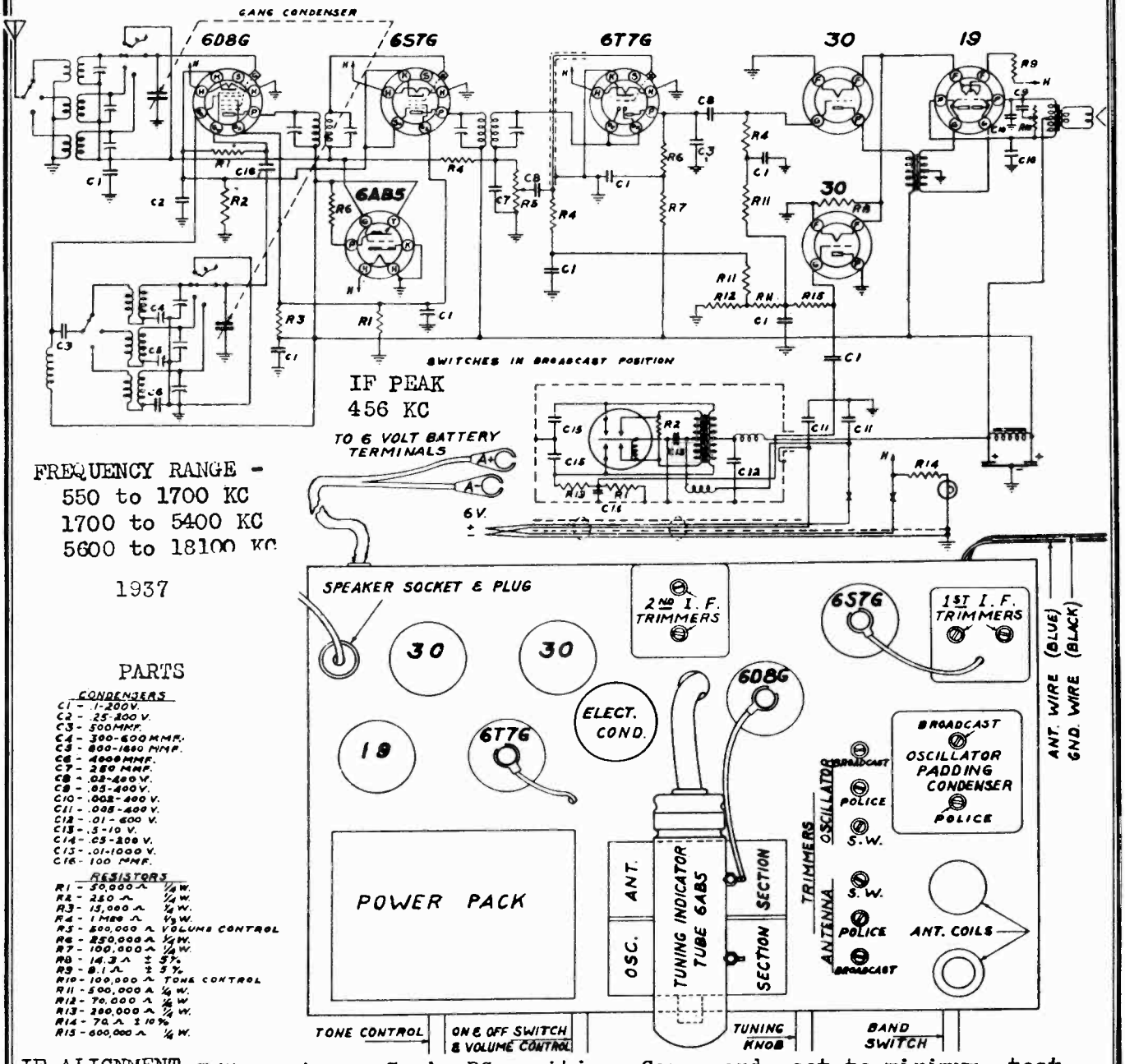
RF. (See above diagram for location of trimmers.) Using 200 mmf condenser in series with the generator, feed 1660 kc to antenna lead and adjust broadcast oscillator trimmer for top frequency. Set generator to 1400 kc. tune receiver and adjust the *two* antenna trimmers. Set generator to 600 kc. tune receiver to signal and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being set in order to secure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frequency. Set generator to 5000 kc. tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 15,750 kc—screw trimmer down tight, then unscrew to *second* peak. Set generator to 15,000 kc. tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**

MODELS 4400,4420
Chassis 7-J
Schematic,Socket
Trimmers,Alignment
Parts

SPIEGEL, INC.



FREQUENCY RANGE -
550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC

1937

PARTS

CONDENSERS

C1 - .1-200V.
C2 - .25-200 V.
C3 - 500MMF.
C4 - 350-600 MMF.
C5 - 800-1800 MMF.
C6 - 4000MMF.
C7 - 250 MMF.
C8 - .02-400 V.
C9 - .05-400 V.
C10 - .002-400 V.
C11 - .008-400 V.
C12 - .01 - 600 V.
C13 - .5 -10 V.
C14 - .05-200 V.
C15 - .01-1000 V.
C16 - 100 MMF.

RESISTORS

R1 - 50,000 Ω 1/2 W.
R2 - 250 Ω 1/2 W.
R3 - 15,000 Ω 1/2 W.
R4 - 1 Meg Ω 1/2 W.
R5 - 500,000 Ω VOLUME CONTROL
R6 - 250,000 Ω 1/2 W.
R7 - 100,000 Ω 1/2 W.
R8 - 14.3 Ω ± 5%
R9 - 8.1 Ω ± 5%
R10 - 100,000 Ω TONE CONTROL
R11 - 500,000 Ω 1/2 W.
R12 - 70,000 Ω 1/2 W.
R13 - 200,000 Ω 1/2 W.
R14 - 70 Ω ± 10%
R15 - 600,000 Ω 1/2 W.

IF ALIGNMENT - Wave change Sw. in BC position. Gang cond. set to minimum, test oscillator at 456 KC, to CG of 6D8G thru .05 MFD cond.,GND to set, Align IF.

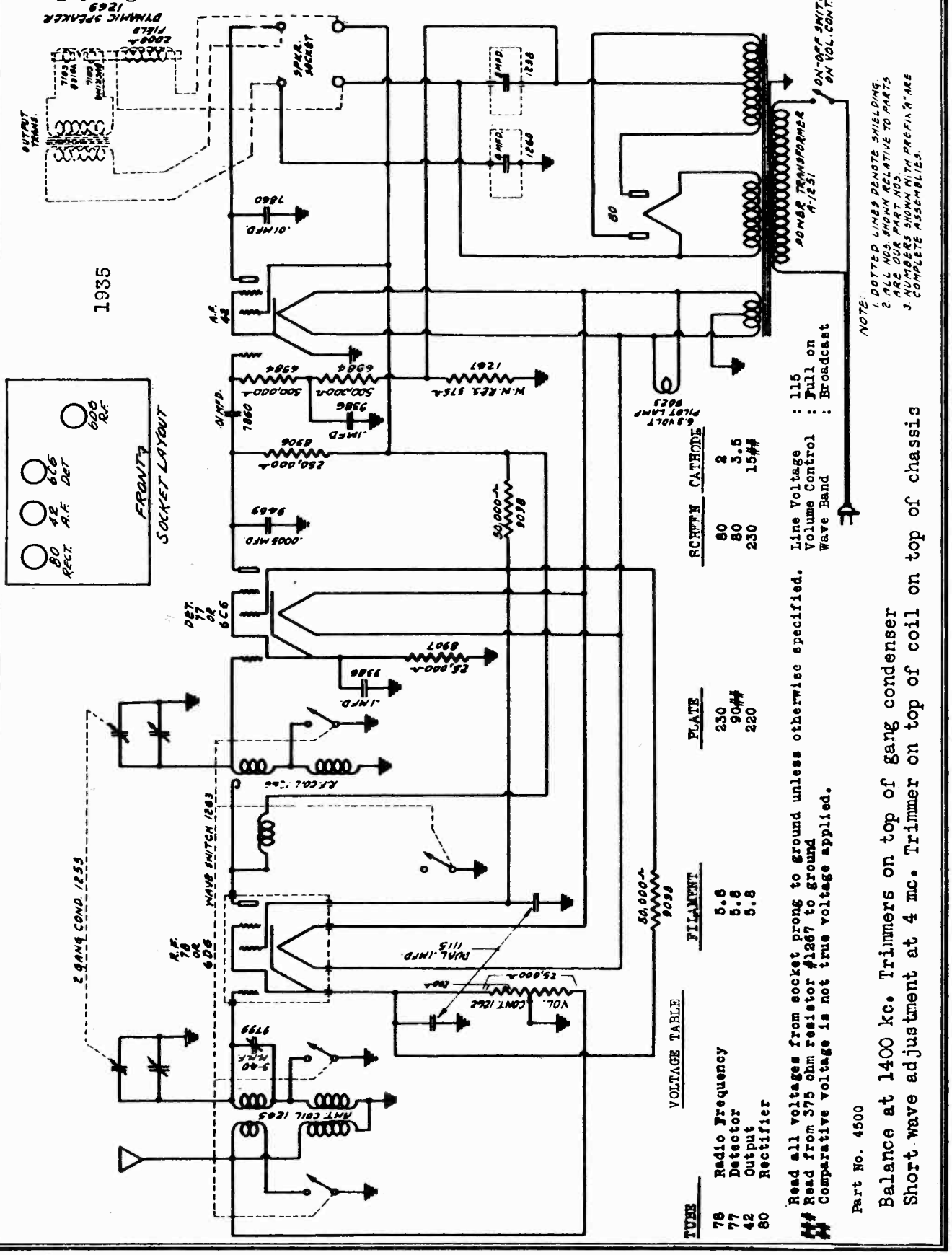
BROADCAST - Gen. connected to ANT lead thru 200 MMFD condenser, Gang at minimum. Osc. to 1730 KC, and adjust OSC. trimmer of set. Shift Gen. and dial to 1400 KC, and adjust ANT trimmer. Generator at 600 KC, pad oscillator to maximum peak.

POLICE - Replace 200 MMFD cond. with 400 ohm resistor, Generator at 5600 KC,Gang condenser at minimum, trim Osc. circuit, Gen. at 4000 KC, trim ANT trimmer. Gen. at 1800 KC and pad Police Oscillator circuit to maximum peak.

SHORT WAVE - Generator at 18100 KC, gang condenser at minimum, adjust oscillator trimmer to peak, Generator at 16000 KC adjust SW ANT trimmer to peak.
No padding required on this band but check 6000 KC for alignment & sensitivity.
For maximum performance, all above adjustments should be repeated. Rock Gang condenser for padding adjustments.

MODEL 4500
Chassis 4536
Schematic, Socket
Voltage, Alignment

SPIEGEL, INC.



	SCREEN	CATHODE
Line Voltage : 115	80	2
Volume Control : Full on	80	3.5
Wave Band : Broadcast	230	15##

VOLTAGE TABLE

TUBE		FILAMENT	PLATE
78	Radio Frequency	5.8	230
77	Detector	5.8	90##
42	Output	5.8	220
80	Rectifier		

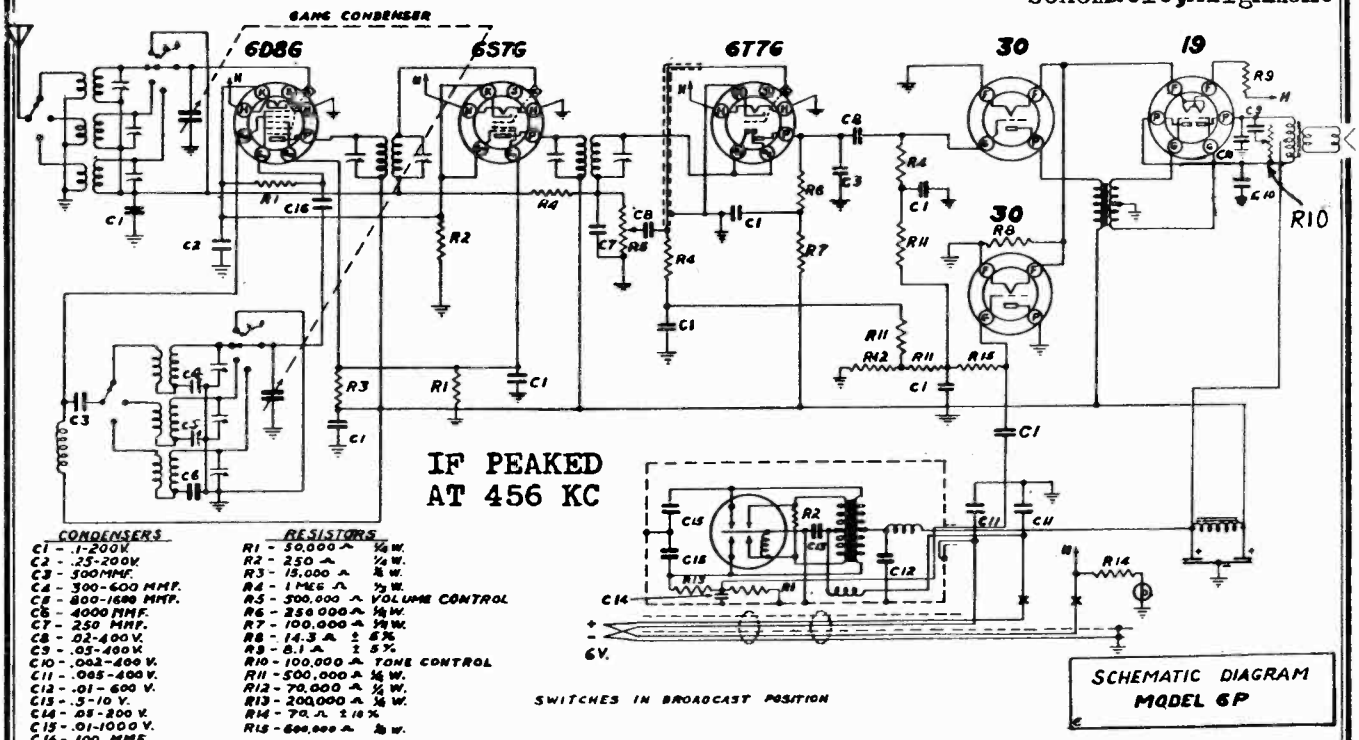
Read all voltages from socket prong to ground unless otherwise specified.
Read from 375 ohm resistor #1267 to ground
Comparative voltage is not true voltage applied.

Part No. 4500

Balance at 1400 kc. Trimmers on top of gang condenser
Short wave adjustment at 4 mc. Trimmer on top of coil on top of chassis

SPIEGEL, INC.

MODELS 4404, 4452
Chassis 6-P
Schematic, Alignment



CONDENSERS		RESISTORS	
C1	.1-200V.	R1	50,000 Ω ½ W.
C2	.25-200V.	R2	250 Ω ½ W.
C3	500MMF.	R3	15,000 Ω ½ W.
C4	300-600 MMF.	R4	1 MEG Ω ½ W.
C5	800-1680 MMF.	R5	500,000 Ω VOLUME CONTROL
C6	4000 MMF.	R6	250,000 Ω ½ W.
C7	250 MMF.	R7	100,000 Ω ½ W.
C8	.02-400V.	R8	14.3 Ω ± 5%
C9	.05-400V.	R9	8.1 Ω ± 5%
C10	.002-400 V.	R10	100,000 Ω TONE CONTROL
C11	.005-400 V.	R11	500,000 Ω ½ W.
C12	.01-600 V.	R12	70,000 Ω ½ W.
C13	.3-10 V.	R13	200,000 Ω ½ W.
C14	.05-200 V.	R14	70 Ω ± 10%
C15	.01-1000 V.	R15	600,000 Ω ½ W.
C16	100 MMF.		

FREQUENCY RANGE-
550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC

Six Tube 6 Volt Battery Superheterodyne
6P Chassis

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, and 18,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F. stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test ocillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT

The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit at this frequency as described in the instructions for padding the broadcast circuits.

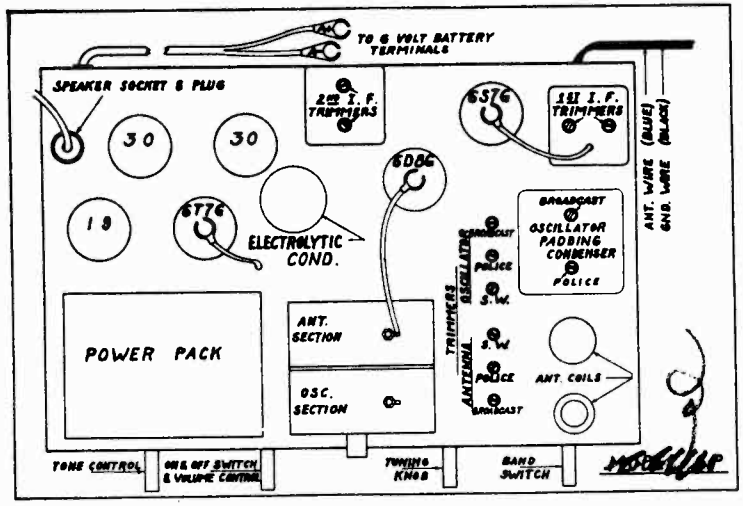
SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC and adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6D8G (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (176 to 545 meters), Police and Aviation Band which extends from 1700 to 5400 Kilocycles (KC) (56 to 176 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) 16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands —the 19, 25, 31 and 49 meter bands.



NOTICE — MICROPHONIC NOISE CORRECTION
If this radio instrument appears to be microphonic during operation, loosen the four (4) mounting screws that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the four (4) rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws.
"Should this radio set be moved any great distance, it is best to put the wooden strips back under the chassis and have the mounting screws securely tightened. If this is not done, damage may be done to the instrument, cabinet or tubes."

INSTALLATION

BATTERY CONNECTIONS At the rear of the receiver there will be found extending from the right end of the chassis, the battery connecting cable. Observation will show that 5 wires are brought out from the braided cable. The **red** and **red with black tracer wires** are joined together and should **both** be securely fastened to the positive (+) terminal of the 6 volt storage battery. The other 3 wires which are **brown, black with green tracer** and **Metallic shield lead** are also joined together and should be securely connected to the negative (—) post of the battery.

Note: It is extremely important that only the best possible means of obtaining a secure connection to the battery terminals be employed. If a battery with automobile terminal posts is used, the **large** post is the positive (+) post; the **smaller post** is the **negative** (—) terminal. It is suggested, when using a battery with auto type posts that large heavy lead covered battery clips be used in making connections. Make sure that **all wires** are firmly connected to clips (solder if possible). Also see that the jaw teeth of the clips are clean, and firmly bite into the post. It is very important that the battery posts and battery clip teeth be cleaned at frequent intervals to assure maintaining good connections. Corrosion may be readily removed by cleaning with a solution of 3 tablespoons of bicarbonate of soda (baking soda) and one cup of water. This solution neutralizes the acid coating that causes the corrosion and leaves a protective condition that retards further corrosion. It is important that this solution does not in any way enter the interior of the battery.

ANTENNA

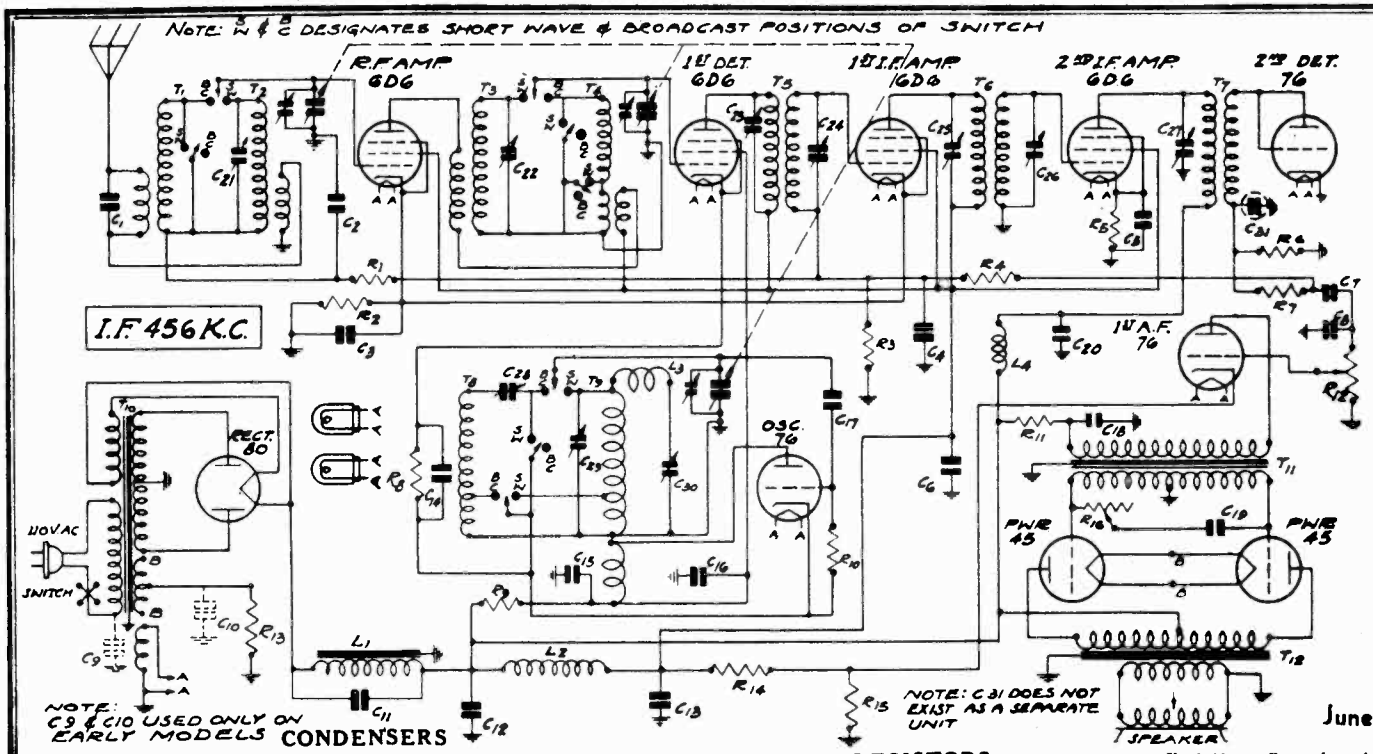
REGULAR ANTENNA Use a standard outside antenna of at least 50 feet including lead-in. Connect the antenna to the "Blue" lead.
In remote locations that are far away from powerful broadcasting stations, a longer antenna may be used for increased receiving range. Antennas as long as 150 to 200 feet may be employed in "dead spots." (Longer antennas increase sensitivity and decrease selectivity slightly.)

GROUND **This receiver requires a good ground.** Water pipes make a very desirable ground connection. Where the wire makes contact, the pipe must be clean and free of paint or corrosion. The ground wire should be connected to the "Black" lead.

Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent bed can be prepared by digging a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a desirable moist condition throughout the year.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharged from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

P1727	Antenna Coil
P392	Battery Cable
P402	Vibrator Unit
P406	Vibrator Socket
P411	Filter Choke
P551	Type 30 Socket
P687	Type 19 Socket
P1666	Type 6T7G7 Socket
P1667	Type 6D8G Socket
P1668	Type 6S7G Socket
P1388	Speaker Socket
P1735	1st I.F. Transformer
P954	Power Transformer
P958	Electrolytic Condenser
P1180	6 Gang Trimmer
P1455	Tube Shield
P1540	Escutcheon
P1605	Knob (Volume)
P1606	Knob (Selector
P1607	Knob (Band Switch)
P1608	Knob (Tone)
P1764	Tone Control
P1220	200,000 Ohm ¼ Watt 20% Resistor
P1500	200,000 Ohm 1/3 Watt 20% Resistor
P162B	1 Megohm 1/3 Watt Resistor
P1715	14.3 Ohm ½ Watt 5% Wire Wound Resistor
P1716	8.1 Ohm ½ Watt 5% Wire Wound Resistor
P141	.25 Mid. 200 Volt Condenser
P142	.1 Mid. 200 Volt Condenser
P143	.02 Mid. 400 Volt Condenser
P1653	Rubber Mounting Pads
P1678	Gang Condenser
P1677	Volume Control and Switch
P1682	Trimmer Condenser
P1683	Pointer
P1685	Band Switch
P1686	Pilot Light Socket
P1687	Pilot Light Bulb
P1688	Dial Scale
P1690	2nd I.F. Transformer
P719	Input Audio Transformer
P1696	6" P. M. Speaker
P1697	8" P. M. Speaker for Console
P875	20,000 ¼ Watt 20% Resistor
P139	250 Ohm ¼ Watt 20% Resistor
P1732	70 Ohm ½ Watt 10% Wire Wound Resistor
P136	250 Ohm ¼ Watt 20% Resistor
P137	500 Ohm ¼ Watt 20% Resistor
P258	15,000 Ohm ¼ Watt 20% Resistor
P280	100,000 Ohm ¼ Watt 20% Resistor
P417	50,000 Ohm ¼ Watt 20% Resistor
P148	.05 Mid. 200 Volt Condenser
P334	.05 Mid. 400 Volt Condenser
P335	.01 Mid. 600 Volt Condenser
P395	.5 Mid. 10 Volt Condenser
P1079	.01 Mid. 1000 Volt Condenser
P1193	.002 Mid. 400 Volt Condenser
P1194	.005 Mid. 400 Volt Condenser
P336	.0005 Mid. Mica Condenser
P480	.0001 Mid. Mica Condenser
P1683	.004 Mid. Mica Condenser
P147	.00025 Mid. Mica Condenser



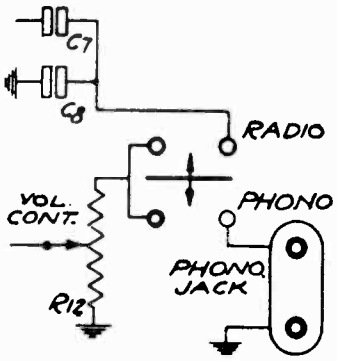


Fig. 5—Phonograph Connections

June, 1934

Fig. 1—Schematic Circuit Diagram

CONDENSERS

Part No.	Code	Capacity	Volts	Type
P-80919	C1	250 mmfd.		Moulded
P-80862	C2	.05 mfd.	200V.	Tubular
P-80888	C3	.25 mfd.	200V.	Tubular
P-80862	C4	.05 mfd.	200V.	Tubular
P-80862	C5	.05 mfd.	200V.	Tubular
P-80888	C6	.25 mfd.	200V.	Tubular
P-80862	C7	.05 mfd.	200V.	Tubular
P-81005	C8	35 mmfd.	600V.	Moulded
*P-80997	C9	.01 mfd.	600V.	Condenser in metal can
*P-80888	C10	.25 mfd.	200V.	Tubular
P-80985	C11	.15 mfd.	200V.	Tubular
P-81039	C12	16.0 mfd.	400V.	Wet Electrolytic
P-81018	C13	6.0 mfd.	150V.	Dry Electrolytic
	C16	2.0 mfd.	300V.	
	C18	2.0 mfd.	300V.	
P-80862	C14	.05 mfd.	200V.	Tubular
P-80864	C15	.10 mfd.	200V.	Tubular
P-81005	C17	35 mmfd.	600V.	Moulded
P-80863	C19	.004 mfd.	600V.	Tubular
P-81041	C20	.10 mfd.	400V.	Tubular
P-2102	C21	3-40 mmfd.		Ant. S.W. Trimmer
P-2102	C22	3-40 mmfd.		1st Det. S.W. Trimmer
P-2103	C23	200+ 50 mmfd.		Dual Trimmer
	C24	200+ 50 mmfd.		Part of I.F. Assem.
P-2103	C25	200+ 50 mmfd.		Dual Trimmer
	C26	200+ 50 mmfd.		Part of I.F. Assem.
P-1685	C27	70+ 30 mmfd.		3rd I.F. Coil Trimmer
P-2112	C28	300-500 mmfd.		600 K.C. Trimmer
P-2102	C29	3-40 mmfd.		Osc. S.W. Trimmer
P-1685	C30	70+ 30 mmfd.		6000 K.C. Trimmer
P-81027		Three Gang Condenser		

RESISTORS

Part No.	Code	Resistance	Watts	Type
P-A95204	R1	200,000 ohm	.2	Carbon
P-98023	R2	150 ohm	.5	Flex. Wire Wound
P-A95105	R3	1 megohm	.2	Carbon
P-A95205	R4	2 megohm	.2	Carbon
P-98024	R5	400 ohm	.5	Flex. Wire Wound
P-A94504	R6	300,000 ohm	.2	Carbon
P-A95104	R7	100,000 ohm	.2	Carbon
P-A94252	R8	2,500 ohm	.2	Carbon
P-98022	R9	30,000 ohm	2.0	Carbon
P-A95104	R10	100,000 ohm	.2	Carbon
P-C94303	R11	30,000 ohm	1.0	Carbon
P-96005	R12	2 megohm		Volume Control and Switch
P-98006	R13	780 ohm	3.0	Armored Wire Wound
	R14	6000 ohm	1.4	
	R15	460 ohm	.2	
P-97003	R16	3 megohm		Tone Control

*Used in Early Models only.

Part No.	Item
P-50638	Power Transformer 115V. 60 cycles T 10
P-50639	Power Transformer 115V. 25 cycles T 10
P-50640	Power Transformer 115-230V. 40-60 cycles T 10
P-50641	Power Choke L 1
P-50642	Audio Output Transformer T 12
P-50643	Audio Input Transformer T 11
P-5176	Antenna R.F. Trans. T 1 and T 2 less can
P-5177	Interstage R.F. Trans. T3 and T4 less can
P-5178	Oscillator Coil Assembly T8 and T9 less can
P-5186	3rd I. F. Coil T7 less can
P-40433	Cans for the above coils
P-5184	1st I.F. Coil & Can Assembly T5
P-5185	2nd I.F. Coil & Can Assembly T6
P-5190	H. F. Oscillator Tracking Coil L3
P-5151	I.F. Plate Isolating Reactor L4
P-70702	A.C. Cord & Plug
P-1421	Single Insulated Terminal Strip
P-1441	Double Insulated Terminal Strip
P-2060	Small Knob
P-2062	Large Knob
P-30342A	Grid Cap only
P-30456	Small Pointer
P-20912	Large Double End Pointer
P-2012	Pilot Light Bulb
P-10272	Rubber Mounting Feet
P-10320	Glass Crystal
P-20875	Crystal Retaining Ring
P-2152	8" Dynamic Speaker Mantel L2
P-1968	10" Dynamic Speaker Console L2
P-2101	Three Position Band Change Switch
P-20905	Condenser Shield
	8" Black Drive Cord (V.C. or T.C. Ind.)
	29" Black Drive Cord (Cond. Drive)
P-2126	Pilot Lamp Socket & Clip Assembly
P-20911	Bottom Shield
P-1011A	Phono-Radio Switch
P-1193	Phono Jack
P-2025	No. 80 Socket
P-1643	No. 45 Socket
P-2022	No. 76 Socket
P-1885	No. 6D6 Socket
P-1637	Speaker Socket
P-40434	Tube Shield—Aluminum (for earlier models)
P-40424	Tube Shield Base—Aluminum (for earlier models)

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth

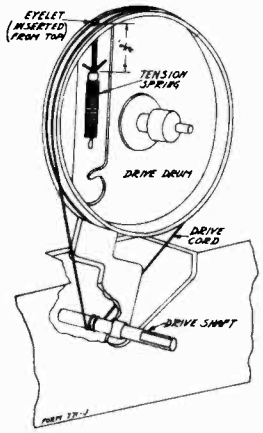


Fig. 4—Drive Cord Replacement

turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

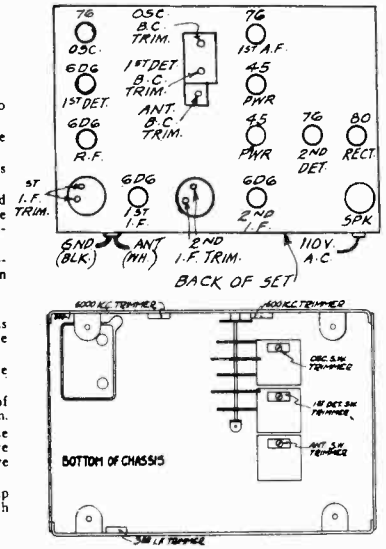


Fig. 2—Tube Arrangement & Location of Trimmers

Voltages at Sockets

LINE VOLTAGE — 115

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate

Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

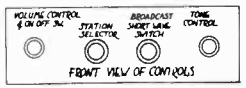


Fig. 3—Arrangement of Controls

D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code		D.C. Resistance in Ohms
P-5176	S.W. and B.C. Antenna R.F. Transformer Primaries (in series)	T1	T2	27.9
	B.C. Antenna R.F. Transformer Secondary	T1		5.0
	S.W. Antenna R.F. Transformer Secondary	T2		Small
P-5177	S.W. and B.C. Interstage R.F. Transformer Primaries (in series)	T3	T4	2.7
	B.C. Interstage R.F. Transformer Secondary	T4		4.4
	S.W. Interstage R.F. Transformer Secondary	T3		Small
P-5178	S.W. Oscillator Grid Coil	T9		Small
	S.W. Oscillator Plate Coil	T9		.25
	B.C. Oscillator Grid Coil	T8		3.5
P-5190	S.W. Oscillator Tracking Coil	L3		1.27
P-5184	1st I.F. Coil Primary	T5		5.0
	1st I.F. Coil Secondary	T5		5.0
P-5185	2nd I.F. Coil Primary	T6		5.0
	2nd I.F. Coil Secondary	T6		5.0
P-5186	3rd I.F. Coil Primary	T7		9.3
	3rd I.F. Coil Secondary	T7		36.3
P-50643	Audio Input Transformer Primary	T11		2300.
	Audio Input Transformer Secondary Center Tap to Outside	T11		2600.
	Audio Input Transformer Secondary Center Tap to Inside	T11		2000.
P-50642	Audio Output Transformer Primary Center Tap to Outside	T12		360.
	Audio Output Transformer Primary Center Tap to Inside	T12		320.
	Audio Output Transformer Secondary	T12		.44
P-1968	Speaker Voice Coil			3.0
	Speaker Field Coil	L2		5000.
P-50641	Filter Choke	L1		150.
P-50638	Power Transformer 115V. 60 Cycles Pri.	T10		5.3
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Outside	T10		120.
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Inside	T10		110.
	Power Transformer 115V. 60 Cycles Sec. (80 Fil.)	T10		Small
	Power Transformer 115V. 60 Cycles Sec. (AA Fil.)	T10		Small
	Power Transformer 115V. 60 Cycles Sec. (BB Fil.)	T10		Small

MODELS 4509, 9912
Chassis 22B7
Schematic, Socket
Trimmers, Parts

SPIEGEL, INC.

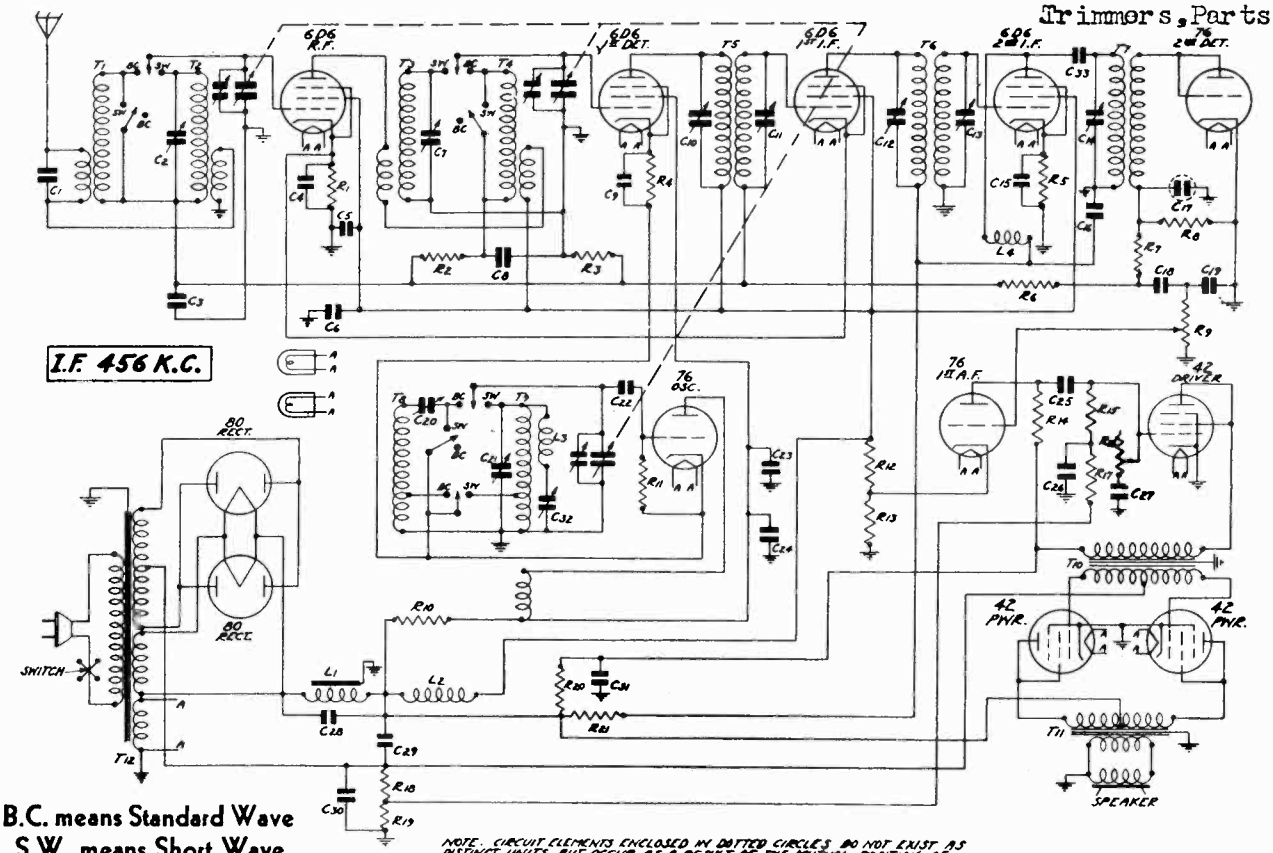


Fig. 1—Schematic Circuit Diagram

Aug., 1934

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A93141ww	R1	140 Ohm		Wire Wound
P-A95204	R2	200,000 Ohm	0.2	Carbon
P-A95105	R3	1.0 Megohm	0.2	Carbon
P-A94252	R4	2,500 Ohm	0.2	Carbon
P-A93401ww	R5	400 Ohm	0.2	Wire Wound
P-A95205	R6	2.0 Megohm	0.2	Carbon
P-A95104	R7	100,000 Ohm	0.2	Carbon
P-A94304	R8	300,000 Ohm	0.2	Carbon
P- 96005	R9	2.0 Megohm		Volume Control and Switch
P-E94403	R10	40,000 Ohm	3.0	Carbon
P-A95104	R11	100,000 Ohm	0.2	Carbon
P- 98038	R12	4,000 Ohm	2.5	Armored Wire Wound
	R13	390 Ohm	0.5	
	R18	128 Ohm	2.5	
	R19	145 Ohm	3.0	
P-B95603	R14	60,000 Ohm	0.5	Carbon
P-A95603	R15	60,000 Ohm	0.2	Carbon
P- 97011	R16	150,000 Ohm		Tone Control
P-A95203	R17	20,000 Ohm	0.2	Carbon
P- 98037	R20	4,000 Ohm	4.0	Armored Wire Wound
	R21	6,000 Ohm	2.0	

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80919	C1	250 mmf	600V	Moulded
P-2102	C2	3—40 mmf		Short Wave Ant. Trimmer
P-81076	C3	0.05 mf	200V	Tubular
P-81111	C4	0.25 mf	200V	Tubular
P-81117	C5	0.25 mf	200V	Tubular
P-81056	C6	6.0 mf	150V	Dry Electrolytic
	C24	2.0 mf	350V	
P-2102	C7	3—40 mmf		Short Wave Inter. Trimmer
P-81076	C8	0.05 mf	200V	Tubular
P-81076	C9	0.05 mf	200V	Tubular
P-2103	C10	150—250 mmf		Double (Part of 1st I. F. Trans. Trimmer)
	C11	150—250 mmf		
P-2103	C12	150—250 mmf		Double (Part of 2nd I. F. Trans. Trimmer)
	C13	150—250 mmf		
P-1685	C14	40—100 mmf		3rd I. F. Trans. Pri. Trimmer
P-81076	C15	0.05 mf	200V	Tubular
P-81097	C16	0.10 mf	500V	Tubular
	C17			Integral Part of 3rd I. F. Assem.
P-81076	C18	0.05 mf	200V	Tubular
P-81081	C19	35 mmf		Wire Capacitor
P-2112	C20	300—500 mmf		Osc. Std. W. Padding Cond.
P-2102	C21	3—40 mmf		Osc. Sho. W. Trimmer
P-81081	C22	35 mmf		Wire Capacitor
P-81118	C23	0.10 mf	400V	Tubular
P-81096	C25	0.25 mf	400V	Tubular
P-81117	C26	25 mf	200V	Tubular
P-81076	C27	0.05 mf	200V	Tubular
P-81099	C28	0.15 mf	220V	AC Tubular
P-81058	C29	16 mf	450V	Wet Electrolytic
P-82000	C30	30 mf	50V	Dry Electrolytic
P-81039A	C31	16 mf	400V	Wet Electrolytic
P-1685	C32	40—100 mmf		Osc. Sho. W. Padding Cond.
P-80919	C33	250 mmf	600V	Moulded

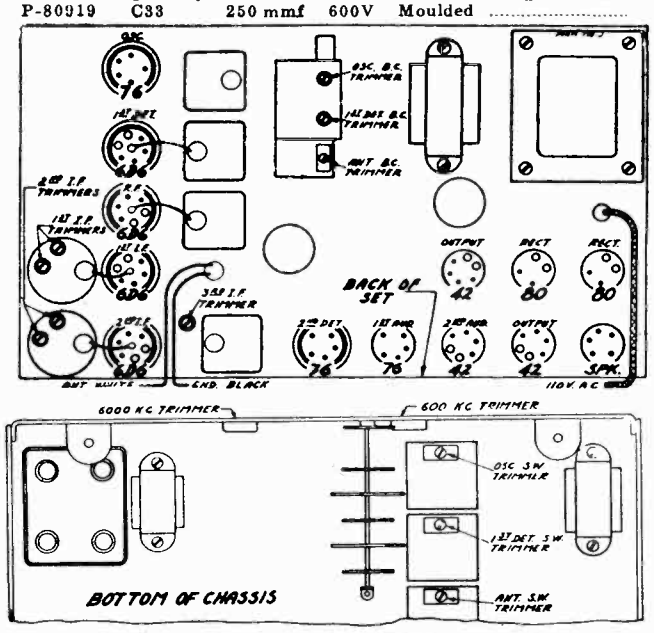


Fig. 2—Location of Tubes, Trimmers and Controls

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjust ng trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the top panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the top panel.

Standard Wave Band Adjustment

The standard-short wave switch should be in the standard wave position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator standard wave trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the standard wave band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector standard wave trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the standard wave band alignment as described above has been made, do not change the adjustment of any of the standard wave band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the standard-short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cathode	Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	105	105	2.8	8.8
6D6	1st Detector	6.3	95	105	10.0	3.3
76	Oscillator	6.3	115		0.0	5.8(1) 7.7(2)
6D6	1st I. F.	6.3	260	105	2.8	8.8
6D6	2nd I. F.	6.3	260	105	3.2	7.2
76	2nd Detector	6.3				
76	1st Audio	6.3	170		11.0	1.2
42	Driver Stage	6.3	235	235	18 (3)	26.5
42	Output	6.3	350	350	38.0	21.0
80	Rectifier	4.6	435			35.5 per plate

(1) Switch in Standard Wave position.
(2) Switch in Short Wave position (No Signal).
(3) Measured across resistor R19.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

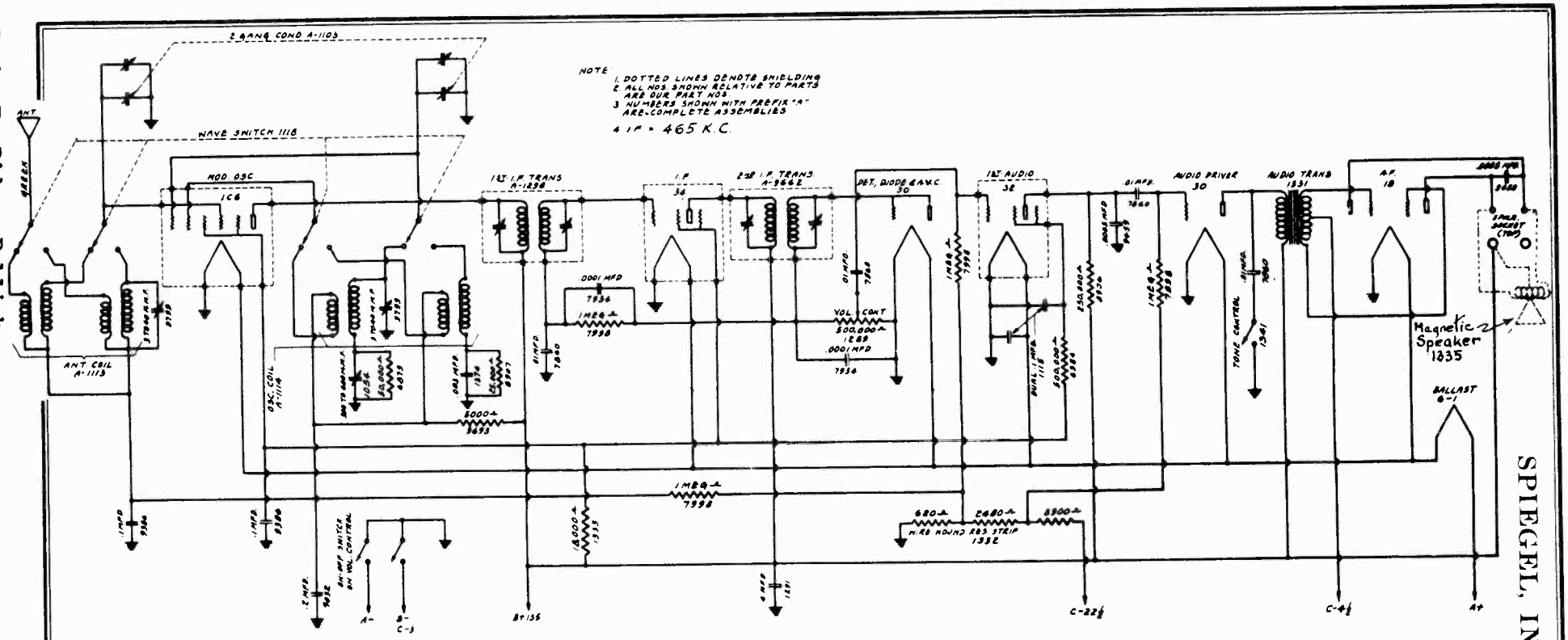
Part No.	Item	Code	D. C. Resistance in Ohms
P-5176	B. C. Antenna Transformer Primary	T1	28.
	B. C. Antenna Transformer Secondary	T1	4.9
	S. W. Antenna Transformer Primary	T2	.3
	S. W. Antenna Transformer Secondary	T2	Small
P-5241	B. C. & S. W. Interstage R. F. Transformer Primaries in series	T4	2.9
	B. C. Interstage R. F. Trans. Sec.	T4	7.8
	S. W. Interstage R. F. Trans. Sec.	T3	Small
P-5243	1st I. F. Transformer Primary	T5	4.8
	1st I. F. Transformer Secondary	T5	4.8
P-5244	2nd I. F. Transformer Primary	T6	5.
	2nd I. F. Transformer Secondary	T6	5.
P-5245	3rd I. F. Transformer Primary	T7	12.0
	3rd I. F. Transformer Secondary	T7	30.0
P-5183	B. C. Oscillator Grid Coil	T8	3.3
	S. W. Oscillator Grid Coil	T9	Small
	S. W. Oscillator Plate Coil	T9	0.25
P-50653-2B	Audio Input Transformer Primary	T10	400.
	Audio Input Transformer Secondary (Center Top to Inside)	T10	200.
	Audio Input Transformer Secondary (Center Tap to Outside)	T10	289.
P-50642A-2B	Audio Output Transformer primary (Center Tap to Inside)	T11	300.
	Audio Output Transformer Primary (Center Tap to Outside)	T11	340.
	Audio Output Transformer Secondary	T11	.4
P-50620-2B	Power Trans. (115V 60 Cycles) prim.	T12	2.5
	Power Transformer (115V 60 Cycles) H. T. Sec. (Center Tap to Inside)	T12	150.
	H. T. Sec. (Center Tap to Outside)	T12	165.
	Power Transformer (115V 60 Cycles) Secondary (80 Filament)	T12	Small
	Power Transformer (115V 60 Cycles) Secondary A-A (Filament)	T12	Small
P-50650-2B	Power Choke	L1	140.
P-5190	H. F. Oscillator Tracking Coil	L3	1.2
P-5246	2nd I. F. Plate Reactor	L4	57.
P-1925	Speaker Voice Coil		1.6
	Speaker Field Coil	L2	5300.

Power Output

The maximum undistorted power output is 15 watts, measured with a 7000 ohm load resistor connected between the plates of the type 42 PWR tubes. The speaker voice coil must be disconnected for this measurement.

Sensitivity

Standard Wave Band
Over entire band—2 microvolts absolute
Short Wave Band
6.0 MC—5 microvolts absolute
15.0 MC—2 microvolts absolute



WIRING DIAGRAM

SPIEGEL, INC.

MODELS 4512, 9914, 9915
9932, 9933
Chassis 7700
Schematic, Parts
Voltage

1935

VOLTAGE TABLE
"A" Battery - 3 Volt Dry Cell
"B" Battery - 3 45 Volt "B" Batteries
"C" Battery - 1 22½ Volt Battery

TUBE		FIL.	PLATE	SCREEN	GRID NO.2	GRID NO 3 & 5
1C6	Oscillator & 1st Detector	2.1	135		115	67½
30	Second Detector	2.1				
34	I. F.	2.1	135	67½		
32	1st Audio	2.1	37.5##	20##		
30	Driver	2.1	135			
19	Output	2.1	135 each plate			

Comparative voltage only
Read all voltages from socket to chassis

Total "B" Drain - .023 Amperes
Total "A" Drain - .620 Amperes

When making tube voltage checks use batteries that deliver full voltage with the receiver turned on.

MODELS 4512,9914,9915
9932,9933

SPIEGEL, INC.

Alignment, Parts

Chassis 7700

PART NUMBER		LIST PRICE
1113	ANTENNA COIL	$1.63
1114	OSCILLATOR COIL	1.63
1298	1ST I. F. TRANSFORMER	2.05
9662	2ND I. F. TRANSFORMER	2.05
1331	AUDIO TRANSFORMER	1.40
1291	4 MFD. WET ELECTROLYTIC CONDENSER	.85
1115	DUAL .1 MFD. 200 VOLT CONDENSER	.35
7860	.01 MFD. 400 VOLT CONDENSER	.17
9032	.2 MFD. 200 VOLT CONDENSER	.23
9459	.0005 MFD. MICA MOULD CONDENSER	.21
7934	.0001 MFD. MICA MOULD CONDENSER	.21
1374	.003 MFD. MICA MOULD CONDENSER	.21
1332	WIRE WOUND RESISTOR STRIP	.35
7998	1 MEG OHM 1/3 WATT RESISTOR	.19
6984	500,000 OHM 1/3 WATT RESISTOR	.19
8906	250,000 Ohm 1/3 WATT RESISTOR	.19
6879	50,000 OHM 1/3 WATT RESISTOR	.19
1335	SPEAKER	6.25
1118	WAVE SWITCH	.75
1333	18,000 OHM 1/2 WATT RESISTOR	.19
9693	5,000 OHM 1/3 WATT RESISTOR	.19
8907	25,000 OHM 1/3 WATT RESISTOR	.19
1292	6 CONDUCTOR BATTERY CABLE	.68
1289	VOLUME CONTROL WITH D. P. S. T. SWITCH	1.24
1341	TONE CONTROL SWITCH	.40

PART NUMBER		LIST PRICE
1103	TWO GANG CONDENSER USED WITH EARLY TYPE DIAL	$3.93
1657	TWO GANG CONDENSER USED WITH AEROPLANE TYPE DIAL	4.00
1106	DRIVE DISC WITH METAL HUB	.32
1641	CALIBRATED DIAL (CALIBRATION #1371) WITH FRAME AND GASKET	.50
1641	CALIBRATED DIAL (CALIBRATION #1653) WITH FRAME AND GASKET	.50
1744	CALIBRATED DIAL (CALIBRATION #1405) WITH FRAME AND GASKET	.50
1744	CALIBRATED DIAL (CALIBRATION #1745) WITH FRAME AND GASKET	.50
	GLASS FOR ABOVE DIALS	.35
1206	ESCUTCHEON PLATE MARKED FOREIGN AND BROADCAST	.13
1207	ESCUTCHEON PLATE MARKED ON AND OFF	.13
1361	TUBE SHIELD	.15
9988	TUBE SHIELD	.11
1053	PADDING CONDENSER	.50
1054	PADDING CONDENSER	.55
9799	TRIMMER CONDENSER	.15
6-1	VOLTAGE REGULATOR TUBE	3.00
1179	KNOB, LARGE	.15
1180	KNOB, SMALL WITH DOT	.17
9758	KNOB, SMALL	.14
1370	TUNING DIAL EARLY TYPE	.30

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SERVICE NOTES
for the
BATTERY OPERATED
SEVEN TUBE SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE: For properly aligning either the intermediate transformer or the gang condenser it is necessary that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 106 tube leaving the grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate transformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two type intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

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 short wave band, tune the receiver to exactly 15 megacycles on the dial and set the test oscillator frequency to exactly 15 megacycles. THEN TUNE IN THE 15 MEGACYCLE SIGNAL BY ADJUSTING THE TRIMMER MOUNTED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER TO MAXIMUM OUTPUT.

Looking at the front of the receiver the oscillator section is the rear section of the gang condenser.

3. Set the band selector switch for operation on the broadcast band, adjust the test oscillator frequency to 1400 kilocycles and set the receiver dial to exactly 1400 kilocycles. NEXT, BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER LOCATED UNDERNEATH AND NEAR THE CENTER FRONT OF THE CHASSIS.

4. After making this adjustment tune the dial to 1720 kilocycles and set theoscillator frequency to 1720 kilocycles. If the 1720 kilocycle signal cannot be received reduce the 1400 kilocycle trimmer capacity until the 1720 kilocycle signal is brought in.

5. Next, set the receiver dial and test oscillator to exactly 1400 kilocycles, and adjust the trimmer located on the front section of the gang condenser for maximum sensitivity.

6. Leave the band selector switch for operation on the broadcast band, tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser, which is located on and accessible through the small hole in the front of the chassis, for maximum sensitivity. As this adjustment is quite critical it is necessary to rock the condenser slightly to the right and left to find the point of greatest sensitivity.

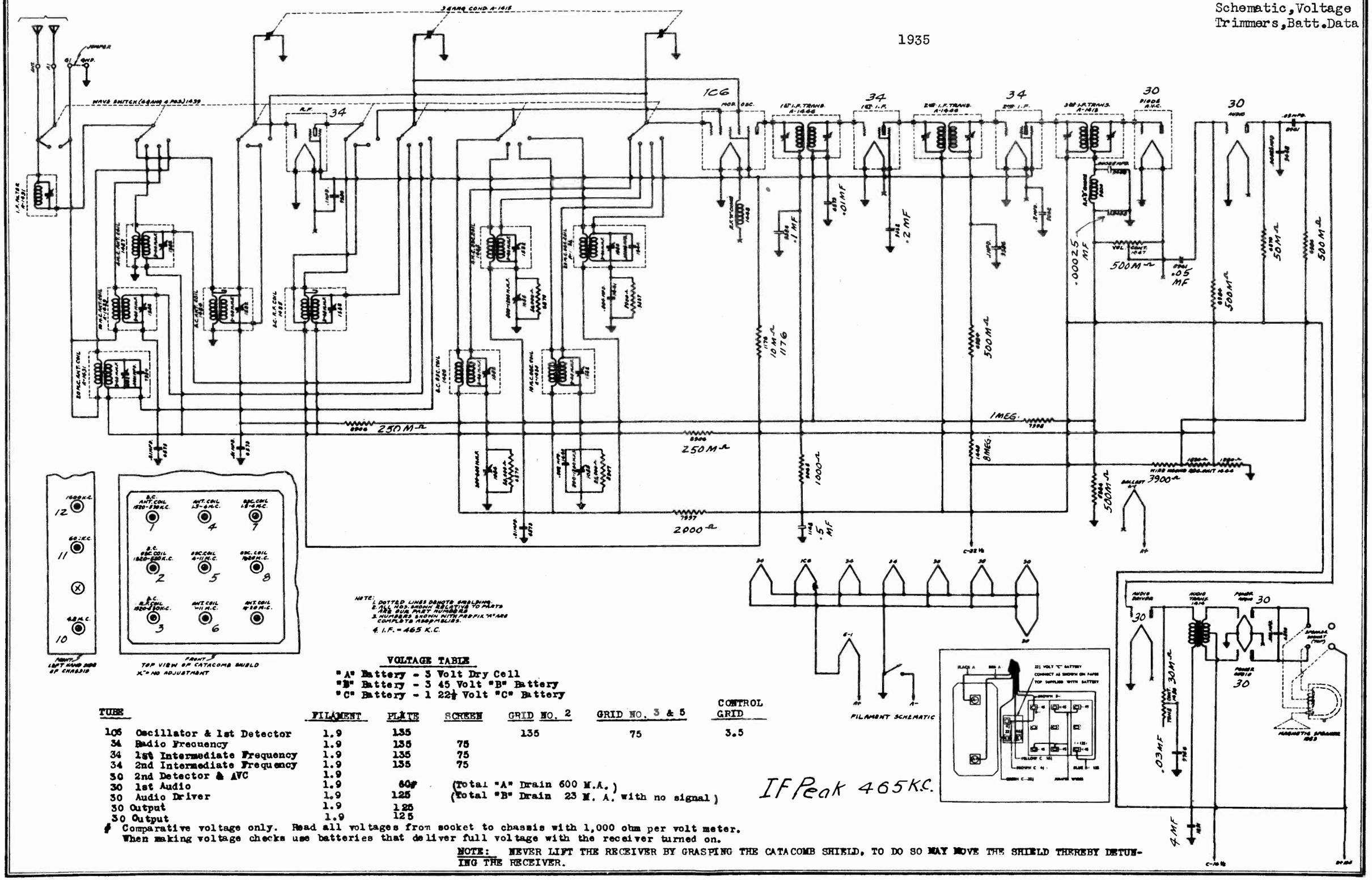
7. Place the band selector switch for operation on the short wave band, adjust the test oscillator frequency to exactly 15 megacycles and set the receiver dial to 15 megacycles. Turn the receiver on its back with the dial up and adjust the trimmer, which is mounted on the top of the coil underneath and near the right hand side of the chassis, for maximum output. Be sure to rock the condenser slightly to the right and left when making this adjustment.

This completes the alignment procedure. It is recommended that all of the adjustments be gone over again generally it will be found that improved results can be obtained if this is done.

MODEL 4514
Chassis 9148
Schematic, Voltage
Trimmers, Batt. Data

SPIEGEL, INC.

1935



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

VOLTAGE TABLE

"A" Battery - 3 Volt Dry Cell
"B" Battery - 3 45 Volt "B" Battery
"C" Battery - 1 22½ Volt "C" Battery

TUBE		FILAMENT	PLATE	SCREEN	GRID NO. 2	GRID NO. 3 & 5	CONTROL GRID
1C6	Oscillator & 1st Detector	1.9	135		135	75	3.5
34	Radio Frequency	1.9	135	75			
34	1st Intermediate Frequency	1.9	135	75			
34	2nd Intermediate Frequency	1.9	135	75			
30	2nd Detector & AVC	1.9					
30	1st Audio	1.9	60#	(Total "A" Drain 600 M.A.)			
30	Audio Driver	1.9	125	(Total "B" Drain 23 M. A. with no signal)			
30	Output	1.9	125				
30	Output	1.9	125				

Comparative voltage only. Read all voltages from socket to chassis with 1,000 ohm per volt meter. When making voltage checks use batteries that deliver full voltage with the receiver turned on.

IF Peak 465 K.C.

NOTE: NEVER LIFT THE RECEIVER BY GRASPING THE CATACOMB SHIELD, TO DO SO MAY MOVE THE SHIELD THEREBY DETUNING THE RECEIVER.

SPIEGEL, INC.

MODEL 4514
Chassis 9148
Alignment

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 1C6 tube, leaving the grid cap disconnected. Connect the ground side of the oscillator to the receiver ground post.

2. Set the test oscillator frequency to 465 kilocycles. (This must be accurate).

3. Align the first intermediate transformer by turning one of the trimmer screws up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the other intermediate transformers in the same manner.

TO ALIGN THE VARIABLE CONDENSER:

Adjustment of the trimmer condensers, located inside of and accessible through the holes found in the top of the catacomb (mounted on top and in the left hand front corner of the receiver) will be referred to by numbers as indicated on the circuit diagram showing the relative location of these trimmers.

1. Connect the high output side of the oscillator through a 250 mmfd. (.00025 Mfd.) to the receiver antenna post and the ground to the ground post.

2. Place the band selector switch for operation on the 1520 to 535 kilocycle band (broadcast), tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to exactly 1400 kilocycles. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER MARKED No. 2 ON CATACOMB DIAGRAM, after which adjust No. 1 and No. 3 trimmers in the order named for maximum sensitivity.

3. Leave the band selector switch for operation on the broadcast band (1520-535 kilocycles) and tune the receiver and set the test oscillator to approximately 600 kilocycles. Then while rocking the condenser slightly to the right and left adjust the 600 kilocycle padding condenser No. 11, which is located on and accessible through the hole provided on the left hand side of the chassis, for maximum sensitivity.

4. Recheck the alignment at 1400 kilocycles as the 600 kilocycle adjustment may have changed the alignment at 1400 kilocycles.

5. Place the band selector switch for operation on the 1.5 to 4.2 megacycle band and set the test oscillator frequency and tune the receiver dial to EXACTLY 3.8 MEGACYCLES. THEN TUNE IN THIS 3.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING CATACOMB TRIMMER NO. 7. Next adjust catacomb trimmer No. 4 for maximum sensitivity.

6. With the band selector switch in the same position (1.5-4.2 megacycle band) tune the receiver dial and set the oscillator frequency to approximately 1600 kilocycles, and then while rocking the variable condenser slightly to the right and left adjust the 1600 kilocycle trimmer No. 12 located on the left hand side of the chassis for maximum sensitivity.

7. Recheck 3.8 megacycle adjustments.

8. Adjust the band selector switch for operation on the 4 to 11 megacycle band and tune the receiver dial and set the oscillator frequency to exactly 10.5 megacycles. When adjusting catacomb trimmer No. 5 two peaks (the fundamental and the image peak) will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 10.5 MEGACYCLES. First back off catacomb trimmer No. 5 to minimum capacity, next screw down the trimmer (add capacity) until the first peak which is the fundamental and the one you are to use is tuned in. If the trimmer is screwed down beyond the point where this first peak is received the incorrect image peak will be tuned in. When the first peak has been located adjust catacomb trimmer No. 5 to BRING IN THE 10.5 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. After completing this adjustment always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 10.5 megacycles, increase its output, and tune the receiver dial to approximately 9.5 megacycles. Vary the receiver dial slightly to the right and left of 9.5 megacycles and if the fundamental peak was used in aligning at 10.5 megacycles the test oscillator signal will be heard at approximately 9.5 megacycles on set dial. If it is not possible to receive the signal then the fundamental peak was not used and the 10.5 megacycle adjustment of trimmer No. 5 must be gone over and properly adjusted. After correctly completing catacomb trimmer No. 5 adjustment adjust catacomb trimmer No. 6 for maximum sensitivity. Should two peaks be noticed with this trimmer always adjust trimmer No. 6 to the one that requires the most capacity.

9. With the band selector switch adjusted for operation on the same band (4-11 megacycles) set the test oscillator frequency and tune the receiver dial to approximately 4.8 megacycles. Then while rocking the variable condenser slightly to the right and left adjust the 4.8 megacycle trimmer No. 10, located on the left hand side of the chassis for maximum sensitivity.

10. Recheck the 10.5 megacycle adjustment.

11. Adjust the band selector switch for operation on the 10 to 20 megacycle band, tune the receiver dial and set the oscillator frequency to exactly 19 megacycles. When adjusting catacomb trimmer No. 8 two peaks (the fundamental and the image peak) will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 19 MEGACYCLES. First back off catacomb trimmer No. 8 to minimum capacity, next screw down the trimmer (add capacity) until the first peak which is the fundamental and the one you are to use is tuned in. If the trimmer is screwed down beyond the point where this first peak is received the incorrect image peak will be tuned in. When the first peak has been located adjust catacomb trimmer No. 8 to BRING IN THE 19 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. After completing this adjustment always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 19 megacycles, increase its output, and tune the receiver dial to approximately 18 megacycles. Vary the receiver dial slightly to the right and left of 18 megacycles and if the fundamental peak was used in aligning at 19 megacycles the test oscillator signal will be heard at approximately 18 megacycles on set dial. If it is not possible to receive the signal then the fundamental peak was used and the 19 megacycle adjustment of trimmer No. 8 must be gone over and properly adjusted. After correctly completing catacomb trimmer No. 8 adjustment adjust catacomb trimmer No. 9 for maximum sensitivity. Should two peaks be noticed with this trimmer always adjust trimmer No. 9 to the one that requires the most capacity.

12. Some code and aircraft signals are broadcast on a frequency exactly the same or near the IF frequency of the receiver. To eliminate interference from these signals a 465 kilocycle filter (mounted in the coil shield located underneath and towards the front of the chassis) is incorporated in the set. To adjust, set the oscillator frequency (with oscillator output connected to set antenna and ground) TO EXACTLY 465 KILOCYCLES, turn the receiver on end and adjust the trimmer located on and accessible through the top of the filter shield for MINIMUM 465 KILOCYCLE SIGNAL.

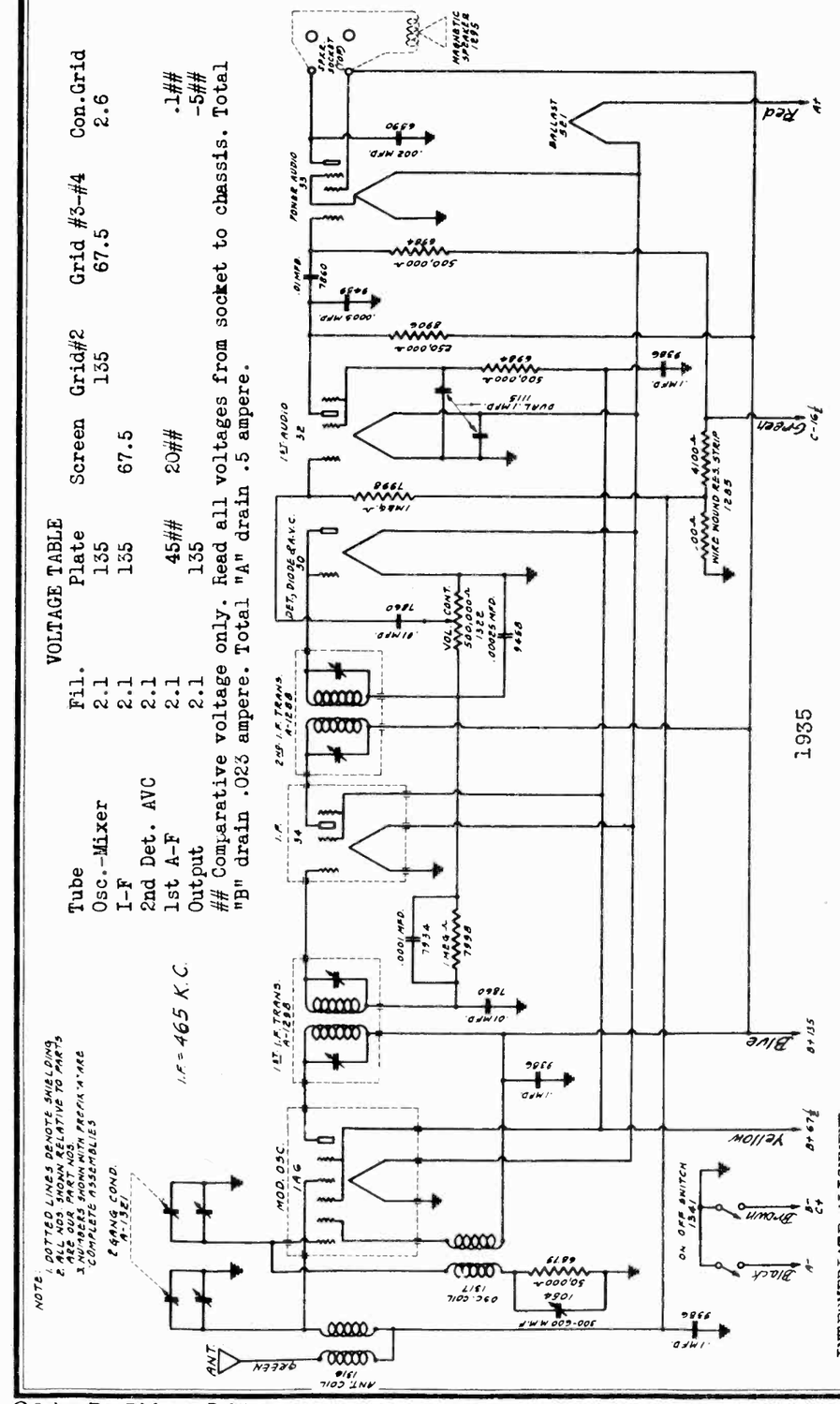
MODELS 4510,4516,4533,9923
Chassis 6246
Schematic,Voltage,Alignment

SPIEGEL, INC.

VOLTAGE TABLE

Tube	Fil.	Plate	Screen	Grid#2	Grid #3-#4	Con.Grid
Osc.-Mixer	2.1	135	67.5	135	67.5	2.6
I-F	2.1	135	67.5			
2nd Det. AVC	2.1	45##	20##			-1##
1st A-F	2.1	135				-5##
Output	2.1					

Comparative voltage only. Read all voltages from socket to chassis. Total "B" drain .023 ampere. Total "A" drain .5 ampere.



dial to 1720 kc. Then adjust trimmer condenser located on top of the oscillator (front section) unit of the gang condenser.

Then tune the receiver to 600 kc. and reset the test oscillator to this frequency. Then rock the tuning condenser slightly to the right and left, while adjusting the 600 kc. oscillator padding condenser, which is accessible through the hole provided on the front of the chassis. Repeat all the adjustments for maximum output.

INTERMEDIATE ALIGNMENT

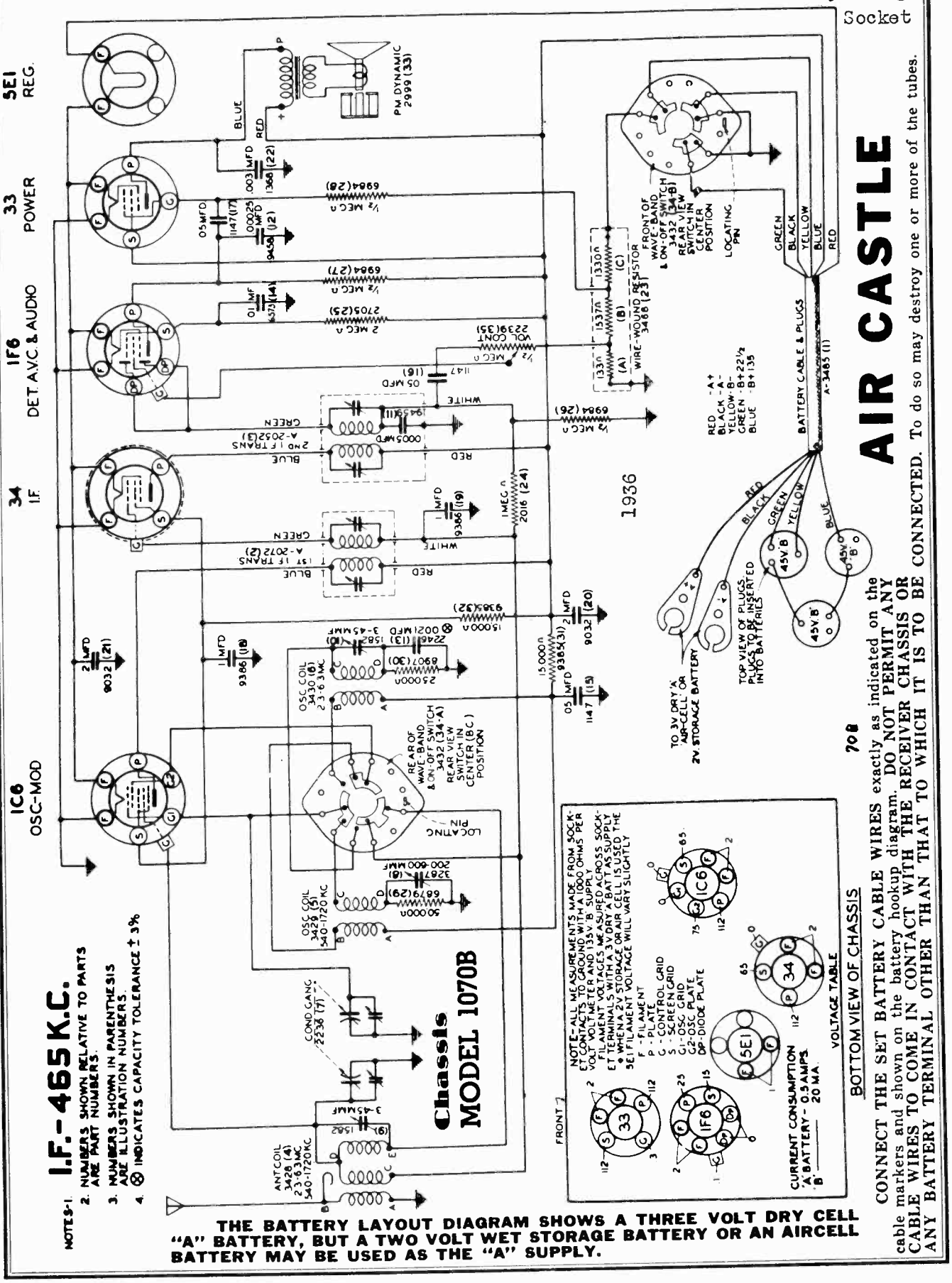
Align at 465 kc. Two types of i-f trimmers are used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for one trimmer, the other intermediate trimmer being adjusted by means of the trimmer screw located within the brass hex nut.

MIXER-OSCILLATOR ALIGNMENT

Connect test oscillator to antenna post and ground or chassis. Set test oscillator and receiver

SPIEGEL, INC.

MODEL 5102
Chassis 1070B
Schematic, Voltage
Socket



Alignment of this receiver should never be necessary unless one of the coils has been replaced.

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, improperly connected or low batteries, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMER AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I. F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 1C6 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Remove test oscillator lead from grid of the 1C6 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser.
Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. condenser in series with test oscillator lead with a 400 ohm resistor.
(b) Place band selector switch for operation on 2.3-6.3 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 6.3 MEGACYCLES.
(c) BRING IN 6.3 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 6.3 megacycle oscillator trimmer, which is mounted on top of coil located underneath chassis.
(d) Tune receiver dial and set test oscillator frequency to EXACTLY 6 MEGACYCLES.
(e) Adjust 6 megacycle antenna trimmer which is mounted on coil located on top of chassis for maximum 6 megacycle signal sensitivity.

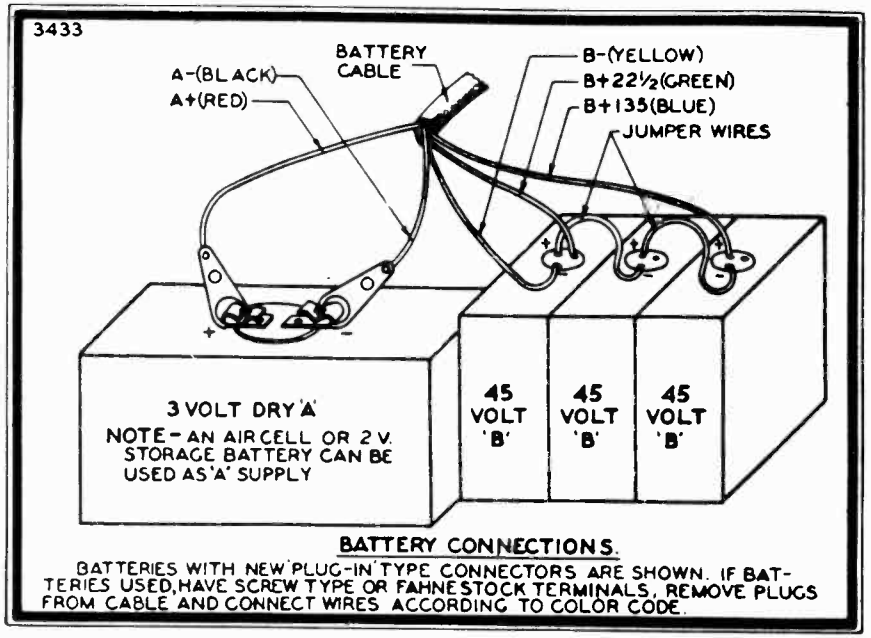
Illus. No.	Part No.	Part Name	Description
1	3485	Cable	5 Conductor Battery With Plugs
2	2072	Coil	1st I.F. Transformer
3	2052	Coil	2nd I.F. Transformer
*4	3428	Coil	Antenna, 1720-540 K.C. 2.3-6.3 M.C. Band
5	3429	Coil	Oscillator, 1720-540 K.C. Band
6	3430	Coil	Oscillator, 2.3-6.3 M.C. Band
7	2236	Condenser	2 Gang Tuning
8	3287	Condenser	Padding (340-460 M.M.F.)
9	1582	Condenser	Trimmer (3-45 M.M.F.)
10	1582	Condenser	Trimmer (3-45 M.M.F.)
11	9459	Condenser	Mica .0005 Mfd.
12	9458	Condenser	Mica .00025 Mfd.
**13	2246	Condenser	Mica .0021 Mfd. (Yellow Dot)
14	6573	Condenser	Tubular .01 Mfd. 200 Volt
15	1147	Condenser	Tubular .05 Mfd. 200 Volt
16	1147	Condenser	Tubular .05 Mfd. 200 Volt
17	1147	Condenser	Tubular .05 Mfd. 200 Volt
18	9386	Condenser	Tubular .1 Mfd. 200 Volt
19	9386	Condenser	Tubular .1 Mfd. 200 Volt
20	9032	Condenser	Tubular .2 Mfd. 200 Volt
21	9032	Condenser	Tubular .2 Mfd. 200 Volt
22	1368	Condenser	Tubular .003 Mfd. 400 Volt
23	3468	Resistor	Wire Wound
24	2016	Resistor	Carbon 1 Meg Ohm 1/3 Watt Ins.
25	2705	Resistor	Carbon 2 Meg Ohm 1/3 Watt
26	6984	Resistor	Carbon ½ Meg Ohm 1/3 Watt
27	6984	Resistor	Carbon ½ Meg Ohm 1/3 Watt
28	6984	Resistor	Carbon ½ Meg Ohm 1/3 Watt
29	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt
30	8907	Resistor	Carbon 25,000 Ohm 1/3 Watt
31	9385	Resistor	Carbon 15,000 Ohm 1/3 Watt
32	9385	Resistor	Carbon 15,000 Ohm 1/3 Watt
33	2999	Speaker	P.M. Dynamic (6")
34	3432	Switch	"On-Off" and Band Selector
35	2239	Volume Control	
36	3647	Condenser	Mica .0019
37		Coil	Antenna 1720-540 & 2.3-6.3 M. C. Band

*Replaced by No. 36
**Replaced by No. 37

MISCELLANEOUS

9987	Base	Tube Shield
3507	Dial Assem.	Complete Tuning
3325	Dial Scale	Calibrated Scale
2795	Dial Indicator	"On-Off" Scale
2796	Esc. with Glass	For Dial
3031	Knob	Small
3032	Knob	Large
3043	Pointer	For Tuning Dial
3488	Shield	Tube

PART No. 3565—70B



BATTERY CONNECTIONS.

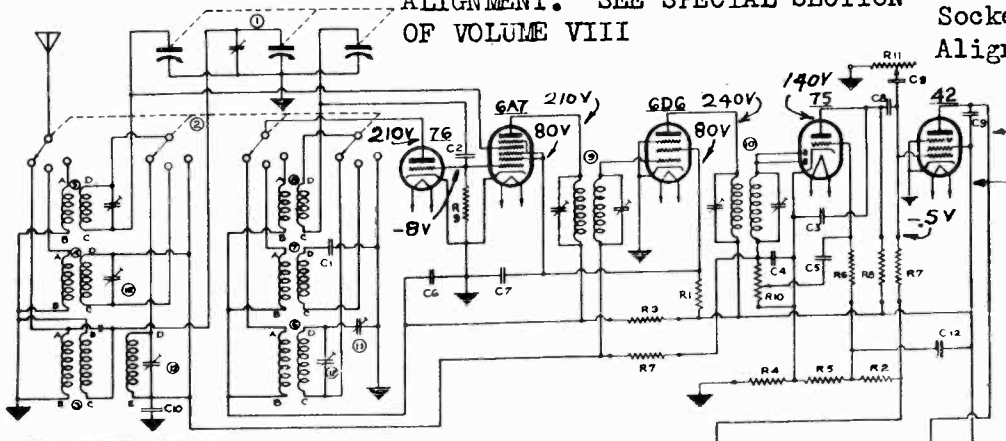
BATTERIES WITH NEW PLUG-IN TYPE CONNECTORS ARE SHOWN. IF BATTERIES USED, HAVE SCREW TYPE OR FAHNESTOCK TERMINALS, REMOVE PLUGS FROM CABLE AND CONNECT WIRES ACCORDING TO COLOR CODE.

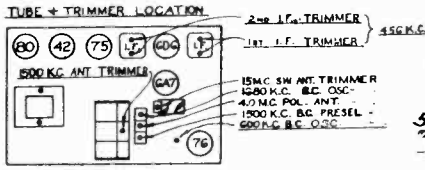
SPIEGEL, INC.

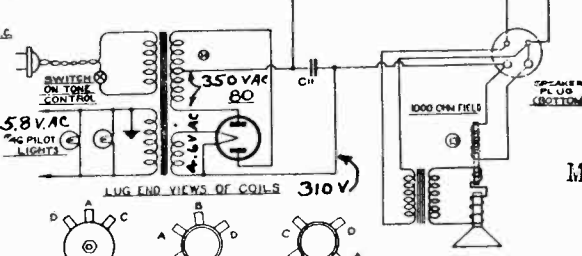
1937

MODELS 5058,5060
Chassis 613
MODEL 6504
Chassis 601
Schematics, Voltage
Socket, Trimmers
Alignment, Parts

BOTH CHASSIS HAVE CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION OF VOLUME VIII

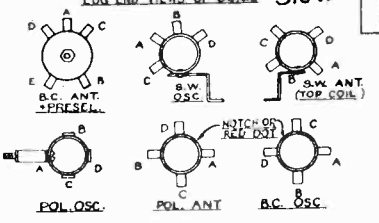


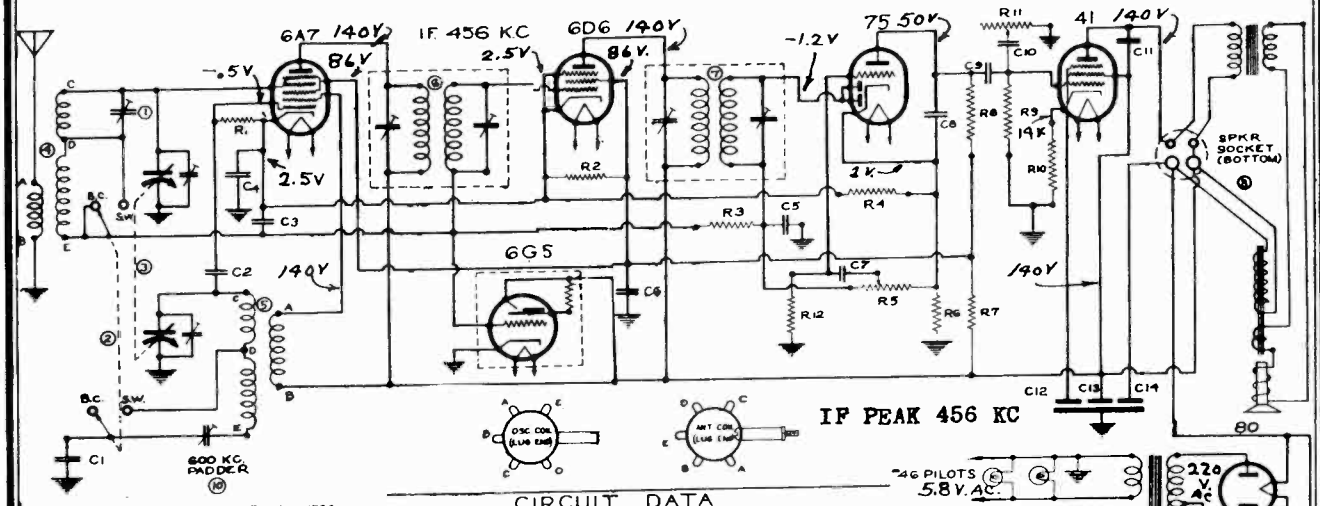


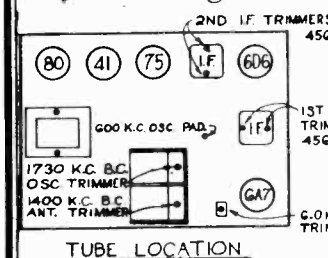


Model 6504

CIRCUIT DATA							
PART No.	DESCRIPTION			PART No.	DESCRIPTION		
C1	18000	.0009	MFD. MICA	R7	6018	500,000	OHMS 1/3 W
C2	1503	.00005	"	R8	6024	250 000	"
C3	1502	.00005	"	R9	6025	50000	"
C4	1504	.00025	"	R10	24-101	500000	VOL. CONTR.
C5	1505	.02	" 400 V	R11	24-101	500 000	TONE CONTR
C6	1602	.1	" 200 V	1	19-106	GANG	
C7	1601	.1	" 400 V	2	69-103	SWITCH	
C8	1648	.03	" 400 V	3	10-137	B.C. ANT.+PRESELECTOR	
C9	1651	.004	" "	4	10-135	POL. COIL	
C10	1622	.05	" 200 V	5	10-132	S.W. "	
C11	18-208	6.0	ELECTROLYTIC	6	10-134	B.C. OSC. "	
C12	18-201	12.0	"	7	10-136	POL. "	
				8	10-133	S.W. "	
R1	6811	15000	OHMS 1W.	9	1123	1ST I.F.	
R2	80-100	2.00	" 1W. 5%	10	1124	2 ND I.F.	
R3	6115	1000	" 1/2 W.	11	20-100	B.C. OSC. PADDER	
R4	80-103	30	" 5%	12	20-101	TRIMMER GANG	
R5	80-104	20	" "	13		SPEAKER	
R6	6020	2.0 MEG.	" 1/3 W	14	80-105	POWER TRANSF.	

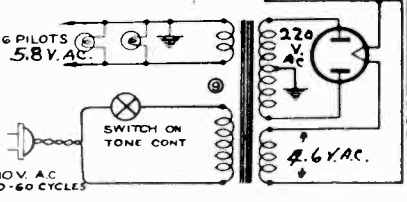






TUBE LOCATION

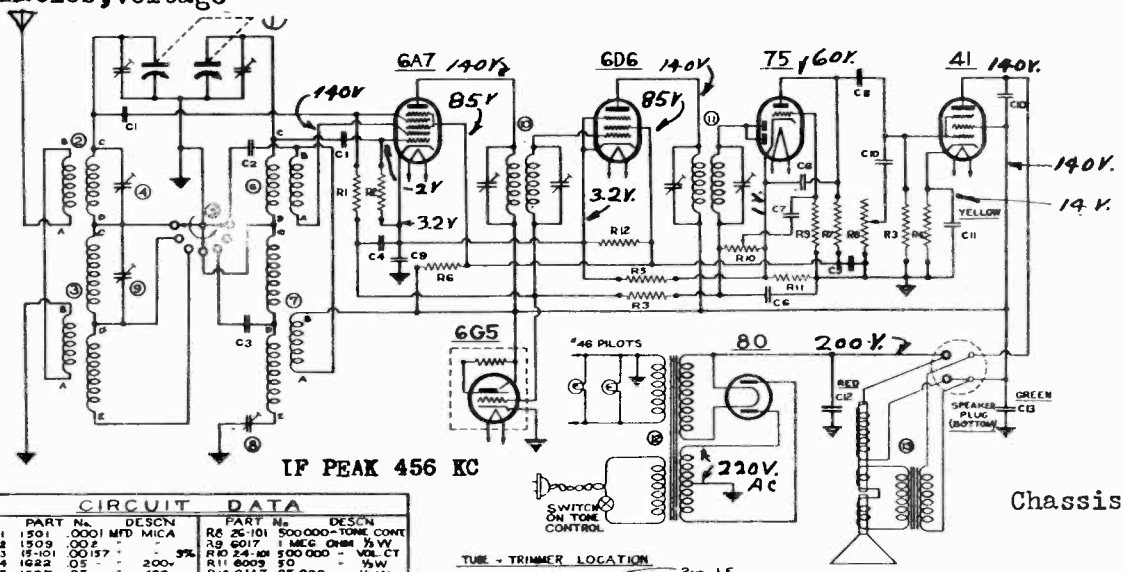
CIRCUIT DATA							
PART No.		DESCRIPTION		PART No.		DESCRIPTION	
C1	15-100	.00157	MFD	R1	6028	40,000	OHMS 1/3 W
C2	1501	.0001	"	R2	6117	25,000	" 1/2 W
C3	1822	.05	" 200v.	R3	6018	500,000	" 1/3 W
C4	1614	.25	" "	R4	6011	100	" "
C5	1504	.00025	"	R5	24-101	500,000	" VOL. CONT
C6	1607	.05	" 400v.	R6	6009	50	" 1/3 W
C7	1603	.01	"	R7	6105	10,000	" 1/2 W
C8	1504	.00025	"	R8	6056	200,000	" 1/3 W
C9	1603	.01	"	R9	6018	500,000	" "
C10	1651	.004	" 600v.	R10	6052	800	" "
C11	1651	.004	" 600v.	R11	24-101	500,000	" TONE CONT
C12	18-102	4 MFD 25v. YELLOW		R12	6017	1.0 MEG.	"
C13		4 " 250v. GREEN		5	10-147	OSC. COIL	
C14		8 " 250v. RED		6	1183	1ST I.F.	
1	2054	S.W. ANT TRIMMER		7	1124	2ND I.F.	
2	6922	WAVE BAND SW.		8	79-204	6 INCH SPEAKER	
3	19-107	GANG COND.		9	80-104	POWER TRANSFORMER	
4	10-125	ANT COIL		10	20-100	PADDER	
				9	79-206	8 INCH SPEAKER	



Models 5058,5060

MODELS 5200,5210,5214,5216
Chassis 651
MODEL 6590
Chassis 633
Schematics, Voltage

SPIEGEL, INC.



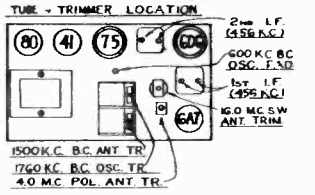
Chassis 633

CIRCUIT DATA

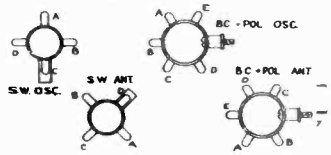
	PART No.	DESCN
C1	1501	.0001 MFD MICA
C2	1509	.002 " "
C3	15-101	.00157 " " 3%
C4	1682	.05 " 200v
C5	1607	.03 " 400v
C6	1504	.00025 " MICA
C7	1603	.01 " 400v
C8	1603	.01 " 400v
C9	1614	.25 " 200v
C10	1651	.004 " 400v
C11		.4 MFD -25v ELECTC
C12	18-102	.8 " 50v "
C13		.4 " 250v "
R1	G020	2 MEG. OHM 1/3 W
R2	G028	40,000 " "
R3	G018	500,000 " "
R4	6052	800 " "
R5	G011	100 " "
R6	G105	10,000 " 1/2 W
R7	G056	200,000 " 1/3 W

	PART No.	DESCN
R8	26-101	500,000 " TONE CONT
R9	G017	1 MEG. OHM 1/3 W
R10	24-101	500,000 " VOL. CT
R11	6009	50 " 1/3 W
R12	G117	25,000 " 1/2 W
1	19-107	GANG COND.
2	10-128	S.W. ANT COIL
3	10-129	POL + BC ANT "
4	2052	SW ANT TRIMMER
5	69-102	WAVE SWITCH
6	10-127	SW OSC COIL
7	10-128	POL + BC OSC COIL
8	20-100	600 KC BC OSC PAD
9	2054	POL ANT TRIMMER
10	1123	1st I.F.
11	1124	2nd I.F.
12	80-104	POWER TRANSFMR
13		SPEAKER

TUBE + TRIMMER LOCATION

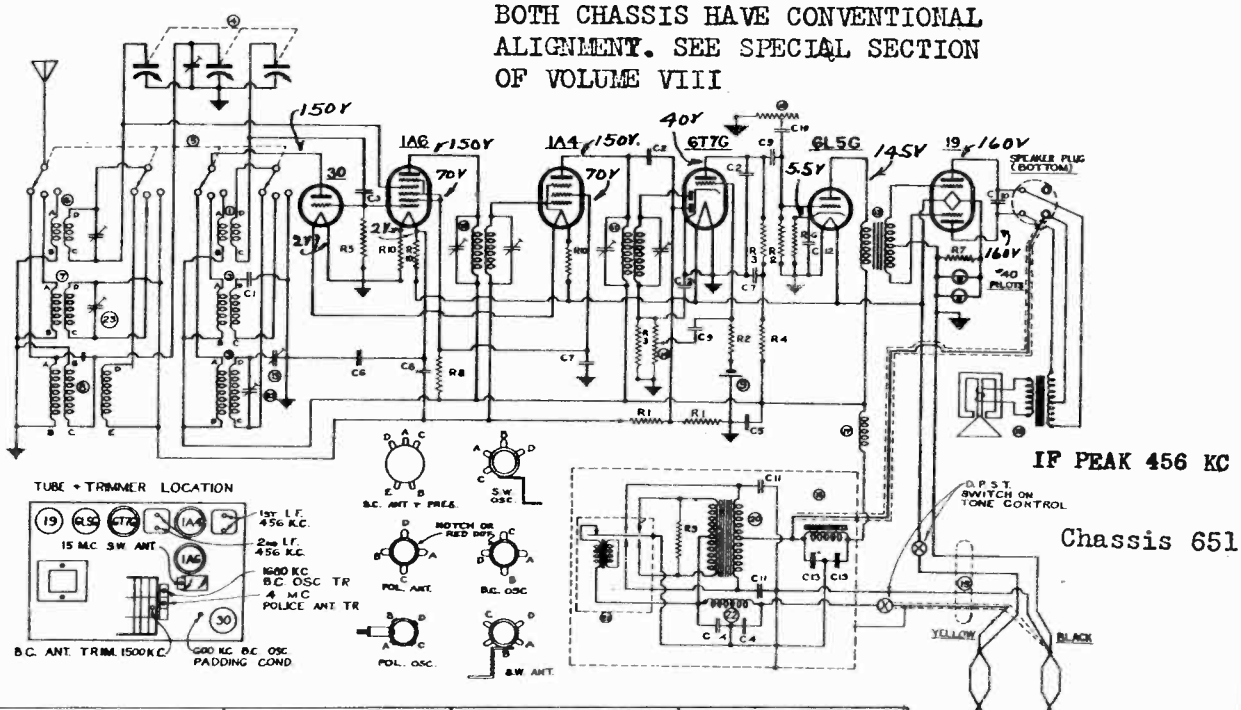


LUG END VIEW OF COILS



1937

BOTH CHASSIS HAVE CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION OF VOLUME VIII



Chassis 651

PART NO.	DESCRIPTION
C1	1500C .001 MFD MICA 5%
C2	1504 .00025 " "
C3	1510 .000025 " "
C4	1552 .5 " 1500v
C5	1618 .25 " 400v
C6	1614 .25 " 200v
C7	1601 .1 " 400v
C8	1600 .1 " 200v
C9	1603 .01 " 400v
C10	1811 .006 " 600v
C11	1804 .01 " 600v
C12	16-100 10 M.F.D. 25V. ELECTROLYTIC
C13	1845 8 " 150V "

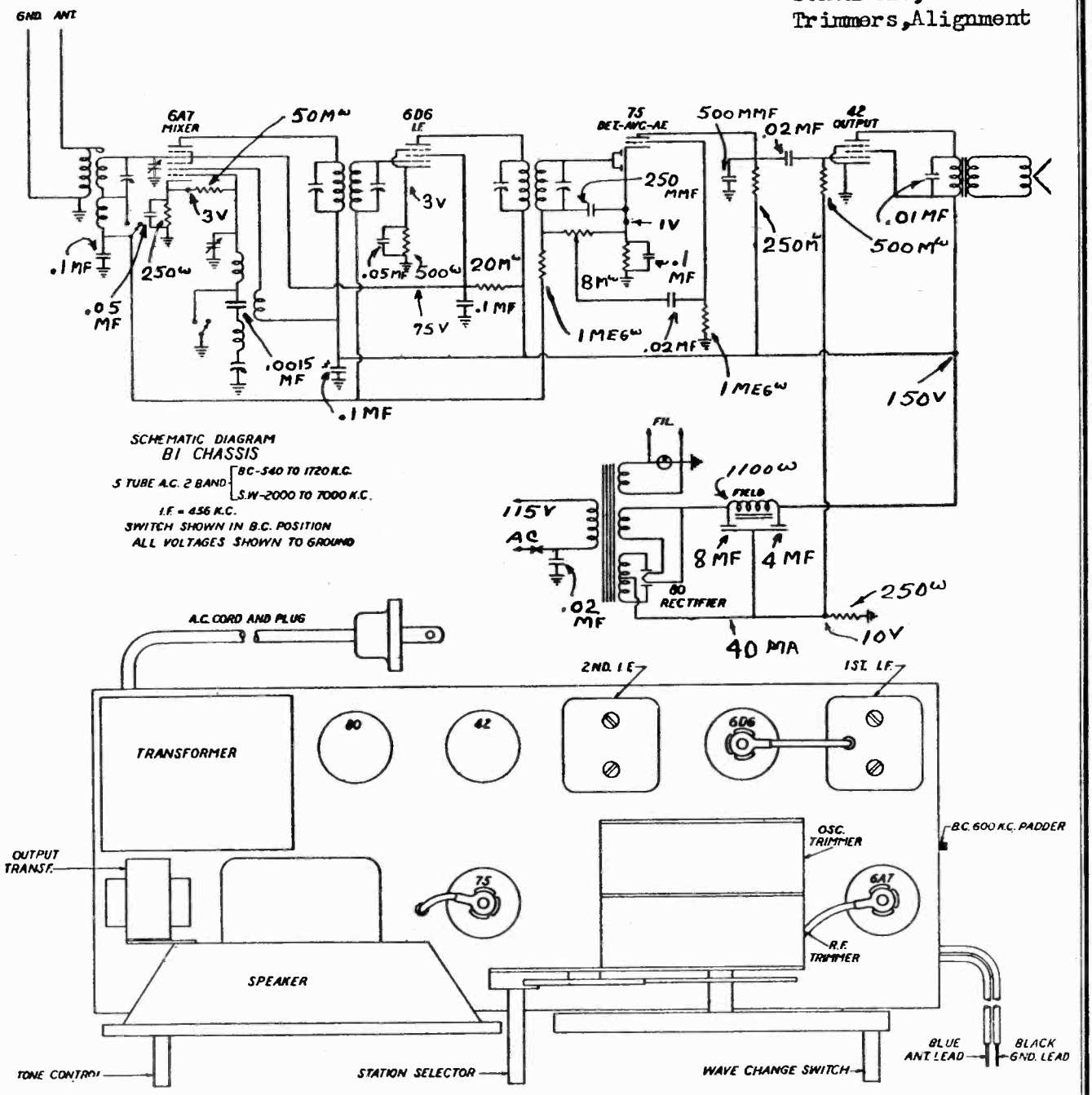
PART NO.	DESCRIPTION
R1	6017 1 MEG OHM 1/3 W.
R2	6018 .5 " " "
R3	6054 25 " " "
R4	6058 100,000 " "
R5	6025 50,000 " "
R6	6008 1500 " "
R7	6007 200 " "
R8	6117 25,000 " 1/2 W.
R9	6101 100 " "
R10	80-106 35 1/3 " " WIRE WOUND

PART NO.	DESCRIPTION
1	10-139 S.W. OSC. COIL
2	10-138 POLICE OSC. COIL
3	10-134 B.C. OSC. COIL
4	19-106 GANG CONDENSER
5	69-103 WAVE SWITCH
6	10-132 S.W. ANT. COIL
7	10-136 POLICE ANT. COIL
8	10-137 B.C. ANT. & PRESEL. C'L
9	4500 STAR CELL
10	1133 1ST I.F. TRANSFORMER
11	1134 2ND I.F. TRANSFORMER
12	26-101 TONE CONTROL
13	1880 PUSH-PULL AUDIO TRANS.

PART NO.	DESCRIPTION
14	24-101 VOLUME CONTROL
15	20-100 B.C. OSC. PADDER
16	SPEAKER
17	8308 R.F. "B" CHOKE
18	3307 FILTER
19	23-103 BATTERY CABLE
20	8041 POWER TRANSFORMER
21	3407 VIBRATOR
22	3313 R.F. "A" CHOKE
23	20-102 TRIMMER STRIP

SPIEGEL, INC.

MODELS 6510,6514,6520
Chassis B 1
Schematic,Socket
Trimmers,Alignment



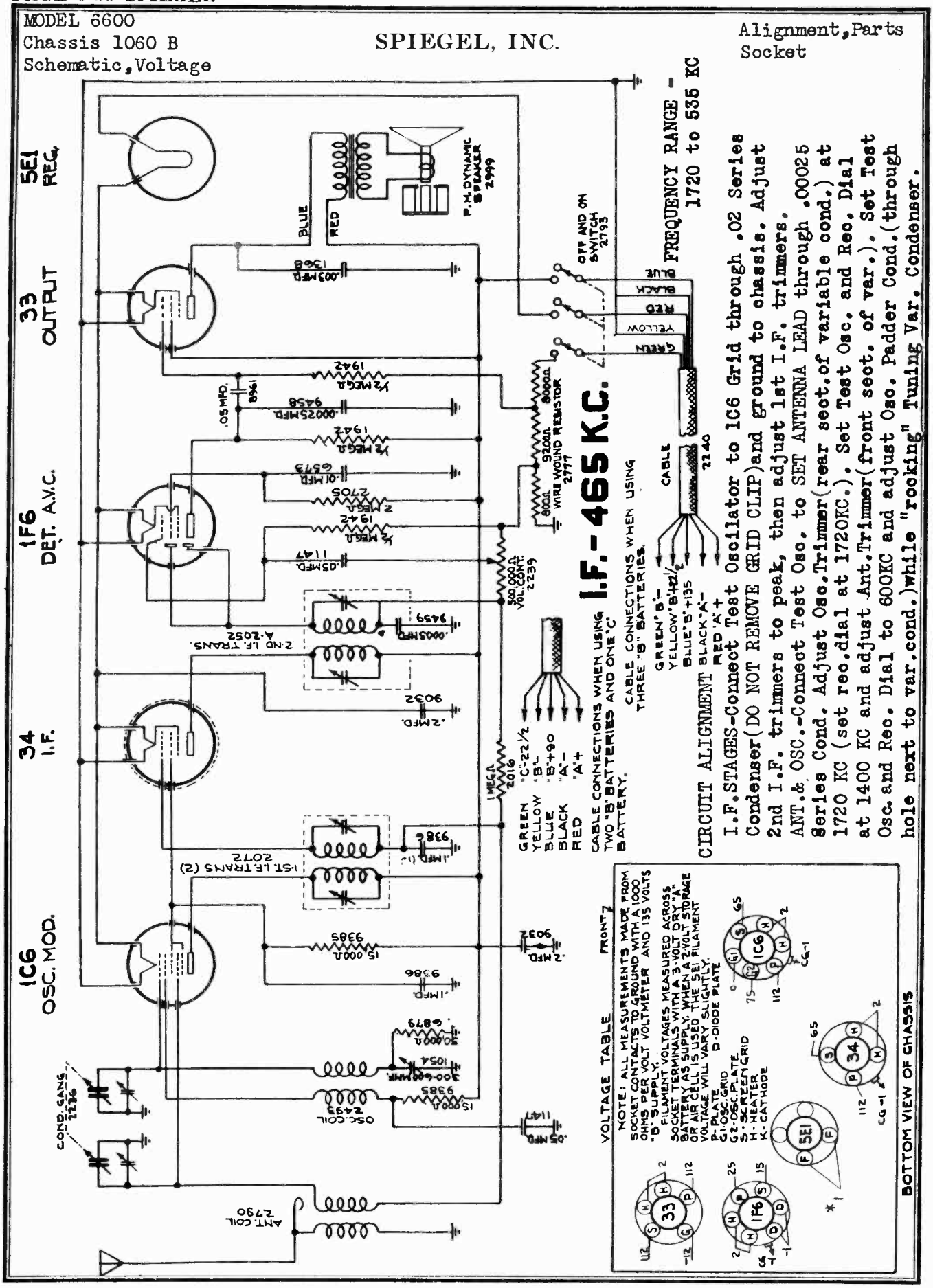
ALIGNMENT

INTERMEDIATE FREQUENCY - Connect the Signal Generator to grid of 6A7 tube through a .05 MFD condenser. Ground Generator to Ground of chassis. Set Generator at 456 KC and adjust trimmers on IF transformers for Max. Peak. BROADCAST BAND - Connect the Generator to the antenna of receiver through a 1000MMFD condenser. Ground Generator to ground of chassis. Range switch in Broadcast position. Set Generator to 1400 KC and adjust Oscillator and RF trimmers to maximum peak. Dial of receiver set on 1400 KC. Pad the Broadcast band at 600 KC, rocking gang condenser during the adjustment. SHORT WAVE BAND - Set Receiver and Generator to 6000 KC. Range switch in SW position. Adjust SW antenna trimmer for maximum peak. No padding adjustment is required on this band.

MODEL 6600
Chassis 1060 B
Schematic, Voltage

SPIEGEL, INC.

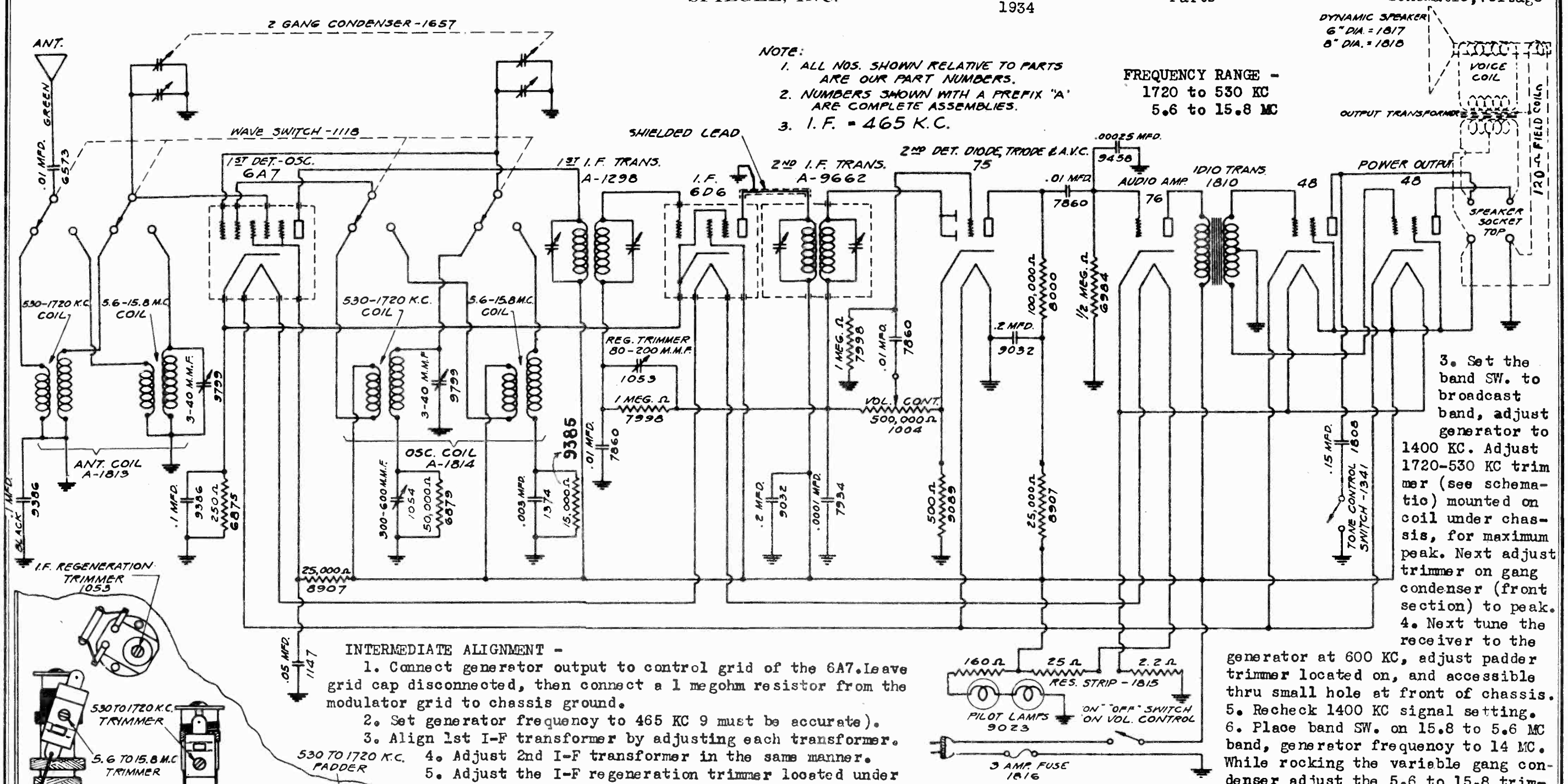
Alignment, Parts
Socket



SPIEGEL, INC.

1934

Trimmers, Alignment Parts — Chassis 6946 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 one one 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 comparative voltage only
Read all voltages from socket to chassis

Schematic, Socket, Trimmers
Alignment

SPIEGEL, INC.

MODELS 6525, 6532, 6540
6560
Chassis 14-136EA, 14-152ES

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an output meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

R. F. Alignment

To align the broadcast band, proceed as follows:

First, connect the ground side of the signal generator to the chassis. Connect the high side of the signal generator with a .00025 condenser, in series, to the antenna lead of the set. Make sure the band switch of the set is in the broadcast position. Set the volume control to maximum. Turn the station selector to the highest frequency (as far as it will go). Set the signal generator to 1720 K.C. Adjust the oscillator trimmer until the signal is heard. After the oscillator has been set at 1720 K.C., turn the station selector to 1400 K.C. Set the signal generator to 1400 K.C. When the signal is heard, adjust the first detector trimmer for maximum output.

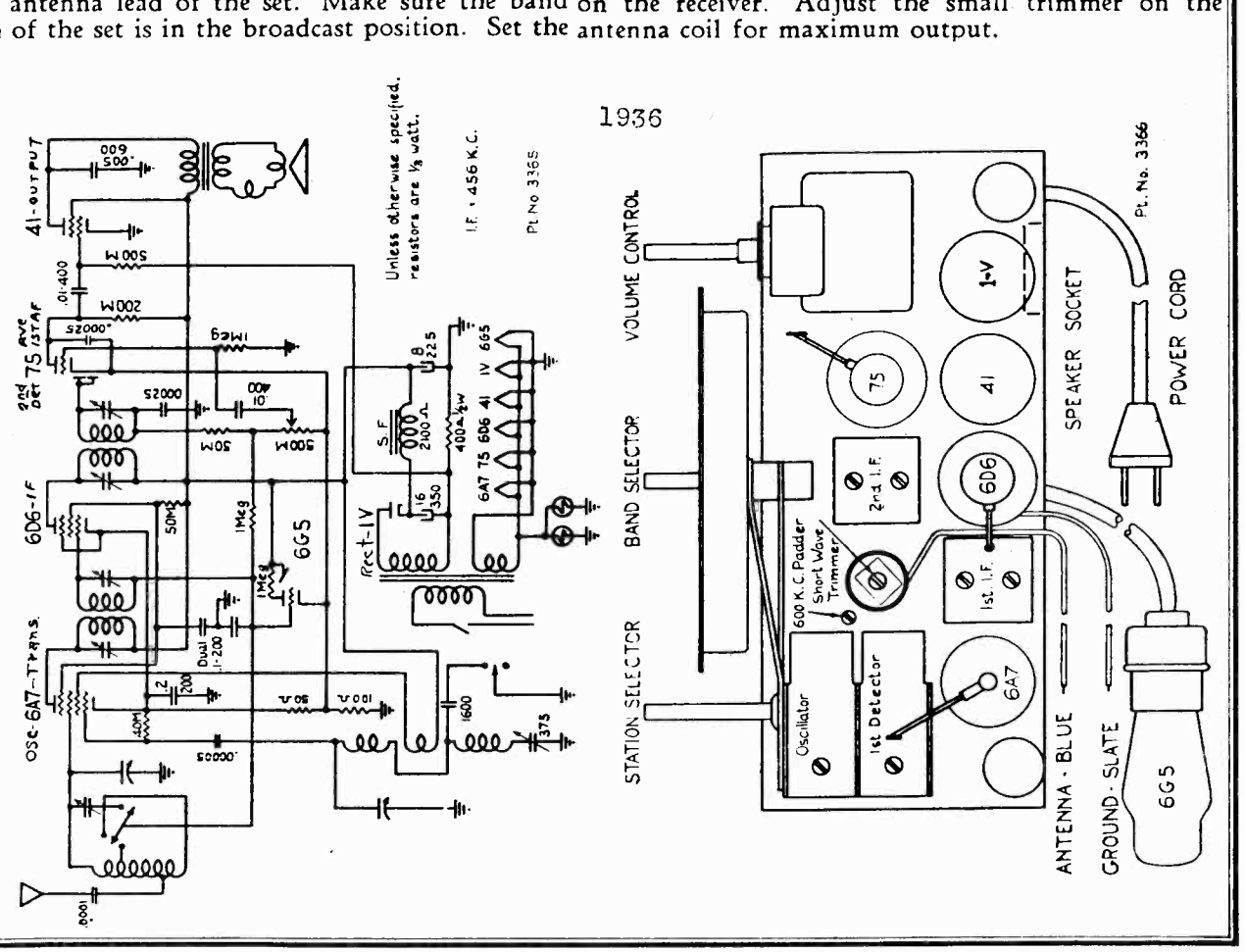
When the set has been adjusted at 1400 K.C., turn the station selector dial to 600 K.C. Set the signal generator to 600 K.C. When the signal is heard, adjust the padder condenser by rocking the selector back and forth. While adjusting the padder screw, it is necessary to move the selector so that the signal may be kept in tune while adjusting the padder screw. This procedure should be followed until maximum output is obtained.

The foregoing procedure should be repeated. That is, the set is to be rechecked at 1720, 1400 and 600 K.C.

When aligning the R.F., use the same output standard as was used on the I.F. alignment.

Short Wave Alignment

Turn the band selector switch of the set to short wave. Set the signal generator to 6000 K.C. Connect a 400 ohm resistor in series with the .00025 condenser. Tune the set until the signal is heard. If two signals are heard, always align to the highest frequency heard on the receiver. Adjust the small trimmer on the antenna coil for maximum output.

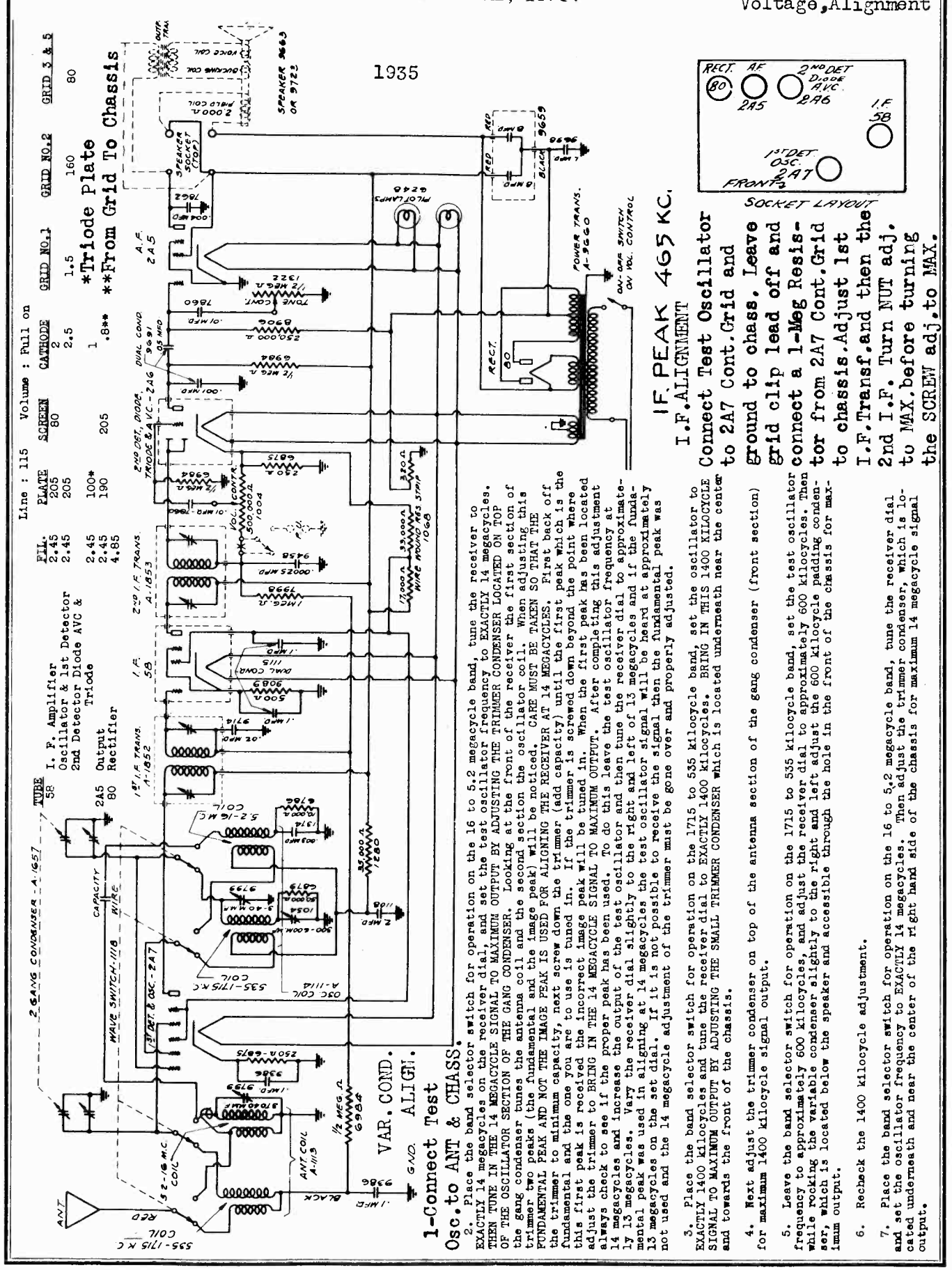


MODELS 9902, 9908
Chassis 5700B

SPIEGEL, INC.

Schematic, Socket
Voltage, Alignment

1935



IF. PEAK 465 KC.

I.F. ALIGNMENT

Connect Test Oscillator to 2A7 Cont. Grid and ground to chass. Leave grid clip lead off and connect a 1-Meg Resistor from 2A7 Cont. Grid to chassis. Adjust 1st I.F. Transf. and then the 2nd I.F. Turn NUT adj. to MAX. before turning the SCREW adj. to MAX.

1-Connect Test Osc. to ANT & CHASS.

2. Place the band selector switch for operation on the 16 to 5.2 megacycle band, tune the receiver to EXACTLY 14 megacycles. THEN TUNE IN THE 14 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSER LOCATED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER. Looking at the front of the receiver the first section of the gang condenser tunes the antenna coil and the second section the oscillator coil. When adjusting this trimmer two peaks (the fundamental and the image peak) will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 14 MEGACYCLES. When the trimmer to minimum capacity, next screw down the trimmer (add capacity) until the first peak which is the fundamental and the one you are to use is tuned in. If the trimmer is screwed down beyond the point where this first peak is received the incorrect image peak will be tuned in. When the first peak has been located adjust the trimmer to BRING IN THE 14 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. After completing this adjustment always check to see if the proper peak has been used. To do this leave the test oscillator dial to approximately 14 megacycles and increase the output of the test oscillator at 14 megacycles. Vary the receiver dial slightly to the right and left of 13 megacycles and if the fundamental peak was used in aligning at 14 megacycles the test oscillator signal will be heard at approximately 13 megacycles on the set dial. If it is not possible to receive the signal then the fundamental peak was not used and the 14 megacycle adjustment of the trimmer must be gone over and properly adjusted.

3. Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to EXACTLY 1400 kilocycles and tune the receiver dial to EXACTLY 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE SMALL TRIMMER CONDENSER which is located underneath near the center and towards the front of the chassis.

4. Next adjust the trimmer condenser on top of the antenna section of the gang condenser for maximum 1400 kilocycle signal output.

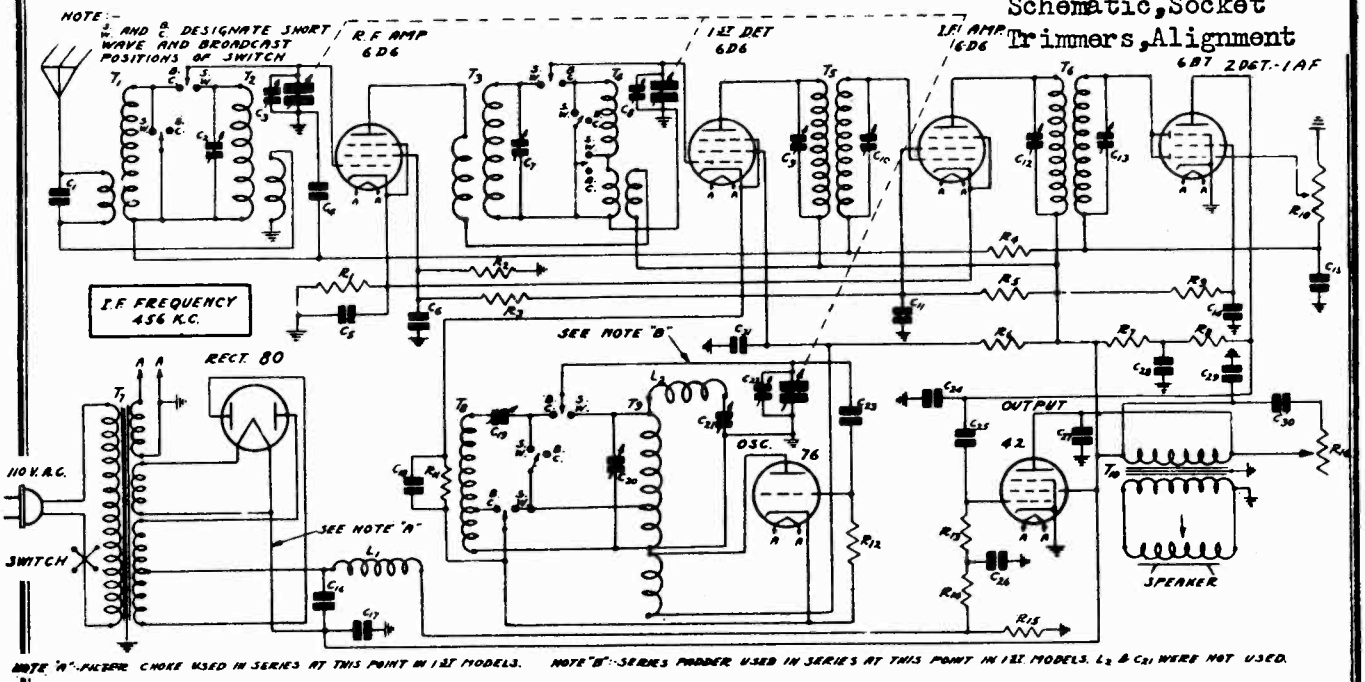
5. Leave the band selector switch for operation on the 1715 to 535 kilocycle band, set the test oscillator frequency to approximately 600 kilocycles, and adjust the receiver dial to approximately 600 kilocycles while rocking the variable condenser slightly to the right and left adjust the 600 kilocycle padding condenser, which is located below the speaker and accessible through the hole in the front of the chassis for maximum output.

6. Recheck the 1400 kilocycle adjustment.

7. Place the band selector switch for operation on the 16 to 5.2 megacycle band, tune the receiver dial and set the oscillator frequency to EXACTLY 14 megacycles. Then adjust the trimmer condenser, which is located underneath and near the center of the right hand side of the chassis for maximum 14 megacycle signal output.

SPIEGEL, INC.

MODELS 9904, 9910, 9926
9928
Chassis 27D
Schematic, Socket
Trimmers, Alignment



1934

Fig. 1—Schematic Circuit Diagram

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to the trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Attenuate the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the pointer screw and set the pointer at the 1500 K. C. mark on broadcast band scale. Retighten pointer screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

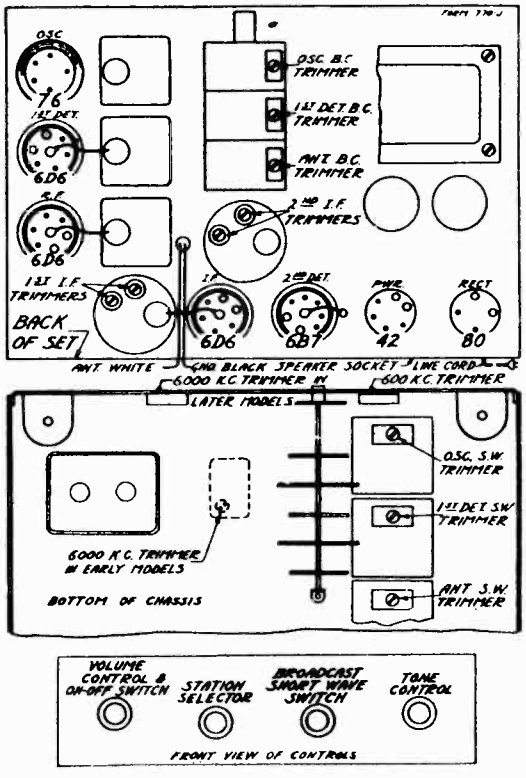


Fig. 2—Tube Arrangement and Location of Trimmers

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over

this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be attenuated to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2.

Next set the signal generator for 15,000 K. C. Turn the rotor until the dial pointer is at the 15,000 K. C. mark on the short wave portion of the dial scale. Then adjust the antenna and 1st detector short wave trimmers until maximum output is obtained.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. In the first models of this receiver, this condenser was located at the point shown in Fig. 2 in dashed lines. In the later models it is reached through a hole in the front panel of the chassis as shown in the same illustration. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained. In the early models this adjustment is broad while in the later models it is more critical.

Caution

The can of electrolytic condenser C16 is not at ground potential. Therefore in any work on the chassis, care should be taken not to touch this can and any other grounded point such as the other electrolytic condenser can.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 3.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 3. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Control Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	246	100	3.6(1)	5.3
6D6	1st Det.	6.3	237	97	8.0(2)	3.4
76	Osc.	6.3	115		0	4.8
6D6	I. F.	6.3	246	130	3.6(1)	8.3
6B7	2nd Det.	6.3	50(3)	40(3)	0	2.7
42	Power	6.3	230	245	17.0(4)	33.0
80	Rectifier	5.0				37.0 per plate

(1) Cathode to ground
(2) Subject to variation
(3) Read with 1,000,000 ohm meter
(4) As read across R15

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

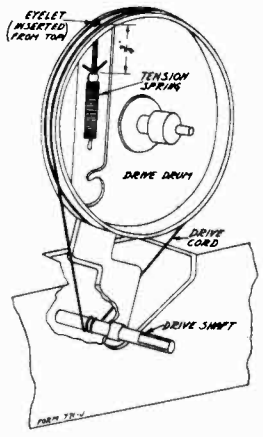


Fig. 3—Drive Cord Replacement

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 3.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¼" from the flange of the drum as shown in Fig. 3. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

Changes in Early Models

There are two points at which the early models of this receiver differ from the present models. These points are indicated in Fig. 1 and described below.

Power Unit

In the early models a separate filter choke was used in series at the point indicated in note A in Fig. 1. The values of the two filter condensers C16 and C17 were less than as used at present. The values of the old and new condensers are shown in the parts list. A different power transformer was also used with the early filter system and this is likewise shown in the parts list.

The two power transformers are not interchangeable and care must be taken in ordering for replacement purposes to order the correct one. The original chassis can be identified by the separate filter choke.

Short Wave Oscillator

Referring to Fig. 1 it will be noted that there is a tracking coil L2 and a trimmer condenser C21 connected in series between the short wave oscillator coil and ground. In the first models of this receiver these two units, which are required for tracking the short wave oscillator, are not used. Instead a series padding condenser was used at the point in the circuit indicated by note B in Fig. 1.

At the time this change was made a change was also made in the oscillator assembly and care must be taken in ordering for replacement purposes to order the correct one. Early models with the original oscillator assembly have no spot of paint or a green spot of paint on the 80 socket rivet. Later models with the new oscillator assembly and new tracking system have a red spot of paint on the 80 socket rivet.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle, receiver, only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty-cycle power supply. However, the reverse is not true, the sixty-cycle receiver cannot be operated from a twenty-five cycle power supply.

A 110-220 Volt, 40-60 cycle Power Transformer is also available for this model.

REPAIR PARTS LIST FOR 7 TUBE BROADCAST AND SHORT WAVE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

Part No.	Item	List Price
P-1441	Double Mounting Strip	.10
P-1421	Single Mounting Strip	.10
P-2060	Knob Small	.20
P-2062	Knob Large	.20
P-10037	Small Tone & Volume Control Disc	.10
P-20912	Pointer, Large	.20
P-2012	Pilot Light Bulb 6-8 volt	.15
P-10272	Rubber Mounting Feet	.10
P-10420	Glass Crystal	.15
P-20825	Crystal Retainer Ring	.10
P-2090	6" Speaker Mantel Sets L) - 1250 ohm	6.00
P-2091	8" Speaker Console Sets L) - 1250 ohm	6.75
	8" Black Drive Cord (V. C. or T. C. Ind.)	.05
	29" Black Drive Cord (Cond. Drive)	.10
P-2136	Pilot Lamp Socket & Clip Assembly	.10
P-2101	Broadcast-Short Wave Switch	1.88

Part No.	Item	List Price
P-1885	No. 6D6 Socket	$ .15
P-2022	No. 76 Socket	.15
P-1944	No. 6B7 Socket	.15
P-1884	No. 42 Socket	.15
P-2025	No. 80 Socket	.15
P-1637	Speaker Socket	.10
P-40445	Tube Shield for 6D6 & 6B7 Tubes	.15
P-40444	Tube Shield for 76 Tube	.15
P-40443	Tube Shield Bases	.10
*P-50654	Power Transformer 115 Volts, 60 Cycles	3.00
*P-50655	Power Transformer 115 Volts, 25 Cycles	4.50
*P-50636	Power Transformer 115-230 Volts, 40-60 Cycles	3.25
†P-50646	Power Transformer 115 Volts, 60 Cycles	3.25
†P-50647	Power Transformer 115 Volts, 25 Cycles	4.50
†P-50648	Power Transformer 115-230 Volts, 40-60 Cycles	3.75
*P-50637	Filter Reactor	.85
P-50399 A	Output Transformer T 10	1.35
P-5176	Antenna R.F. Trans. less can T1 & T2	1.80
P-5177	Inter-Stage R. F. Trans. less can T3 & T4	1.75
*P-5178	Oscillator Coil Assembly Less can T8 & T9	1.70
†P-5183	Oscillator Coil Assembly Less can T8 & T9	1.70
P-40433	Cans for the above Assemblies	.15
†P-5190	High Frequency Oscillator Tracking Coil T2	.35
P-5179	1st I. F. Assembly Complete with Can T5	2.15
P-5180	2nd I. F. Assembly Complete with Can T6	1.75
P-50342-A	Grid Cap Only	.10
P-70702	AC Cord & Plug	.70
P-1504	8 Terminal Mounting Strip	.10

Part No.	Code	Resistance	Watts	Type	List Price
P-98016	R1	200 ohm	.2	Flex. Wire Wound	$ .15
P-B93303	R2	30,000 ohm	.5	Carbon	.20
P-B94602	R3	6,000 ohm	.5	Carbon	.15
P-A95205	R4	2.0 megohm	.2	Carbon	.15
P-98020	R5 16,000 ohm 1.5 / R6 25,000 ohm 1.0			Armored wire wound	.65
P-A94203	R7	20,000 ohm	.2	Carbon	.15
P-B94603	R8	60,000 ohm	.5	Carbon	.15
P-B94254	R9	250,000 ohm	.5	Carbon	.15
P-96014	R10	500,000 ohm		Vol. Control & Switch	1.05
P-A94252	R11	2,500 ohm	.2	Carbon	.15
P-A94104	R12	100,000 ohm	.2	Carbon	.15
P-A95504	R13	500,000 ohm	.2	Carbon	.20
P-A94104	R14	100,000 ohm	.2	Carbon	.15
P-98015	R15	235 ohm	2.0	Flex. Wire Wound	.15
P-97011	R16	150,000 ohm		Tone Control	.75

Part No.	Code	Capacity	Volts	Type	List Price
P-80919	C1	.00025 mfd.		Moulded	$ .20
P-2102	C2	3-40 mmfd.		Ant. S.W. Trimmer	.15
	C3	(See 3 Gang Cond.)		Gang Trimmer	
P-80862	C4	.05 mfd.	200V.	Tubular	.15
P-80888	C5	.25 mfd.	200V.	Tubular	.25
P-80890	C6	.05 mfd.	400V.	Tubular	.20
P-2102	C7	3-40 mmfd.		1st Det.S.W. Trim.	.15
	C8	(See 3 Gang Cond.)		Gang Trimmer	
P-1386-B	C9 90±30 mmfd. / C10 90±30 mmfd.			Dual Trimmer Part of I. F. Assem.	
P-81034	C11	.25 mfd.	300V.	Tubular	.30
P-1386-B	C12 90±30 mmfd. / C13 90±30 mmfd.			Dual Trimmer Part of I. F. Assem.	
P-81040	C14	.25 mfd.	400V.	Tubular	.35
P-80977	C15	.0001 mfd.		Moulded	.20
†P-81043	C16	18.0 mfd.	300V.	Electrolytic Wet	1.30
*P-80916	C16	8.0 mfd.	450V.	Electrolytic Wet	1.25
*P-81032	C17	8.0 mfd.	500V.	Electrolytic Wet	1.30
†P-81042	C17	14.0 mfd.	400V.	Electrolytic Wet	1.45
P-80862	C18	.05 mfd.	200V.	Tubular	.15
P-2112	C19	300-500 mmfd.		600 K.C. Trimmer	.45
P-2102	C20	3-40 mmfd.		Osc. S.W. Trimmer	.15
†P-1685	C21	70±30 mmfd.		6000 K.C. Trimmer	.35
	C22	(See 3 Gang Cond.)		Gang Trimmer	
P-81005	C23	.000035 mfd.		Moulded	.15
P-80914	C24	.002 mfd.	600V.	Tubular	.20
P-80981	C25	.01 mfd.	400V.	Tubular	.20
P-81044	C26	.03 mfd.	400V.	Tubular	.15
P-80914	C27	.002 mfd.	600V.	Tubular	.20
P-81033	C28	.25 mfd.	400V.	Tubular	.35
P-80887	C29	.1 mfd.	400V.	Tubular	.20
P-80890	C30	.05 mfd.	400V.	Tubular	.20
P-80882	C31	.1 mfd.	400V.	Tubular	.20
P-81027-B	3 Gang Condenser				3.35
*P-2113		600-1300 mmfd.		6000 K.C. Trimmer	.61

* Used in early Models. See Article on changes in this Manual
† Used in Later Models. See Article on changes in this Manual

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

SPIEGEL, INC.

Schematic, Socket Trimmers, Parts

SPIEGEL, INC.

MODELS 9915, 9917
Chassis 29B

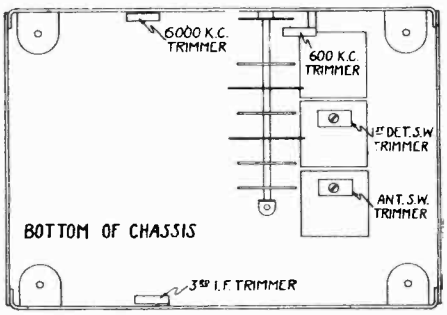
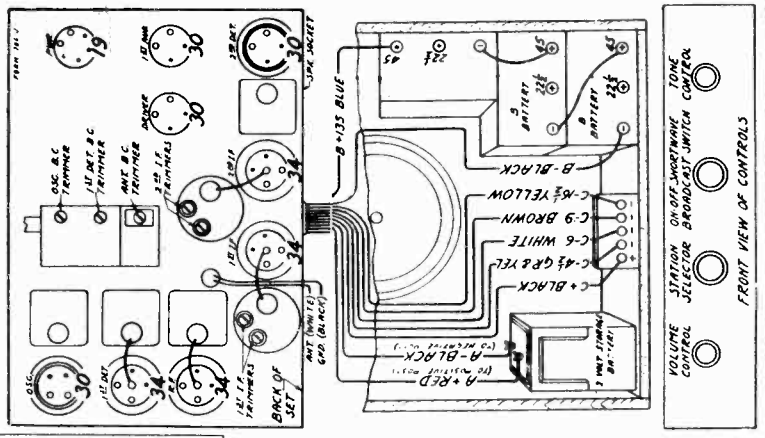
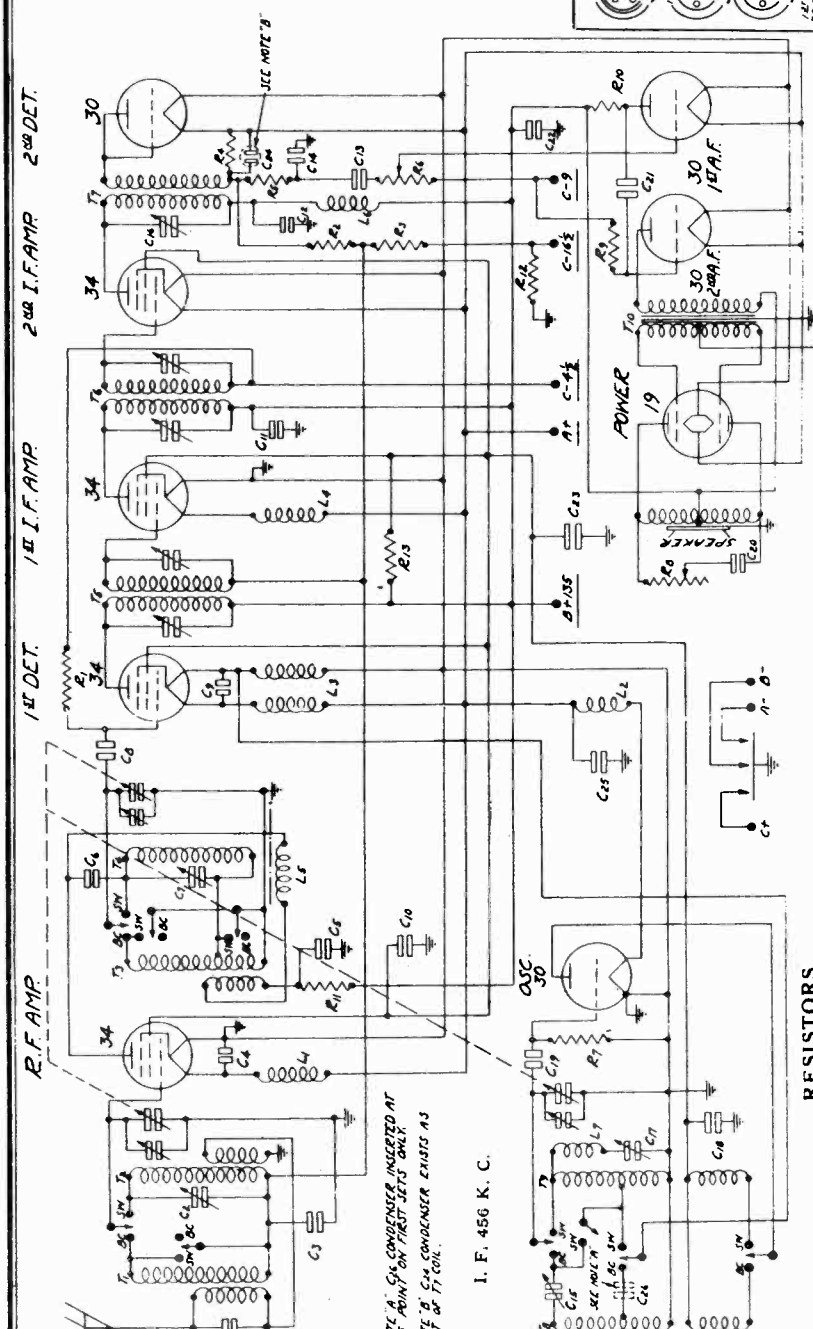


Fig. 3—Trimmer Locations





RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95805	R1	3 Megohm	.2	Carbon
P-A95805	R2	3 Megohm	.2	Carbon
P-A94805	R3	3 Megohm	.2	Carbon
P-A94304	R4	300,000 Ohm	.2	Carbon
P-A95104	R5	100,000 Ohm	.2	Carbon
P- 96016	R6	2 Megohm		Volume Control
P-A94104	R7	100,000 Ohm	.2	Carbon
P- 97013	R8	45,000 Ohm		Tone Control
P-A94105	R9	1 Megohm	.2	Carbon
P-A94104	R10	100,000 Ohm	.2	Carbon
P-A95102	R11	1,000 Ohm	.2	Carbon
P-A95153	R12	15,000 Ohm	.2	Carbon
P-B94652	R13	6,500 Ohm	.2	Carbon
*P- 97011		150,000 Ohm		Tone Control
*P-A95603		60,000 Ohm	.2	Carbon

* These parts were used on first models only—see article on "Changes in Early Models."

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80919	C1	250 mmf.		Moulded
P- 2102	C2	3-40 mmf.		Trimmer
P-81076	C3	.05 mf.	200V	Tubular
P-81076	C4	.05 mf.	200V	Tubular
P-81076	C5	.05 mf.	200V	Tubular
P-81094	C6	.006 mf.	600V	Tubular
P- 2102	C7	3-40 mmf.		Trimmer
P-81800	C8	50 mmf.		Wire Capacitor
P-81076	C9	.05 mf.	200V	Tubular
P-81102	C10	.25 mf.	140V	Tubular
P-81110	C11	.25 mf.	200V	Tubular
P-81076	C12	.05 mf.	200V	Tubular
P-81076	C13	.05 mf.	200V	Tubular
P-80977	C14	100 mmf.		Wire Capacitor
P- 2112	C15	300-500 mmf.		Trimmer
P- 1685	C16	40—100 mmf.		Trimmer
P- 1685	C17	40—100 mmf.		Trimmer
P-81076	C18	.05 mf.	200V	Tubular
P-81005	C19	35 mmf.		Moulded
P-81071	C20	.05 mf.	400V	Tubular
P-81094	C21	.006 mf.	600V	Tubular
P-82001	C22	4.0 mf.	150V	Electrolytic
C23		4.0 mf.	150V	
C24		Part of 3rd I. F. Coil		Assembly T7
P-81102	C25	.25 mf.	140V	Tubular
*P-81076	C26	.05 mf.	200V	Tubular
P-81027		3 Gang Condenser		

1934

MODELS 9916,9917
Voltage,Resistance
Alignment

SPIEGEL, INC.

Condenser Alignment

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings of these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION—Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 3 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 3. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. actior.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 3 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read from Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Gnd.	Control Grid to Ground	Screen to Gnd.	Normal Plate M. A.
34	R. F.	2.0	135	4.5(1)	80	2.8
34	1st Det.	2.0	135	4.5(1)	80	3.0
30	Osc.	2.0	80			2.8
34	1st I. F.	2.0	135	4.5(1)	80	2.8
34	2nd I. F.	2.0	135	4.5	80	2.8
30	2nd Det.	2.0				
30	1st Audio	2 0	95	9.0(2)		0.35
30	2nd Audio	2.0	135	9.0(3)		3.0
19	Output	2.0	135	6.0		1.3

(1) Computed figure—cannot be read because of high resistance cir.
(2) Volume Control at minimum.
(3) As read at battery.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5176	B. C. Antenna R. F. Transformer, Primary	T1	28.0
	B. C. Antenna R. F. Transformer, Secondary	T1	5.0
	S. W. Antenna R. F. Transformer, Primary	T2	0.25
	S. W. Antenna R. F. Transformer, Secondary	T2	Small
P-5236	B. C. Interstage R. F. Transformer, Primary	T3	5.25
	B. C. Interstage R. F. Transformer, Secondary	T3	5.0
	S. W. Interstage R. F. Transformer, Secondary	T4	Small
P-5224	B. C. Oscillator Grid Coil	T8	2.4
	B. C. Oscillator Plate Coil	T8	3.5
	S. W. Oscillator Grid Coil	T9	1.0
	S. W. Oscillator Plate Coil	T9	Small
P-5179-A	1st I. F. Coil Primary	T5	12.0
	1st I. F. Coil Secondary	T5	13.0
P-5185	2nd I. F. Coil Primary	T6	5.5
	2nd I. F. Coil Secondary	T6	5.5
P-5186	3rd I. F. Coil Primary	T7	12.0
	3rd I. F. Coil Secondary	T7	30.0
P-50586-B	Audio Transformer Primary	T10	910.0
	Audio Transformer Secondary, Center tap to outside	T10	590.0
	Audio Transformer Secondary, Center tap to inside	T10	530.0
P-5189	Filament Reactor	L1	0.65
P-5189	Filament Reactor	L2	0.65
P-5235	Double Filament Reactor (each)	L3	0.3
P-5189	Filament Reactor	L4	0.65
P-5228	S. W. R. F. Interstage Plate Reactor	L5	28.0
P-5227	I. F. Isolating Reactor	L6	1.6
P-2179	Speaker Voice Coil, Center tap to outside		300.0
	Speaker Voice Coil, Center top to inside		250.0

Schematic, Socket Trimmers, Voltage Parts

SPIEGEL, INC.

MODEL 9930
Chassis 25Y

VOLTAGES AT SOCKETS

Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

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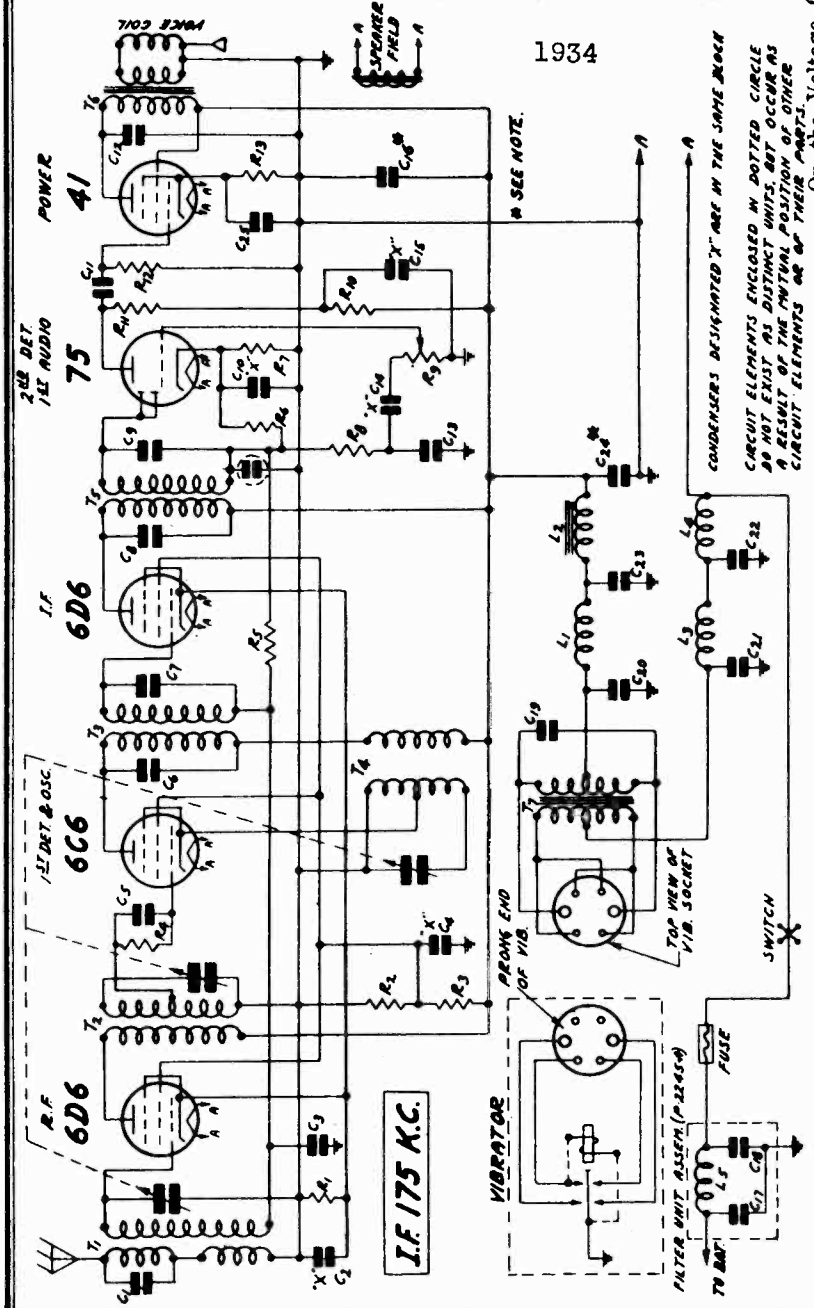


Fig. 1—*Schematic Circuit Diagram*

On the Voltage Chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected at the bavonet connector.

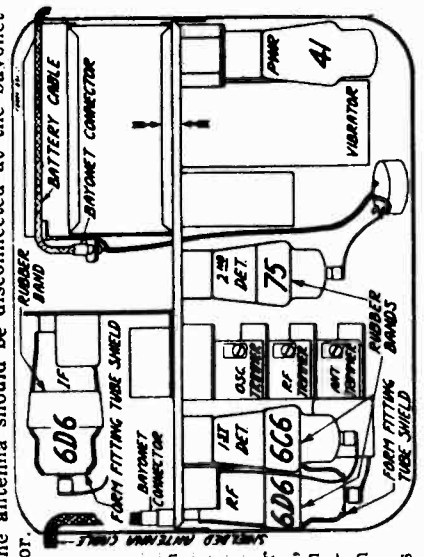


Fig. 2—*Location of Tubes and Vibrator*

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.	Part of	Antenna Coil Assembly
	C2	.50 mf.	200V.	
	C4	.10 mf.	140V.	
P-82600D	C10	.25 mf.	140V.	Bypass Block
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	35 mmf.	Part of	Grid Leak Assembly
P-81806	C6	70 mmf.	Part of	1st I. F. & Osc. Coil Assembly
	C7	70 mmf.		
P-81806	C8	70 mmf.	Part of	2nd I. F. Coil Assembly
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	In Choke Condenser Unit
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-8500	Gang Condenser			

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B9435Iww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
	R7	7,500 Ohm	.2	Carbon
P-A94752	R8	100,000 Ohm	.2	Carbon
P-A95104	R9	2 Megohm		Volume Control and Switch
P- 96017	R10	50,000 Ohm	.2	Carbon
P-A95503	R11	200,000 Ohm	.2	Carbon
P-A95204	R12	500,000 Ohm	.2	Carbon
P-A95504	R13	800 Ohm	.5	Flexible Wire Wound
P-B94801ww				

In the first models of this receiver a bypass condenser block (P-82600) containing condensers: C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attemped unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the effect of adjustments.

First remove the cover of the box. Leuve the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION—Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	12.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec. (Center Tap to Inside)	T2	3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	To	600.00
	Output Trans. Sec. and Voice Coil in Par.		0.80
	Speaker Field		6.00

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No.

Part No.	Item
P-1885	6V6 Tube Socket
P-1886	6A6 Tube Socket
P-1775	75 Tube Socket
P-1911	41 Tube Socket
P-5247	Antenna Coil Assembly Less Can
P-40415B	Can for above assembly Part of Gang Condenser Assembly
P-5248	R. F. Interstage Coil Assembly Less Can
P-40447C	Can for above assembly Part of Chassis Assembly
P-5249	1st I. F. and Oscillator Coils and Can Assembly
P-5250	2nd I. F. Coil and Can Assembly
P-2228	Dynamic Speaker
P-10159	Cardboard Baffle for Speaker
P-2229	Vibrator Unit
P-2030	Vibrator Socket
P-50656	Power Transformer
P-5251	R. F. "A" Choke Coil
P-5174	R. F. "B" Choke Coil
P-50657	Power Choke Coil Assembly
P-5253	Filament Choke Coil
P-2220	2 Half Tube Shields with Clamping Ring
P-2240	Grid Leak and Condenser Assembly
P-2224	Knobs
P-20960	Thumb Screws
P-10356	Glass Crystal
P-10361	Gasket for Glass Crystal
P-20342A	Grid Clip only
P-10213	Wide Rubber Bands for Tubes
P-70774	Shielded Antenna Cable
P-70781	"A" Battery Cable
P-1421	Single Lug Terminal Strip
P-2002	Double Insulated Terminal Strip
P-2212	Five Lug Terminal Strip
P-1933	Cinch Terminal Lug
P-20701	Drive Tension Spring
P-20953	Horse-shoe Lock (Washer)
P-2227	Dial Strip
P-20954	Dial Pointer

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

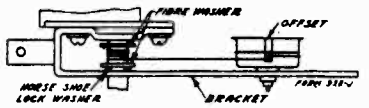


Fig. 3—*Cord Drive—Top View*

First remove the chassis from the case as explained on page 4.

Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Separate and take off the horse-shoe lock washer which holds the drive shaft in position. This may be done with a fine jawed long nose plier.

Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the horse-shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 4. The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

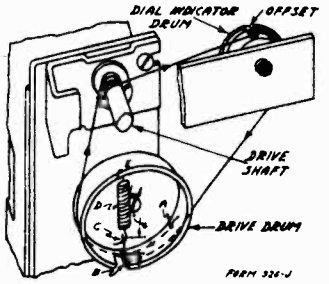


Fig. 4—*Cord Drive Replacement*

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

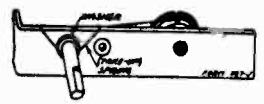


Fig. 5—*Drive "Take-up" Spring*

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between ½" and ⅝" from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about ½".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and clip the "take-up" spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

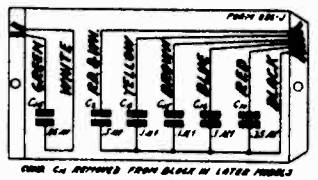
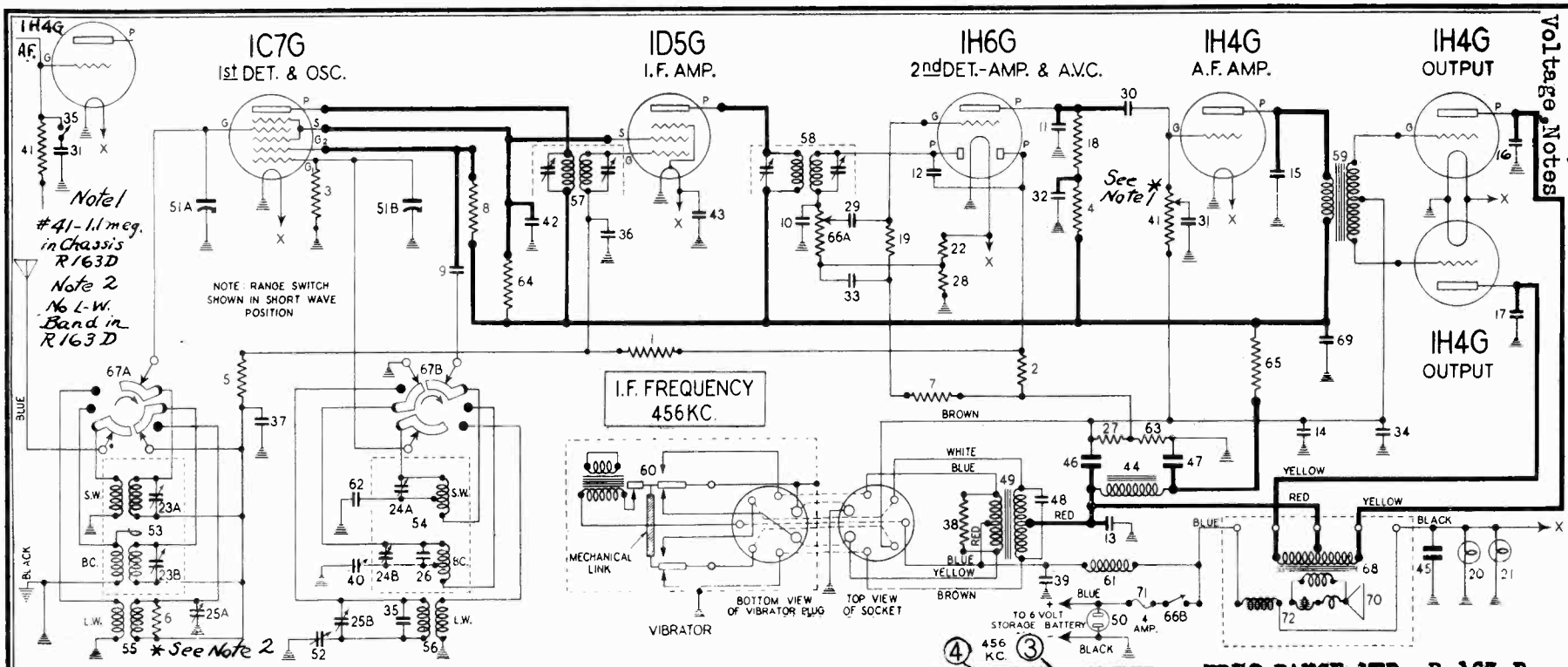


Fig 6—*Condenser Block Internal Wiring*

Fig. 7—*Electrolytic Block Internal Wiring*

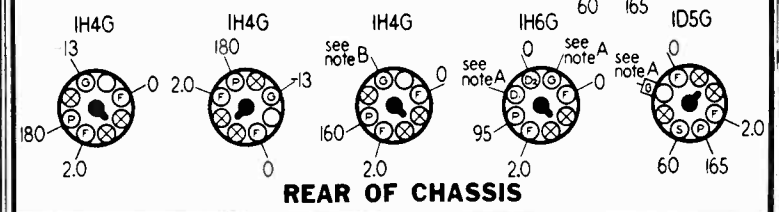
STEWART-WARNER CORP.

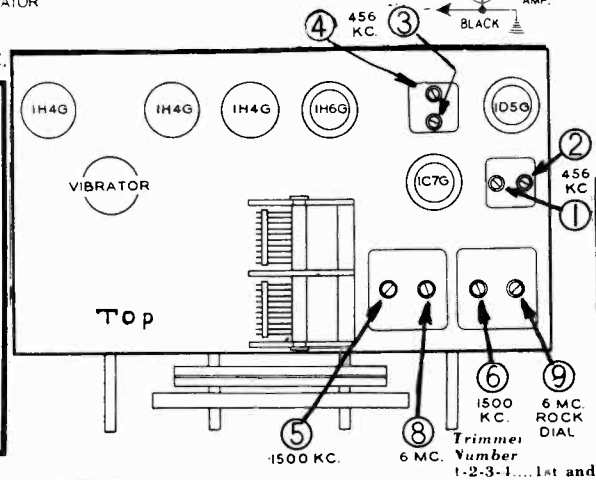


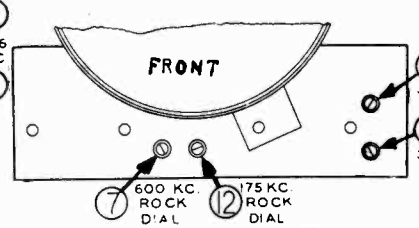
A BATTERY VOLTAGE 6.0 VOLTS DIAL TUNED TO 530 KC.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
D C CURRENT DRAIN 1.95 AMPERES
SEE NOTE (X)







FREQ. RANGE MOD. R-163-D
540 to 1750 KC
2.2 to 7 MC

November 5, 1936

TRIMMER LOCATIONS

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.

FREQ. RANGE MOD. R-164D
140 to 400 KC
540 to 1750 KC
2.2 to 7.0 MC

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G and the A.V.C. delay voltage for one diode of the 1H6G is —2.7 volts measured across resistor 63.

NOTE B: The grid bias on the 1H4G 1st audio and output tubes is — 13.0 volts measured across resistors 27 and 63.

NOTE (X): These terminals indicate tube pins which are not internally connected to any element.

MODELS 1631D-1639D incl.
MODELS 1641D-1649D "
Alignment, Parts, Notes

STEWART WARNER CORP.

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.

PROPER SIZE OF FUSE

The early production of this model was equipped with 3-ampere fuses. If one of these blow out, and if there is nothing wrong in the set to cause it to blow, replace with a 4-ampere fuse.

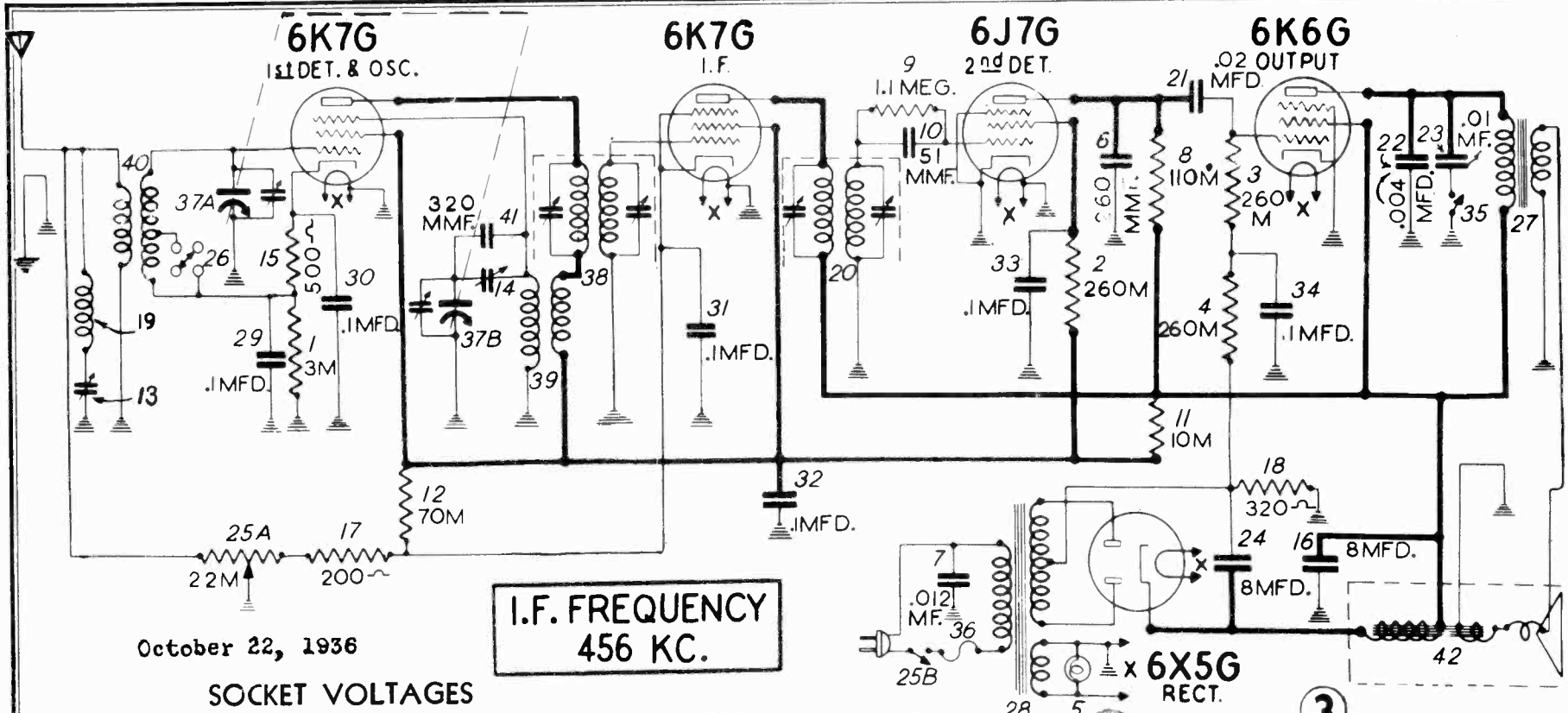
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Diagram Number	Part Number	Description	List Price
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3, 4	83080	51,000 ohm ¼ watt carbon resistor	.12
5, 6, 7	83082	260,000 ohm ¼ watt carbon resistor	.12
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, 14, 15	83784	.0011 mfd. mica condenser	.25
16, 17			
18	84198	110,000 ohm ¼ watt carbon resistor	.12
19	81235	1.1 megohm ¼ watt carbon resistor	.12
20, 21	84515	Dial lamp 2 Volt .06 ampere	.25
22	81888	300 ohm ½ watt wirewound resistor	.15
23A, 23B 24A, 24B 25A, 25B	85087	Dual trimmer	.35
26	85154	11 mmfd. mica condenser	.15
27	85691	500 ohm ½ watt wirewound resistor	.20
28	88009	200 ohm ½ watt wirewound resistor	.15
29, 30	88026	.02 mfd. 400 volt paper condenser	.25
31	88030	.01 mfd. 400 volt paper condenser	.25
32, 33	88040	.3 mfd. 150 volt paper condenser	.25
34	88170	10 mfd. 25 volt electrolytic condenser	.80
35	88173	50 mmfd. mica condenser	.20
36, 37	88189	.05 mfd. 200 volt paper condenser	.25
38	88204	210 ohm ½ watt carbon resistor	.15
39	88285	1.25 mfd. 150 volt paper condenser	.80
40	88478	Variable padding condenser	.38
41	88488	Tone Control—500,000 ohms	.80
42, 43	88990	.5 mfd. 150 volt paper condenser	.35
44	89117	Filter choke	1.35
45	89145	100 mfd. 12 volt electrolytic condenser	.85
46, 47	89147	8 mfd. 250 volt electrolytic condenser	.90
48	89153	.005 mfd. 1500 volt paper condenser	$0.40
49	89164	Power transformer (6 volt primary)	3.60
50	89170	Reading lamp plug receptacle	.15
51A & 51B	89205	Gang condenser	4.00
52	89206	Variable Padding condenser	.45
53	89207	Antenna coil & shield Assembly (B.C. & S.W.) with trimmers	1.90
54	89209	Oscillator Coil & Shield Assembly (B.C. & S.W.) with trimmers	3.00
55	89211	Antenna coil assembly (L.W.)	1.40
56	89212	Oscillator coil assembly (L.W.)	1.00
57	89226	1st I.F. transformer & shield assembly	2.50
58	89227	2nd I.F. transformer & shield assembly	2.50
59	89228	Push Pull input transformer	3.50
60	89272	Vibrator	5.00
61	89273	"A" choke assembly	.30
62	89275	.002 mfd. mica condenser	.40
63	89276	140 ohm ½ watt wirewound resistor	.12
64	89277	35,000 ohm ½ watt carbon resistor	.15
65	89278	1100 ohm ¼ watt carbon resistor	.35
66A 66B	89332	{Volume control 500,000 ohm} {off on switch}	1.20
67A & 67B	89357	Range switch	1.50
68	89401	Output transformer for R257D & R258D speakers	2.60
69	89421	.1 mfd. 200 volt paper condenser	.25
70	89428	Diaphragm, voice coil and spider assembly for R257D speaker	1.75
		For R258D speaker—order complete	
71	89828	4 ampere 25 volt fuse	.05
72	(R257D	6" Dynamic Speaker	6.75
	(R258D	8" Dynamic Speaker	8.00
88165		Tube shield cap—plain	.06
88219		"A" lead with cap (short section of battery cable)	.08
88571		Vibrator shield assembly	.23
89167		Vibrator socket shield (under chassis)	.25
89137		"A" battery clip	.20
89138		"A" battery cable, clips and fuse holder	1.65
89160		Knob—for range switch	.30
89161		Knob—tone, tuning and volume controls	.25

The very low battery drain of 1.7 to 2.0 amperes is obtained by the use of two volt tubes and an efficient vibrator power supply. The filaments of the tubes and the dial bulbs are connected in parallel and the field coil of the dynamic speaker is used to reduce the voltage from six to two volts. Thus the set uses little current and also has the excellent tone quality made possible by the use of a dynamic speaker. 60 milliampere dial light bulbs are used. In replacing these, be sure to use the correct type. If ordinary 2.5 volt dial light bulbs or flashlight bulbs are used, the tube filaments will not receive the proper voltage.

Since a gas engine charger usually charges at a high rate, it is absolutely essential to stop the engine before turning on the radio set. However, when a Windcharger is used, ordinarily the voltage will not be excessive unless the set has been used very little or the wind has been blowing hard for some time. Thus, with a Windcharger it is usually satisfactory to operate the set while charging the battery although there is some danger of injuring the tubes if the battery is fully charged.

STEWART WARNER CORP. Chassis R-167S, R-168
MODELS 1671 - 1689 incl.
Schematic, Voltage, Socket
Trimmers



SOCKET VOLTAGES

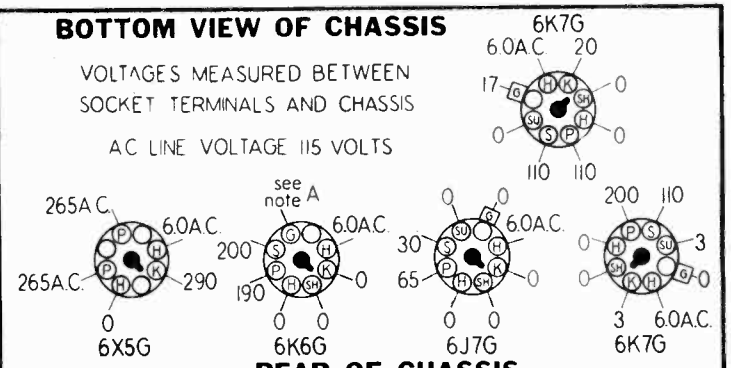
VOLUME CONTROL ON FULL
RANGE SWITCH SET ON BROADCAST POSITION

ANTENNA GROUNDED
DIAL TUNED TO 525 KC.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN
SOCKET TERMINALS AND CHASSIS

A.C. LINE VOLTAGE 115 VOLTS



REAR OF CHASSIS

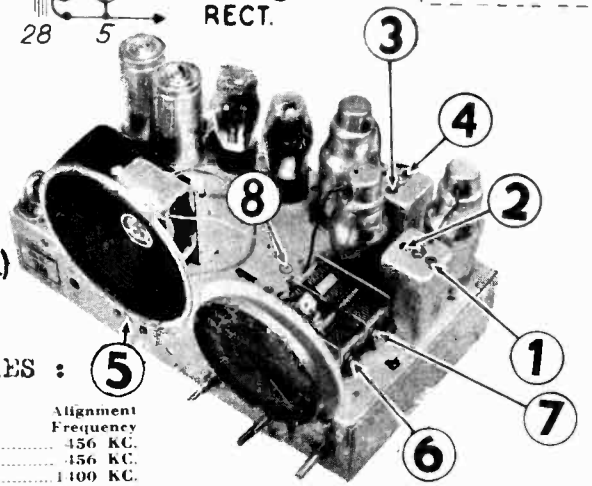
IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6K6G is —14.0 volts measured across resistance 18.

FREQUENCY RANGES

BROADCAST BAND
1750 to 540 KC

POLICE BAND
(No alignment
frequency required)



ALIGNMENT FREQUENCIES :

Trimmer Number	Trimmer Location	Alignment Frequency
1, 2, 3, 4	I.F. Trimmers	456 KC.
5	Wave trap trimmer	456 KC.
6	Oscillator shunt trimmer	1400 KC.
7	Antenna trimmer	1400 KC.
8	Oscillator padding trimmer	600 KC.

MODELS 1671 - 1689 incl.
Chassis R-167S, R-168

STEWART WARNER CORP.

Circuit Data, Alignment
Parts List

CIRCUIT DESCRIPTION

The R-167-S and R-168 chassis are identical with the exception of the size and location of the speaker and the physical location of a few other parts. The R-167-S, which is used in the table model cabinet, has a 5 inch speaker mounted on the chassis and the variable condenser, dial and the control shafts are located on the right side of the chassis. The R-168 is used in the console with a separate 8 inch speaker while the variable condenser, dial, and shafts are in the center of the chassis.

These receivers use a superheterodyne circuit which employs five glass tubes with octal bases. The intermediate frequency is 456 KC. The tuning range of this chassis includes, in addition to the standard broadcast band, the two police radio bands. The 2500 KC. police band can be tuned in around 1600 KC. on the broadcast dial with the range switch in the short-wave position (counter clockwise).

The volume control is double acting. It simultaneously changes the antenna signal input and the I. F. stage bias. Because of the sensitivity of this receiver, and due to the fact that it does not have A. V. C., it requires an antenna that is shorter than usual. The short antenna is particularly necessary where interference from powerful local stations is encountered, and where difficulty is experienced in properly controlling the volume.

When tuning on the short wave band, local broadcast stations can be heard in the background at their regular positions on the dial. This is a normal condition, and is due to the tapped coil method of tuning the antenna coil secondary to the short wave band. No aligning adjustments are required on the short wave band.

A wave trap is connected across the primary of the antenna coil to reduce code interference from stations with a frequency near 456 KC.

ALIGNING EQUIPMENT

For proper alignment of this receiver, an output meter and a high grade modulated service oscillator are essential. The oscillator should be capable of generating the frequencies of 456 KC., 600 KC. and 1400 KC. The test oscillator calibration should be checked, using broadcast station signals as standards. For trimmer adjustment, it is advisable to use an all bakelite screwdriver, although one with a small metal tip may be used.

ALIGNING THE I.F. CIRCUIT

1. (a) Connect the output meter in series with a .25 mfd. condenser between the plate of the 6K6G tube and ground, or across the voice coil, depending on the type of meter.

(b) Turn the volume control to the maximum volume position. (Note: The volume control should be kept in this position throughout the entire alignment procedure.) Ground the antenna lead to the chassis.

(c) Turn the range switch to the right (clockwise) to the broadcast position.

(d) Adjust the test oscillator to exactly 456 KC. and connect its output in series with a .1 mfd. condenser to the control grid of the 6K7G first detector tube and the chassis.

(e) Align I. F. trimmers No. 1, 2, 3 and 4 for maximum output as indicated on the output meter. No inward or sideward pressure should be applied to the alignment tool, or the condenser may spring back to a different setting as soon as the tool is removed.

(f) Repeat all I. F. trimmer adjustments since the changing of each trimmer may affect the others.

456 KC. WAVE TRAP ADJUSTMENT

2. (a) Disconnect the antenna lead from ground.

(b) Connect the test oscillator output in series with a .00025 mfd. condenser to the antenna lead, and connect the test oscillator ground lead to the receiver chassis. Ground the chassis.

(c) Without changing the test oscillator from the frequency setting used in aligning the I. F. stage, adjust trimmer No. 5 for **MINIMUM** output. Increase the test oscillator output as a minimum is reached, in order to obtain a clearly defined setting of the trimmer. NOTE: If code interference transmitted on a frequency slightly different than 456 KC. is troublesome, the wave trap should be adjusted for **MINIMUM** output with the test oscillator set to the same frequency as the signal that is causing interference.

DIAL CALIBRATION

3. (a) The dial pointer should indicate 530 KC. with the gang condenser in full mesh.

(b) Adjust the test oscillator to exactly 1400 KC.

(c) Tune in a broadcast station with a known frequency of about 1300 to 1400 KC. to determine whether the dial calibration is correct at the high frequency end of the dial. If no such station can be heard, tune in the 1400 KC. oscillator signal to check calibration.

(d) If the calibration is correct, do not adjust trimmer No. 6 (oscillator shunt trimmer). If the calibration is not correct, adjust trimmer No. 6 to give proper calibration at the high frequency end of the dial.

ALIGNMENT

4. (a) With the test oscillator set at 1400 KC. tune the receiver to the signal for maximum output.

(b) Adjust trimmer No. 7 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. 8 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 in 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 No. 6 and 7 at 1400 KC.

No trimmers are provided for alignment on the short wave band.

Diagram Number	Part Number	Description	List Price
1	71657	3000 ohm ¼ watt carbon resistor	$ .25
2-3-4	83082	260,000 ohm ¼ watt carbon resistor	.12
5	83278	Pilot lamp, No. 40, 6-8 volts	.15
6	83539	.260 mmfd. mica condenser	.20
7	83976	.01 mfd. 1000 V. shielded condenser	.40
8	84198	110,000 ohm ¼ watt carbon resistor	.12
9	84235	1.1 megohm ¼ watt carbon resistor	.12
10	85061	51 mmfd. mica condenser	.15
11	85061	10,000 ohm 1 watt carbon resistor	.20
12	85266	70,000 ohm ¼ watt carbon resistor	.20
13	85285	456 KC. wave trap trimmer	.40
14	85285	Variable padding condenser	.40
15	85691	500 ohm ½ watt wire wound resistor	.20
16	88007	.8 mfd 250 V. electrolytic condenser	1.00
17	88009	200 ohm ½ watt wire wound resistor	.15
18	88010	320 ohm 1½ watt wire wo'd resistor	.15
19	88014	456 KC. wave trap coil	.50
20	88017	2nd I.F. transformer	2.00
21	88026	.02 mfd. 400 V. paper condenser	.25
22	89826	.004 mfd. 750 V. paper condenser	.24
23	88030	.01 mfd. 400 V. paper condenser	.25
24	88033	.8 mfd. 350 V. electrolytic condenser	1.10
25-A / 25-B	88036	Volume control (22,000 ohm) / A.C. line switch	1.25
26	88037	Range switch	.60
27	88040	Output transformer (R-246-A or R-265-A speaker)	1.50
28	88044	Power transformer, 115 V. 60 cycle (167AS, 168A)	$4.20
	88138	Power transformer, 115 V. 25 cycle (167BS, 168B)	5.50
	89251	Power transformer, 220 V. 50 cycle (167KS)	3.75
	89756	Power transformer, 105 to 250 V., 50 to 133 cycles (167WS)	7.00
29-30-31 / 32-33-34	88046	.1 mfd. 150 V. paper condenser	.25
35	88054	Tone control switch	.30
36	88055	Fuse, ¾ ampere	.12
28	88138	Power transformer, 115 V. 25 cycle (167BS, 168B)	5.50
28	89251	Power transformer, 220 V. 50 cycle (167KS)	3.75
37-A to B	89500	Two gang condenser	3.25
38	89575	1st I.F. transformer	2.25
39	89576	Oscillator coil assembly	.75
40	89581	Antenna coil assembly	1.00
41	89587	320 mmfd. mica condenser	.24
28	89756	Power transformer, 105 to 250 V., 50 to 133 cycles (167WS)	7.00
22	89826	.004 mfd. 750 V. paper condenser	.24
42	R-246-A	5" dynamic speaker (R-167)	4.50
	R-265-A	8" dynamic speaker (R168)	5.80
13923		Spring washer for drive shaft	$ .05
88106		Dial gasket	.01
89361		Dial frame and bracket assembly	.25
89365		Driven disc and bearing assembly	.36
89378		Drive disc and shaft assembly	.30
89386		Dial glass	.15
89400		Dial scale	.50
89453		Pointer and stud assembly	.05
89613		Escutcheon	.55

MISCELLANEOUS PARTS

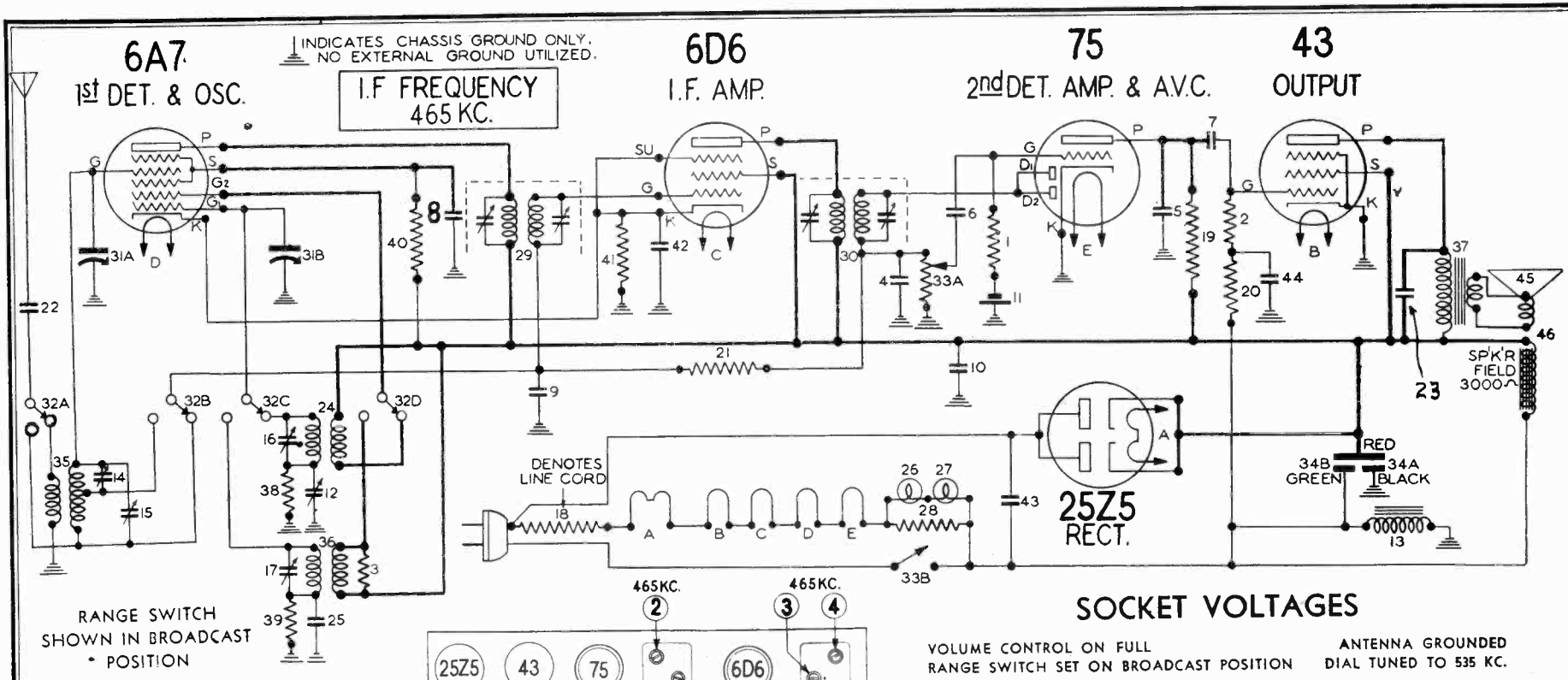
Part Number	Description	List Price
67590	Flat steel washer	$0.01
83552	No. 10x⅜ S.H.H. screw	.03
84805	Felt washer for knob	.01
88056	Fuse mounting	.15
88057	Fuse cover	.08
88115	Knob (push on)	.20
88161	Tube shield section	.08
88164	Tube shield cap	.06
89363	Light bracket assembly	.16
89381	Bearing drive for dial shaft	.05
89627	No. 2x¼ oval head wood screw	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORP. Chassis R-171

MODELS 1711 - 1719 incl.

Schematic, Socket, Voltage Trimmers



MODEL R-171

November 18, 1936

TUNING RANGE

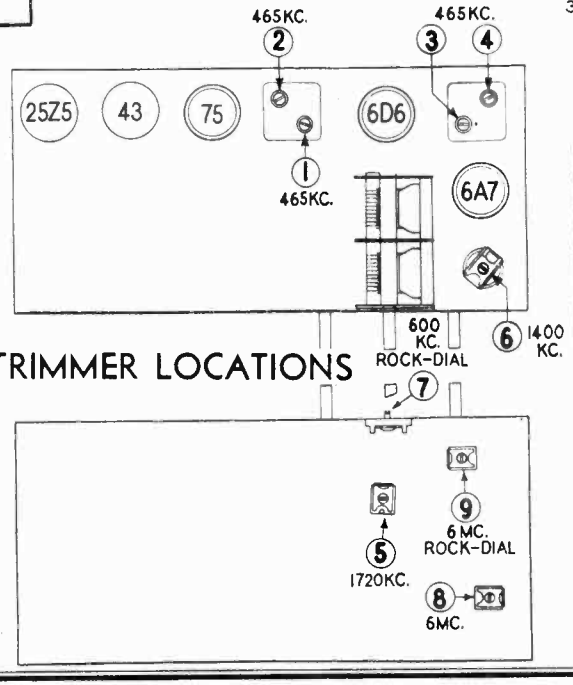
535 to 1720 KC

2.3 to 6.15 MC

ALIGNMENT

Trimmer Number		Alignment Frequency
1.	2nd I.F. Transformer Trimmer	465 KC.
2.	2nd I.F. Transformer Trimmer	465 KC.
3.	1st I.F. Transformer Trimmer	465 KC.
4.	1st I.F. Transformer Trimmer	465 KC.
5.	Broadcast oscillator shunt trimmer	1720 KC.
6.	Broadcast antenna trimmer	1400 KC.
7.	Broadcast oscillator series padder	600 KC.
8.	Short-wave oscillator shunt trimmer	6 MC.
9.	Short-wave antenna shunt trimmer	6 MC.

TRIMMER LOCATIONS



SOCKET VOLTAGES

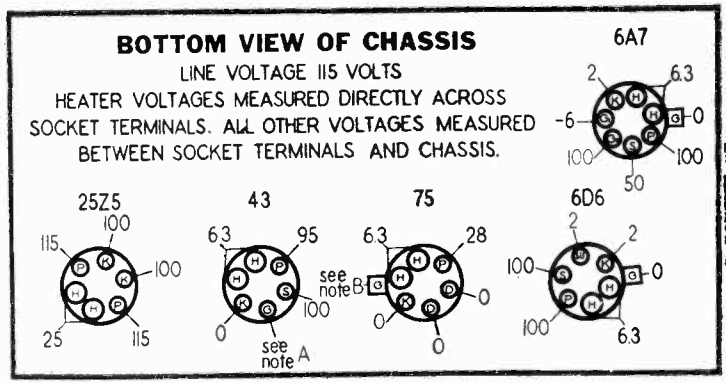
VOLUME CONTROL ON FULL
RANGE SWITCH SET ON BROADCAST POSITION

ANTENNA GROUNDED
DIAL TUNED TO 535 KC.

BOTTOM VIEW OF CHASSIS

LINE VOLTAGE 115 VOLTS

HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.



REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The control grid voltage of the 43 output tube is —16 volts measured across choke 13.

NOTE B: The control grid bias of the triode section of the 75 tube is —1 volt as supplied by the bias cell (number 11), however, this voltage can be measured only with a vacuum tube voltmeter.

ALIGNING THE I.F. AMPLIFIER

(a) Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure.

(b) Turn the range switch to the broadcast position (fully clockwise).

(c) Connect the test oscillator output leads to the 6A7 control grid and chassis with a .1 mfd. condenser in series with the oscillator output.

(d) Set the oscillator to exactly 465 KC.

(e) Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

(f) 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

(a) With the gang condenser in full mesh, the dial pointer should be on the horizontal line below 540 KC. on the dial scale.

(b) Turn the range switch to the clockwise position and connect the test oscillator output to the antenna lead of the receiver with a 400 ohm carbon resistor in series with the antenna lead and the oscillator output.

(c) Adjust the test oscillator to exactly 1720 KC. and turn the receiver dial pointer to 1720 KC. on the tuning dial.

(d) To calibrate the dial, adjust trimmer No. 5 for maximum output.

(e) Adjust the test oscillator to 1400 KC. and carefully tune the receiver to the signal.

(f) Adjust trimmer No. 6 for maximum output.

(g) Adjust the test oscillator to 600 KC. and tune the receiver to the signal.

(h) 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.

(i) Check the adjustment of trimmer 5 at 1720 KC. and trimmer 6 at 1400 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT

(a) Turn the range switch to the short wave position (counter-clockwise).

(b) Adjust the test oscillator to exactly 6.0 MC.

(c) 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 oscillator shunt trimmer No. 8.

(d) 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 trimmed screw farthest out.

(e) 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 dial. Continue detuning No. 9 and retuning the dial until the output meter deflection is a maximum.

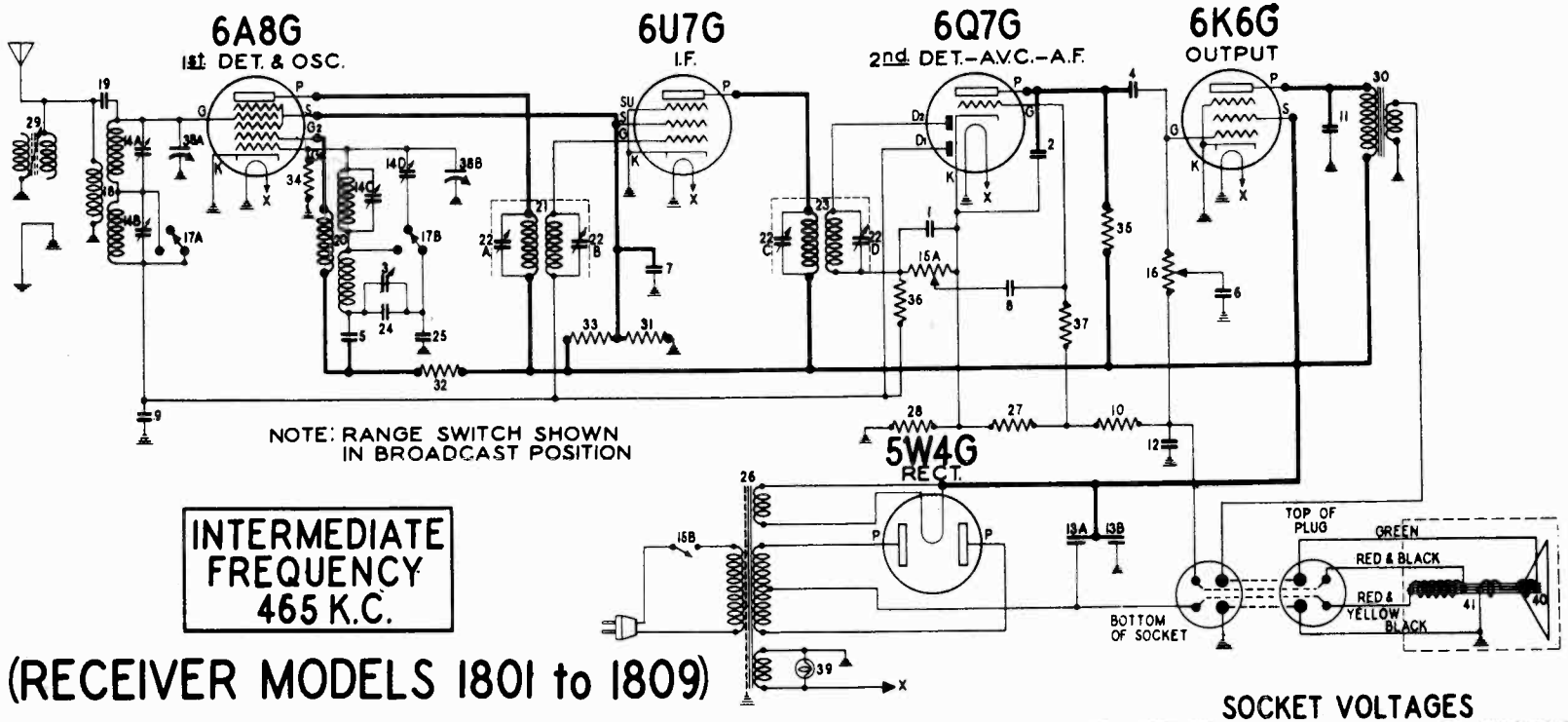
PARTS LIST

Diagram Number	Part Number	DESCRIPTION	List Price
1-2	67262	500,000 ohm, ¼ watt carbon resistor	$0.12
3	67580	6,000 ohm, ¼ watt carbon resistor	.25
4-5	81155	500 mmfd. molded mica condenser	.25
6-7	88189	.05 mfd. 200 volt paper condenser	.25
8-9-10	89421	.1 mfd. 200 volt paper condenser	.25
11	89849	Grid bias cell (1 volt)	.22
12	89938	Padding trimmer (300 to 600 mmfd.)	.55
13	89939	Filter choke	.92
14-15 / 16-17	89940	Trimmer condenser (3 to 45 mmfd.)	.21
18	89941	Line cord (130 ohms)	1.00
19-20	89942	250,000 ohm ¼ watt carbon resistor	.19
21	89943	1 megohm ¼ watt carbon resistor	.19
22-23	89944	.005 mfd. 600 volt paper condenser	.18
24	89945	Broadcast oscillator coil	.65
25	89946	2100 mmfd. molded mica condenser	.28
26-27	89947	Dial lamp (6.3 volt 0.25 ampere)	.19
28	89948	140 ohm 1½ watt wire-wound resistor	.28
29	89949	1st I.F. transformer and shield	1.25
30	89950	2nd I.F. transformer and shield	$1.25
31A-31B	89951	Two-gang variable condenser	2.50
32A to D	89952	Range switch	.69
33A / 33B	89953	Volume control (500,000 ohms) / Line switch	1.00
34A / 34B	89954	12 mfd. 150 volt dry elect. condenser / 20 mfd. 150 volt dry elect. condenser	1.50
35	89955	Antenna coil	.85
36	89956	Short-wave oscillator coil	.85
38	89959	50,000 ohm, ¼ watt carbon resistor	.19
39-40	89960	25,000 ohm, ¼ watt carbon resistor	.19
41	89961	150 ohm, ¼ watt carbon resistor	.19
42	89962	.2 mfd. 200 volt paper condenser	.23
43	89963	.05 mfd. 400 volt paper condenser	.18
44	89964	.25 mfd. 200 volt paper condenser	.24
46	89966	5" Dynamic speaker (complete)	4.75

MISCELLANEOUS AND DIAL PARTS

Part Number	DESCRIPTION	List Price
89967	Dial escutcheon less glass	$0.45
89971	Knob (small), volume control and range switch	.19
89972	Knob (large), tuning control	.18
89973	Dial assembly (complete)	.54
89974	Dial scale	.39
89975	Dial glass for escutcheon	.35

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



INTERMEDIATE FREQUENCY 465 K.C.

(RECEIVER MODELS 1801 to 1809)

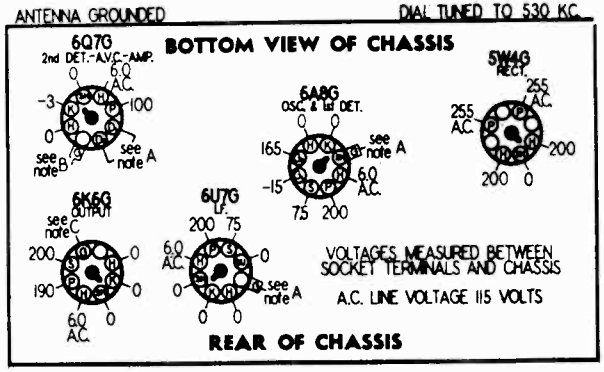
STEWART-WARNER R-180 CHASSIS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	$ .20
3	85285	Condenser - padding	.40
4-5-6	88030	Condenser - paper .01 mfd. 400 volt	.25
7	88048	Condenser - paper .1 mfd. 150 volt	.25
8	88189	Condenser - paper .05 mfd. 200 volt	.25
9	88534	Condenser - paper .05 mfd. 150 volt	.25
10	88585	Resistor - wire wound 240 ohms 1 watt	.15
11	89826	Condenser - paper .004 mfd. 750 volts	.24
12	110377	Condenser - elect. 10 mfd. 25 volts	.80
	112113	Condenser - electrolytic 10 mfd. 50 volt (Model 180-W)	1.50
13A-13B	110497	Condenser - elect. (Sect. A-8 mfd. Sect. B-8 mfd.)	1.50
	112359	Condenser - electrolytic dual 8 mfd. (Model 180-W)	1.50
14A to D	110498	Condenser - trimmer strip	.75
15A-15B	110503	Volume control - 1 meg. with off-on sw.	1.25
16	110504	Tone control - 500,000 ohms	.95
17A-17B	110505	Switch - range	.90
18	110508	Coil - antenna	1.15
19	110510	Condenser - wire 3 mmfd.	.12
20	110512	Coil - oscillator	.85
21	110514	Transformer - 1st I.F.	2.00
22A to D	110516	Condenser - trimmer strip (for I.F. trans.)	.58
23	110520	Transformer - 2nd I.F.	2.00
24	111127	Condenser - mica 520 mmfd. (3%)	.24
25	110523	Condenser - mica 1,980 mmfd. (3%)	.32
26	110524	Transformer - power 115 volt 60 cycle	$4.20
	111956	Transformer - power 115 volt 25 cycle (Model 180-B)	7.00
	112022	Transformer - power 105-250 volt 50-133 cycle (Model 180-W)	9.75
27	110534	Resistor - wire wound 40 ohm 1/2 watt	.12
28	110535	Resistor - wire wound 75 ohm 1/2 watt	.12
29	110536	Coil - wave trap	1.02
30	110537	Transformer - output (Model 180A-180B)	1.50
	112100	Transformer - output (Model 180-W)	1.25
31	110571	Resistor - carbon 12,000 ohm 1/2 watt	.15
32	110550	Resistor - carbon 10,000 ohm 1/2 watt	.15
33	110551	Resistor - carbon 15,000 ohm 1 watt	.12
34	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
35	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
36-37	110554	Resistor - carbon 1 megohm 1/4 watt	.12
38A-38B	110600	Condenser - variable gang	3.50
39	110629	Lamp - pilot, 6.3 volt - .25 amp.	.22
40	110932	Cone - and voice coil assembly (for 275-A speaker)(Model 1801)	1.70
	110944	Cone - voice coil assembly (for R-278-A speaker)(Model 1803-1805)	1.60
	110946	Cone - and voice coil assembly (for R-285-A speaker)(Model 1802)	1.90
41	R-275-A	Speaker - dynamic (5 inch)(Model 1801)	6.50
	R-278-A	Speaker - dynamic (8 inch)-(1803-1805)	8.50
	R-285-A	Speaker - dynamic (8 inch)(Model 1802)	9.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6U7-G and the diode plates of the 6Q7-G is -3 volts measured across resistor 28.

NOTE B: The bias for the control grid of the 6Q7-G triode section is -5 volts measured across resistors 27 and 28.

NOTE C: The bias for the control grid of the 6K6-G tube is -14 volts measured across resistors 10, 27 and 28.

MODELS 1801-1809 incl.
Chassis R-180
Alignment, Trimmers
Parts

STEWART-WARNER CORP.

MODEL R-180 CHASSIS (RECEIVER MODELS 1801 to 1809)

The Model R-180 chassis is a five tube, two band superheterodyne receiver. It has an intermediate frequency of 465 KC. and tuning ranges of 525 to 1750 KC. and 2200 to 7000 KC.

REMEDY FOR SLIPPING DIAL MECHANISM.

Slipping of the dial mechanism may be due to binding of the pointer hub against the hole in the dial scale. To remedy, remove the pointer by twisting it, then center the dial scale hole around the pointer shaft by moving the dial scale.

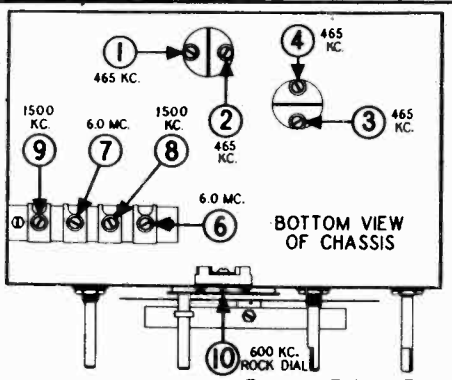
ALIGNMENT EQUIPMENT & PROCEDURE

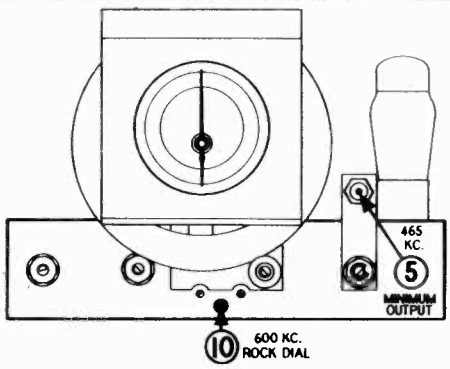
For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 6.0 MC. are required.

IMPORTANT: THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND.

1. Connect the output meter across the voice coil or between the plate of the 6K6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer on the horizontal black line below 530 KC, on the dial.
5. Using a bakelite screw driver proceed to align in exactly the same order as shown in the table below.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER.	CONTROL GRID OF 6A8G TUBE (Do not remove grid clip)	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 - 2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3 - 4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA LEAD	465 KC.	BROADCAST Clockwise	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD	6.0 MC.	SHORT-WAVE Counter-clockwise	6.0 MC.	6	SHORT-WAVE OSCILLATOR	ADJUST TO SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6.0 MC. WITH TRIMMER SCREW FARTHER OUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD	6.0 MC.	SHORT-WAVE Counter-clockwise	TUNE TO 6.0 MC. GENERATOR SIGNAL	7	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	BROADCAST Clockwise	1500 KC.	8	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN.SIG.	9	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	10	BROADCAST OSCILLATOR Series Pad	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.





DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
83552	Bolt - chassis mounting (#10x7/8")	$ .03
110507	Bracket - for mtg. electrolytic condenser	.05
110601	Bracket - for dial & pilot light mounting	.07
110486	Clamp - for mounting 5 inch speaker	.05
110487	Clamp - for mounting 8 inch speaker	.06
89912	Clip - grounding, for tube base	.02
110612	Disc - dial drive	.09
110650	Escutcheon - with celluloid window	2.00
111125	Knob - for all controls	.18
112126	Knob - all controls (Model 1803)	.18
12349	Nut - 8-32 for speaker mounting Per C	.45
110496	Plug - speaker (4 prong)	.12
110622	Pointer - dial	.17
110615	Reflector - for dial & support plate	.25
110611	Retaining ring - for drive shaft	.02
110621	Scale - dial	1.00
110674	Screw - escutcheon mounting (#2x3/8")	.02
68822	Screw - ornamental head 8-32 (speaker mtg.)	$ .02
85040	Screw - self tapping (6x1/4") Per C	.25
83624	Screw - self tapping (8x1/4")	.01
110606	Shaft - drive; and disc assembly	.16
88161	Shield - tube (short section)	.08
88164	Shield cap - tube, grid type	.06
89911	Shield - tube, base	.04
85427	Socket - octal base	.15
110626	Socket - pilot light	.22
110501	Socket - speaker (4 prong)	.16
84015	Washer - felt, for back of knobs	.01
77223	Washer - speaker mounting	.01
110610	Washer - spring for drive shaft	.02
67590	Washer - steel; chassis mounting	.01
110613	Washer - flat for dial drive	.01
110614	Washer - spring, dial drive disc retaining	.03

FORM NO. 8491 10-27-37 PRINTED IN U.S.A.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

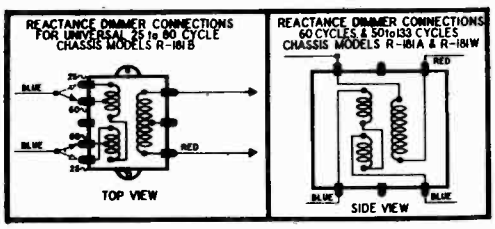
Chassis R-181W
Phono.Schematic
Chassis R-181A,R-181B Data

STEWART-WARNER CORP.

MODELS 1811-1819 incl.
Chassis R-181
Schematic,Socket,Voltage
Parts

STEWART-WARNER R-181 CHASSIS

(RECEIVER MODELS 1811 to 1819)



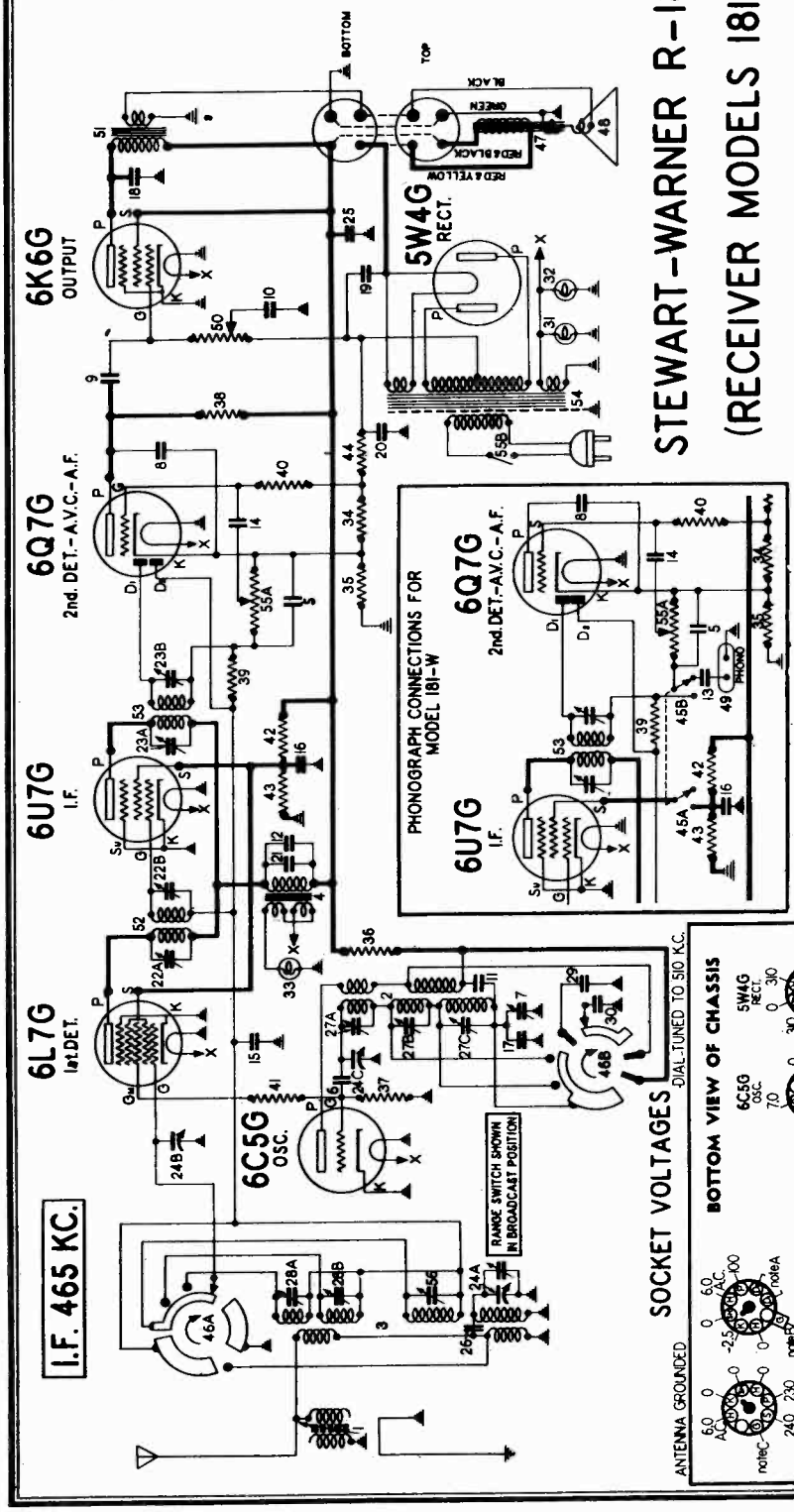


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
24A to C-	110743	Condenser - variable gang	4.50
25----	110768	Condenser - elect. 8 mfd. 450 volt	1.25
25----	112108	Condenser - electrolytic 8 mfd. 450 volt (Model 181-W only)	1.30
26-----	110850	Condenser - wire 7 mmf.	.18
27A to C-	110859	Condenser - trimmer (3 section for osc. coil)	.65
28A to B-	110882	Condenser - trimmer (2 section for ant. coil)	.44
29-----	110906	Condenser - mica .00332 mfd.(3%)	.40
30-----	110907	Condenser - mica 980 mmfd. (3%)	.30
31-32----	110629	Lamp - dial: 6.3 volt - .25 amps	.15
33-----	110911	Lamp - dim. reactor 2.5 V.,.5 amp.	.15
34------	88465	Resistor - wire wd. 25 ohm ½ watt	.15
35-----	110534	Resistor - wire wd. 40 ohm ½ watt	.12
36-----	110550	Resistor - carbon 10000 ohm ½ watt	.15
37------	110552	Resistor - carbon 47,000 ohm ½ watt	.12
38-----	110553	Resistor - carbon 220,000 ohm ½ W.	.12
39-40----	110554	Resistor - carbon 1 megohm ½ watt	.12
41-----	110560	Resistor - carbon 100 ohm ½ watt	.12
42-----	110561	Resistor - carbon 15,000 ohm 2 W.	.30
43-----	110562	Resistor - carbon 22,000 ohm ½ W.	.12
44-----	110872	Resistor - wire wd. 160 ohm 1 watt	.12
45A to B-	84404	Switch - phono toggle(model 181-W)	1.10
46A to B-	110856	Switch - range	1.20
47----	R-276-A	Speaker -dyn. 6"(models 1812-1811)	6.00
	R-279-A	Speaker - dynamic 10" (model 1815)	8.00
48---	110942	Cone - Spkr. & voice coil assem. for R-276 spkr.)	1.20
	110945	Cone - and voice coil assem. (for R-279-A spkr.)	1.80
49------	89709	Terminal strip - phono(model 181W)	.15
50-----	110767	Tone control - (500,000 ohm)	.80
51----	110789	Transformer - output (model 181-A or 181-B)	1.65
	112105	Transformer - output (Model 181-W)	1.65
52-----	110851	Transformer - 1st I.F.	1.85
53-----	110853	Transformer - 2nd I.F.	1.65
54----	110862	Transformer - power (115 V. 60 C)	5.00
	112076	Transformer - power (115 V. 25 C)	7.50
	112119	Transformer-Power 100-240 V. 50-133	7.75
55A to B-	110786	Volume control - 1 megohm (with on-off switch)	.90
56-----	110864	Condenser - trimmer (single section for antenna coil)	.24
1-----	110536	Coil - antenna trap	$1.02
2-----	110860	Coil - Osc. (Less trimmers)	1.40
3----	110881	Coil - assembly (antenna & preselector) with trimmer	3.00
4----	110786	Coil - dimmer reactor (60 cycle)	2.25
	110996	Coil - reactance dimmer (25 to 60 cycle) (Model 181-B only)	3.00
	112152	Coil - reactance dimmer (for 181-W only)(50 to 133 cycle)	2.50
5------	83539	Condenser - mica 260 mmfd.	.20
6------	85061	Condenser - mica 51 mmfd.	.15
7------	85285	Condenser - padding	.40
8------	85394	Condenser - mica 510 mmf.	.25
9------	88026	Condenser - paper .02 mfd.-400 V.	.25
10-11----	88030	Condenser - paper .01 mfd.-400 V.	.25
12-13----	88046	Condenser - paper .1 mfd. 150 V.	.25
14------	88189	Condenser - paper .05 mfd.-200 V.	.25
15------	88534	Condenser - paper .05 mfd.-150 V.	.25
16------	89421	Condenser - paper .1 mfd.-200 V.	.25
17------	89564	Condenser - mica 345 mmfd. (3%)	.40
18----	89826	Condenser - paper .004 mfd. - 750 volt (used in early production	.24
	111214	Condenser - paper .01 mfd. 600 volt (used in late production	.24
19------	89937	Condenser - elect. 30 mfd.-450 V.	1.60
20-21----	110377	Condenser - elect. 10 mfd.-25 volt	.80
	112113	Condenser - elect. 10 mfd. 50 volt (for model 181-W only)	.85
22A to B 23A to B	110516	Condenser - trimmer strip (for I.F. transformer)	.58

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7G, 6U7G, and the diode plates of the 6Q7G is -2.5 volts measured across resistor number 35.

NOTE B: The bias for the control grid of the 6Q7G is -4 volts measured across resistors 34 and 35.

NOTE C: The bias for the control grid of the 6K6G output tube is -16 volts measured across resistors 34, 35, and 44.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 1811-1819 incl.
Chassis R-181
Alignment, Trimmers, Parts
Dial Data

STEWART-WARNER CORP.

MODEL R-181 CHASSIS (RECEIVER MODELS 1811 to 1819)

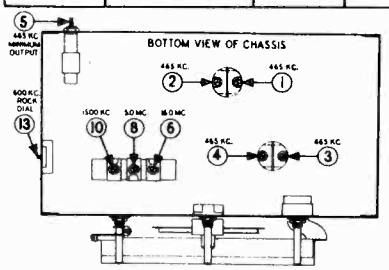
ALIGNMENT EQUIPMENT & PROCEDURE

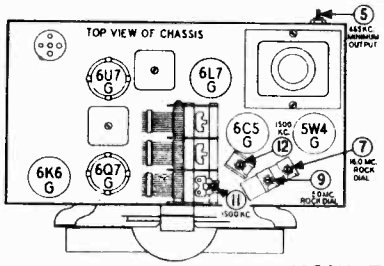
For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 8.0 MC. are required.

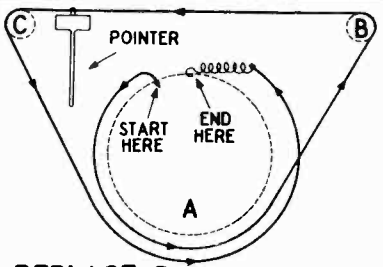
1. Connect the output meter across the voice coil or between the plate of the 6K6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer on the last scale division on the low frequency end of the dial. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT:—THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7G TUBE	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 - 2	1ST I.F.	ADJUST FOR MAXIUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3 - 4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	16 MC.	6	SHORT-WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	7	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	8	POLICE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	9	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	1500 KC.	10	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN.SIG.	11	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
					12	DETECTOR	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	13	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.







DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
110712	Band Indicator - assembly	$ .35
110693	Bracket - dial assembly (right hand)	.25
110694	Bracket - dial assembly (left hand)	.25
88810	Bushing - rubber for chassis mtg.	.03
89912	Clip - tube grounding	.02
81068	Cord - dial drive (35" lengths) Per Ft.	.05
110782	Cord - for band indicator (2 ft.)	.10
110715	Drive shaft - bracket & indicator assem.	1.00
110690	Drum - and disc assembly	.48
111030	Escutcheon - & glass window (model 1815&1811)	1.30
111850	Escutcheon - & glass window (model R-1812-A)	1.75
110707	Frame - dial, with scale complete	1.70
110679	Knob - (model 1815 all controls)(model 1811 tuning control only)	.20
111254	Knob - tuning (model 1812 only)	.25
111255	Knob - tone, volume & range (model 1812 only)	.25
111125	Knob - tone, volume & range (model 1811 only)	.18
110784	Lever - assembly for band indicator	.12
110498	Plug - speaker (4 prong)	.12
36437	Pin - escutcheon mtg. (no. 18 X 5/16") Per C	.10
110785	Pointer - dial	.14
110711	Scale - dial	.85
87449	Screw - 8X3/8" self tapping (for dial brkts)	.03
110716	Screw - band indicator pivot	.03
110800	Screw - #10 x 1 for chassis mtg.	.03
88161	Shield - tube, short section	.08
88162	Shield - tube, long section	.08

HOW TO REPLACE DIAL CORD

Before attempting to replace the dial cord, fully mesh the gang condenser. The holes in drum A should be in the top position as shown in the diagram above.

The pointer drive cord should be 33 inches or more in length. Place one end of the cord through the left hole in drum; then knot the end. Run the free end of the cord down around the drum and up to pulley B. Continue over pulley B to pulley C, then down to drum A. Bring the cord up around drum D. Tie the cord to the end of the tension spring so that the spring will be extended to about 1-1/8 inches, when hooked to the slot in the drum. Now place the pointer on its track so that it points to the last scale division on the low frequency end of the dial, then clip it to the cord.

PART NUMBER	DESCRIPTION	LIST PRICE
88164	Shield - tube cap	.08
89911	Shield - tube base	.04
85427	Socket - octal base	.15
110501	Socket - 4 prong (for spkr.)	.16
110627	Socket - dial lamp	.12
110910	Socket - assembly for dimmer light	.25
110817	Speed nut - retainer for escu. to cabinet	.01
81039	Spring - for tightening drive rope	.10
110719	Spring - for band indicator	.05
85785	Terminal strip - (G.-A.)	.15
87588	Washer - embossed (for mtg. 89937 elect.)	.05
89746	Washer - (paper) for back of knobs	.005
110829	Washer - flat steel, for mtg. chassis	.01

FORM NO. 6492 PRINTED IN USA

Parts
Chassis R-182W Phono.
Chassis R182A, R182B Data

STEWART-WARNER CORP.

MODELS 1821-1829 incl.
Chassis R-182
Schematic, Socket, Voltage

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7G, 6U7G, and the diode plates of the 6H6G is -2.5 volts measured across resistor no. 37.

NOTE B: The bias for the control grid of the 6V6G is -12.5 volts measured across resistors number 37 and 48.

R-182 CHASSIS

MODELS 1821 to 1829

SOCKET VOLTAGES

DIAL TUNED TO 520 KC.
ANTENNA GROUNDED

MODEL R-182 PARTS LIST

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	110536	Coil - wave trap	$1.02
	110786	Coil - reactance dimmer (60 cycle)	2.25
	112152	Coil - reactance dimmer (for 182-W only) (25 to 60 cycle)	2.50
2	110906	Coil - osc. (less trimmers) model 182-B only	3.00
3	110860	Coil - osc. (less trimmers)	1.40
4	110861	Coil - assembly (antenna & preselector) with trimmer	3.00
5	83539	Condenser - mica 280 mmfd.	.20
6	85081	Condenser - mica 51 mmfd.	.15
7	85285	Condenser - padding 150 mmfd.	.25
8	85286	Condenser - padding 530 mmfd.	.25
9	88024	Condenser - paper .02 mfd. 400 volt	.25
10	88030	Condenser - paper .01 mfd. 400 volt	.25
11-12	88046	Condenser - paper .1 mfd. 150 volt	.25
13-14-15	88189	Condenser - paper .05 mfd. 200 volt	.25
16	86534	Condenser - paper .05 mfd. 150 volt	.25
17	89421	Condenser - paper .1 mfd. 200 volt	.25
18	89604	Condenser - mica 345 mmfd. (360)	.40
19	89427	Condenser - elect. 30 mfd. 150 volt	1.40
20	110877	Condenser - elect. 10 mfd. 25 volt	.80
20-21	112113	Condenser - electrolytic 10 mfd. 50 volt (for model 182-W only)	.85
22A - 22B	110516	Condenser - trimmer strip (for I. F. transformer	.58
23A - 23B	110743	Condenser - variable gang	4.50
24A to C	110768	Condenser - elect. 8 mfd. 450 volt	1.25
25	112108	Condenser - electrolytic 8 mfd. 450 volt (model 182-W only)	1.30

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
26	110850	Condenser - wire 7 mmf.	.18
27	110854	Condenser - trimmer (single section for antenna coil)	.24
28A to C	110859	Condenser - trimmer (3 section for oscillator coil)	.65
29A - 29B	110882	Condenser - trimmer (2 section for antenna coil)	.44
30	110906	Condenser - mica .00332 mfd. (3%)	.40
31	110907	Condenser - mica 980 mmfd. (3%)	.30
32	89826	Condenser - paper .004 mfd. 750 volt (used in early production)	.24
	111214	Condenser - paper .01 mfd. 600 volt (used in late production)	.24
33-34	110829	Lamp - dial 6.3 volt - .25 amps.	.15
35	110911	Lamp - dimmer reactor 2.5 volt .5 amp.	.15
36	110550	Resistor - carbon 10,000 ohms 1/2 watt	.15
37	110534	Resistor - wire wound 40 ohm 1/2 watt	.12
38	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
39	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
40	110554	Resistor - carbon 1 megohm - 1/4 watt	.12
41	110560	Resistor - carbon 100 ohm 1/4 watt	.12
42	110561	Resistor - carbon 15,000 ohm 2 watt	.30
43	110562	Resistor - carbon 22,000 ohm 1/2 watt	.12
44-45	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
46	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
47	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
48	110928	Resistor - wire wound 150 ohms 1 watt	.12
49	85-277-A	Speaker - dynamic 8 inch (MODEL 1821)	7.50
	85-280-A	Speaker - dynamic 10 inch (MODEL 1825)	9.00
50	110943	Cone - voice coil assem. for R-277-A spkr. (Do not place gasket between cone and frame)	1.70
	110945	Cone - voice coil assem. (For R-280-A speaker)	1.80
51A - 51B	84404	Switch - phono toggle	1.10
52A - 52B	110858	Switch - range	1.20
53	89709	Terminal Strip - phono	.15
54	110787	Tone Control - (500,000 ohm)	.80
55	110851	Transformer - 1st I. F.	1.85
56	110853	Transformer - 2nd I. F.	1.65
57	110862	Transformer - power (115 volt 60 cycle)	5.00
	112076	Transformer - power (115 volt 25 cycle)	7.50
	112119	Transformer - power (100-240 volt)(50-133 cycle)	7.75
58	110925	Transformer - output (Model 181A or 181B)	1.75
	112154	Transformer - output (Model R-181-W)	1.70
59A - 59B	110927	Vol. Cont. - 1 meg. (with on-off switch)	1.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
		$
110712	Band Indicator - assembly	.35
110683	Bracket - dial support (R.H.)	.25
110694	Bracket - dial support (L.H.)	.25
110487	Clamp - for mtg. 8 inch speaker	.06
89912	Clip - grounding, for tube base	.02
81068	Cord - dial drive (35" lengths) Per Pr.	.05
110782	Cord - for band indicator (2 Ft.)	.10
110690	Drum - and disc assembly	.48
111030	Escutcheon - with glass window	1.30
110707	Frame - dial, with scale complete (Model 1825)	1.70
110679	Knob - tuning (Model 1821); all controls	.20
111125	Knob - tone, vol. & range (Model 1821 only)	.18
110784	Lever - assembly for band indicator Per C	.12
12349	Nut - 8-32 for speaker mtg. Per C	.45
36437	Pin - escutcheon mtg. (No. 18 x 5/16") Per C	.10
110496	Plug - speaker (4 prong)	.12
110785	Pointer - dial	.14
110711	Scale - dial	.85
67449	Screw - 8x3/8" Self tapping (for dial brkts)	.03
110716	Screw - band indicator pivot	.03
110830	Screw - #10 x 1 for chassis mtg.	.03
85827	Set Screw - 8/32 (squarehead)	.04
110715	Shaft - dial drive (brkt. & indic. assem.)	1.00
88161	Shield - tube (short section)	.08
88162	Shield - tube (long section)	.08
88164	Shield Cap - tube, grid type	.05
89911	Shield - tube base	.04
85427	Shield - octal base	.15
110501	Socket - 4 prong (for speaker)	.16
110627	Socket - dial lamp & dimmer lamp	.12
110817	Speed Nut - retainer for escu. to cabinet	.01
81069	Spring - for tightening drive rope	.10
110719	Spring - for band indicator	.05
85785	Terminal strip (G, A)	.15
67568	Washer - embossed (for mtg. 89937 elect.)	.05
77223	Washer - speaker mtg. (for back of knobs)	.01
89746	Washer - (paper) for back of knobs	.005
110629	Washer - flat steel, for mtg. chassis	.01

MODELS 1821-1829 incl.
Chassis R-182
Alignment, Trimmers
Dial Data

STEWART-WARNER CORP.

MODEL R-182 CHASSIS
(RECEIVER MODELS 1821 to 1829)

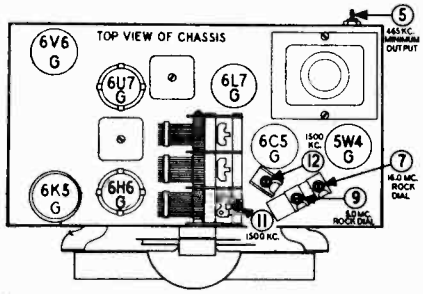
ALIGNMENT EQUIPMENT & PROCEDURE

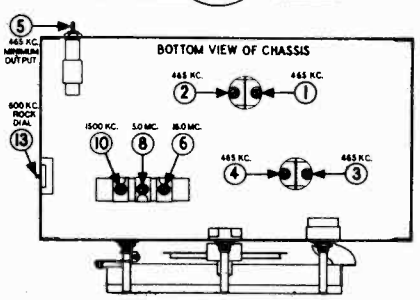
For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18 MC. are required.

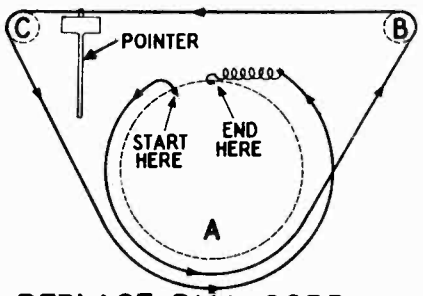
1. Connect the output meter across the voice coil or between the plate of the 6V6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer on the last scale division on the low frequency end of the dial. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT:—THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND AND POLICE BAND.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7G TUBE	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 - 2	1ST I.F.	ADJUST FOR MAXIUM OUTPUT. THEN REPEAT AD JUSTMENT.
					3 - 4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	16 MC.	6	SHORT-WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	7	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	8	POLICE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	9	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	1500 KC.	10	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN.SIG.	11	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
					12	DETECTOR	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	13	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.







HOW TO REPLACE DIAL CORD

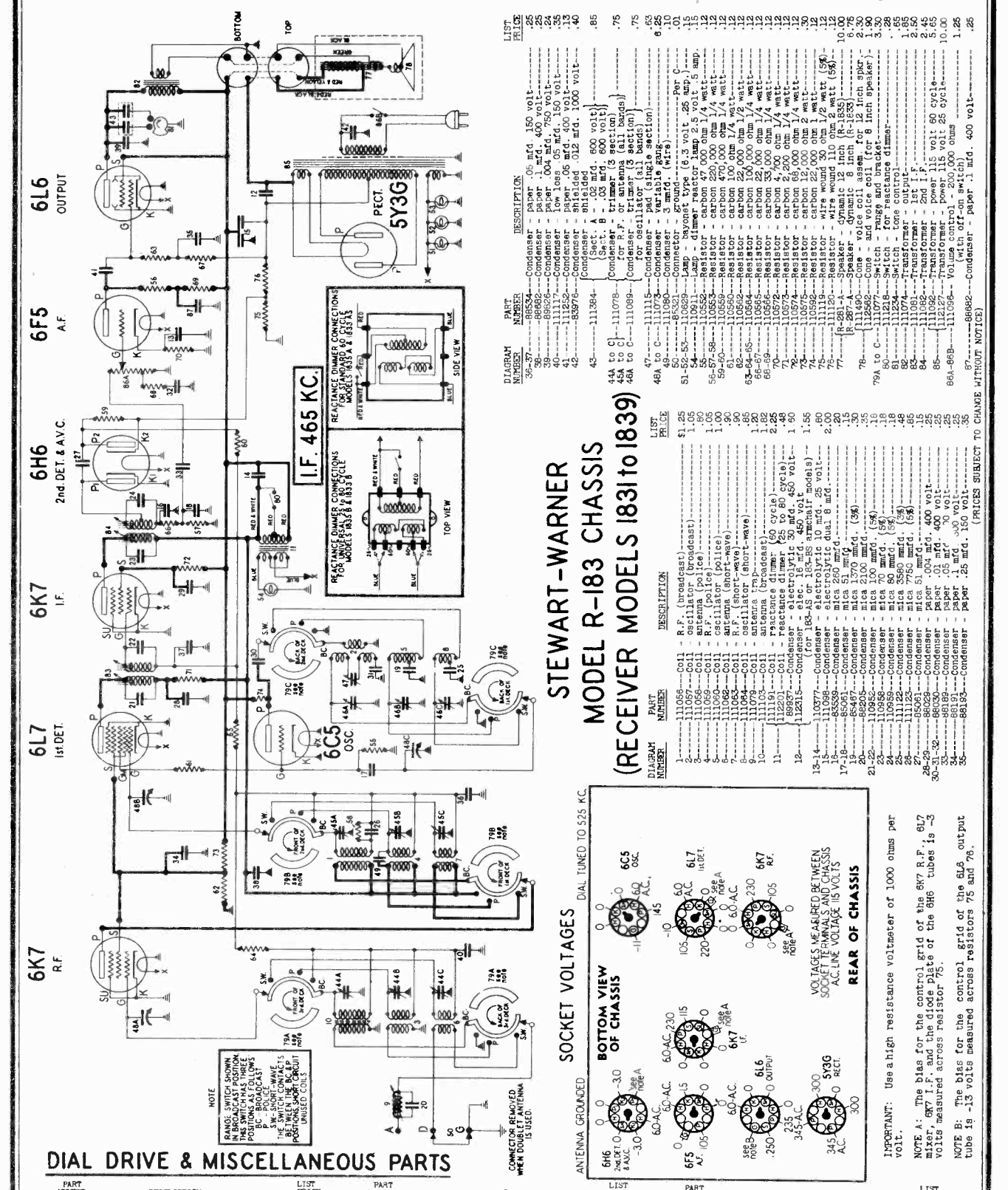
Before attempting to replace the dial cord, fully mesh the gang condenser. The holes in drum A should be in the top position as shown in the diagram above.

The pointer drive cord should be 33 inches or more in length. Place one end of the cord through the left hole in drum; then knot the end. Run the free end of the cord down around the drum and up to pulley B. Continue over pulley B to pulley C, then down to drum A. Bring the cord up around drum D. Tie the cord to the end of the tension spring so that the spring will be extended to about 1-1/8 inches, when hooked to the slot in the drum. Now place the pointer on its track so that it points to the last scale division on the low frequency end of the dial, then clip it to the cord.

Schematic, Socket, Voltage Parts. Dimmer Connections

STEWART-WARNER CORP

MODELS 1831-1839 incl. Chassis R-183



STEWART-WARNER MODEL R-183 CHASSIS (RECEIVER MODELS 1831 to 1839)

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	111056	Coil - R.F. (broadcast)	$1.25
2	111057	Coil - oscillator (broadcast)	1.05
3	111058	Coil - antenna (police)	.80
4	111059	Coil - R.F. (police)	1.05
5	111060	Coil - oscillator (police)	1.00
6	111061	Coil - antenna (short-wave)	.90
7	111062	Coil - R.F. (short-wave)	.80
8	111063	Coil - oscillator (short-wave)	.90
9	111064	Coil - antenna (broadcast)	.85
10	111079	Coil - antenna trap (broadcast)	1.20
11	111103	Coil - reactance dimmer (60 cycle)	1.82
	111191	Coil - reactance dimmer (25 to 80 cycle)	2.25
	112201	Coil - reactance dimmer (25 to 80 cycle)	.48
12	89987	Condenser - electrolytic 30 mfd. 450 volt	1.50
	112515	Condenser - elec. 16-8 mfd. 450 volt (Armchair models)	1.55
13-14	110377	Condenser - electrolytic dual 8 mfd. 475 volt	.80
15	111098	Condenser - electrolytic dual 8 mfd.	2.00
16	83539	Condenser - mica 260 mmfd.	.20
17-18	85061	Condenser - mica 51 mmfd.	.15
19	85467	Condenser - mica 1370 mmfd. (5%)	.30
20	88205	Condenser - mica 2100 mmfd. (5%)	.35
21-22	110852	Condenser - mica 100 mmfd. (5%)	.18
23	110853	Condenser - mica 80 mmfd. (5%)	.18
24	110854	Condenser - mica 350 mmfd. (5%)	.18
25	111122	Condenser - mica 3500 mmfd. (5%)	.18
26	111123	Condenser - mica 7750 mmfd. (5%)	.18
27	05061	Condenser - mica 51 mmfd.	.15
28-29	86029	Condenser - paper .004 mfd. 400 volt	.25
30-31-32	88030	Condenser - paper .01 mfd. 400 volt	.25
33	88189	Condenser - paper .05 mfd. 90 volt	.25
34	88191	Condenser - paper .1 mfd. 400 volt	.25
35	88193	Condenser - paper .25 mfd. 150 volt	.35

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
36-37	86534	Condenser - paper .06 mfd. 150 volt	.25
38	86682	Condenser - paper 1 mfd. 400 volt	.25
39	89826	Condenser - paper .004 mfd. 750 volt	.24
40	111117	Condenser - low loss .05 mfd. 150 volt	.35
41	111252	Condenser - paper .06 mfd. 400 volt	.13
42	83976	Condenser - shielded .012 mfd. 1000 volt	.40
43	111384	Condenser - shielded (Sect. A - .02 mfd. 600 volt) (Sect. B - .03 mfd. 600 volt)	.85
44A to C	111078	Condenser - trimmer (3 section) for antenna (all bands)	.75
45A to C		for R.F.	
46A to C	111089	for oscillator (all bands)	
47	111115	Condenser - pad (single section)	.75
48A to C	111073	Condenser - variable gang	.63
49	111080	Condenser - 3 mmfd. (wire)	6.25
50	87321	Connector - ground	.10
51-52-53	110911	Lamp - bayonet type (6.3 volt .26 amp.)	.01
54	110869	Lamp - dimmer (2 volt .5 amp.)	.15
55	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
56-57-58	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
59-60	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
61	110560	Resistor - carbon 100 ohm 1/4 watt	.12
62	110562	Resistor - carbon 22,000 ohm 1/2 watt	.12
63-64-65	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
66-67	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
68-69	110571	Resistor - carbon 47,000 ohm 1/4 watt	.12
70	110572	Resistor - carbon 68,000 ohm 1/4 watt	.12
71	110573	Resistor - carbon 2,200 ohm 1/4 watt	.12
72	110574	Resistor - carbon 68,000 ohm 1/4 watt	.12
73	110575	Resistor - carbon 12,000 ohm 2 watt	.30
74	110592	Resistor - carbon 22,000 ohm 1 watt	.12
75	111119	Resistor - wire wound 30 ohm 1/2 watt (5%)	.12
76	111120	Resistor - wire wound 110 ohm 2 watt (5%)	.12
77	R-281-A	Speaker - dynamic 12 inch (R-1835)	10.00
	R-281-B	Speaker - dynamic 8 inch (R-1833)	8.75
78	111490	Speaker - voice coil assembly for 8 inch spkr.	2.90
	112562	Cone - and voice coil (for 8 inch speaker)	3.30
79A to C	111077	Switch - range and bracket	.28
80	111218	Switch - for reactance dimmer	.65
81	111234	Switch - tone control	1.85
82	111074	Transformer - output	2.50
83	111081	Transformer - 1st I.F.	2.45
84	111082	Transformer - 2nd I.F.	5.65
85	112127	Transformer - power 115 volt 60 cycle	10.00
86A-86B	111096	Volume control - 200,000 ohms (with off-on switch)	1.25
87	86682	Condenser - paper .1 mfd. 400 volt	.25

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

SOCKET VOLTAGES

DIAL TUNED TO 525 KC.

ANTENNA GROUNDED

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grid of the 6K7 R.F., 6L7 mixer, 6K7 I.F. and the diode plate of the 6H6 tubes is -3 volts measured across resistor 75.

NOTE B: The bias for the control grid of the 6L6 output tube is -13 volts measured across resistors 75 and 76.

DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
111228	Band indicator - frame & scale	$ .48
111261	Bolt - chassis mtg. (#14x1-1/4")	.03
111179	Bracket - and bushing (for drive drum)	.20
111201	Bracket - dial support (L.H.)	.48
111202	Bracket - dial support (R.H.)	.40
112321	Bracket - for chassis mtg. (Armchair)	.30
111260	Bushing - rubber (for chassis mtg.)	.06
110782	Cord - for band indicator (2 ft.)	.10
111302	Cord - drive (order 4 - 86348 eyelets) 44" required for pointer dr. 22" required for cond. drive) (6 ft.)	.30
111233	Dial - frame & scale complete	2.50
111317	Drum - & bushing	.45
86348	Eyelet - for cord drive (Per dz.)	.05
111226	Escutcheon - for dial (with glass)	3.00
111310	Flywheel - with setscrews	1.25
111209	Gear - and shaft (for rope drive)	.50
112363	Glass top - large sect. (Armchair model)	2.90
112365	Glass top - small section (with knob)	3.15
110779	Knob - for range, tone & volume	.20
112125	Knob - tuning	.18
112322	Knob - brass (for glass top)	.75
111197	Lever - for band indicator (on shaft)	.12
110496	Plug - speaker (4 prong)	.12
111236	Pointer - and slide assembly	.15
81145	Retaining ring - for drive shaft (Per C	.50
111222	Scale - dial	1.20
88707	Screw - for mtg. dial frame (per dz.)	.06
110716	Screw - band indicator pivot	.03
112138	Setscrew - slotted (round head) 8/32	.03
111206	Shaft - tuning	.40
85427	Socket - 8 prong octal	.15
110501	Socket - speaker (4 prong)	.16
110827	Socket - dial lamp	.12
111008	Socket - band indicator lamp	.12
110817	Speed nut - retainer for escu. to cab.	.01
85815	Spring - between gears (to remove backlash)	.02
111221	Spring - flat (for pointer slide)	.02
111232	Spring - torsion for band indicator	.05
112430	Spring - coil (between flexible coupler)	.02
85066	Terminal strip - O.D.A.	.20
67588	Washer - embossed (for mtg. 89937 electrolytic)	.05
89746	Washer - (paper) for back of knobs	.005
111262	Washer - flat steel mtg. (13/16" O.D.)	.02

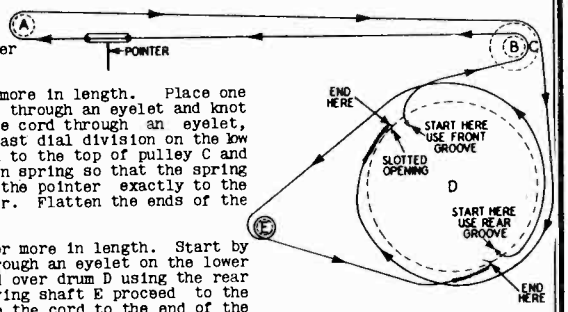
FORM NO. 8494 PRINTED IN U.S.A.

MODELS 1831-1839 incl.
Chassis R-183
Alignment, Trimmers
Dial Data

STEWART-WARNER CORP.

MODEL R-183 CHASSIS (RECEIVER MODELS 1831 to 1839)

HOW TO REPLACE THE DIAL CORD



Before attempting to replace either dial cord, fully mesh the gang condenser plates. The holes in drum D should be in the position shown in the diagram.

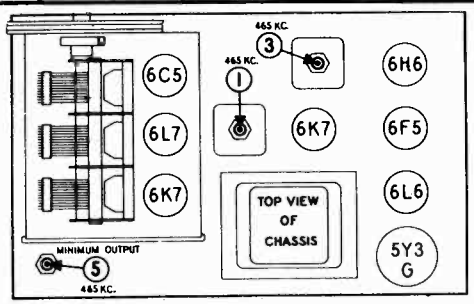
REPLACING THE POINTER DRIVE CORD: The pointer drive cord should be 40 inches or more in length. Place one end of the cord through the upper hole in the front groove of the drum. Put it through an eyelet and knot the end. Flatten the eyelet. Run the free end up over pulley B. Then thread the cord through an eyelet, the pointer slider, and another eyelet. (See diagram). Set the pointer to the last dial division on the low frequency end of the scale. After this run the cord up over pulley A and back to the top of pulley C and down around drum D, using the front groove. Tie the cord to the end of the tension spring so that the spring will be extended to 1-1/8 inches when hooked to the slot in the drum. Now set the pointer exactly to the last low frequency dial scale division and push the eyelets into the pointer slider. Flatten the ends of the eyelets to hold the slider in position on the cord.

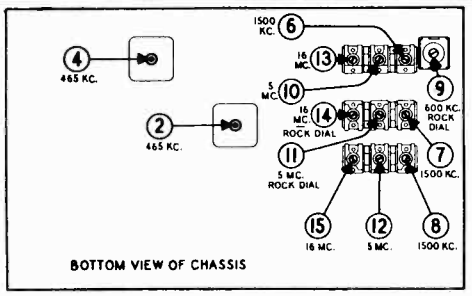
CONDENSER DRIVE CORD: The cord for the main condenser drive should be 19 inches or more in length. Start by placing an end of the cord through the lower hole in the rear groove. Put it through an eyelet on the lower side of the drum and tie a knot in the end. Run the loose end of the cord up and over drum D using the rear groove. Then take the cord down to shaft E and wind 1-1/2 turns around it. Leaving shaft E proceed to the lower side of drum D and place the tension spring on the end of the cord. Tie the cord to the end of the tension spring so that the spring will be extended 1-1/8 inches when hooked to the slot in the drum.

ALIGNMENT EQUIPMENT & PROCEDURE

1. With the gang condenser in full mesh the dial pointer should stop opposite the last low frequency scale division. If the pointer is off not more than one scale division, release the setscrew on the flexible coupler and keeping gang closed, turn the tuning knob until the pointer stops in the correct position. Then retighten the setscrew. If the pointer is off several dial divisions it will be necessary that you release the cord at the slider and reset it.
2. Connect the output meter between the plate of the 6L6 and the chassis, or across the voice coil of the speaker, depending on the type of meter. The more sensitive type should be connected across the voice coil.
3. Connect the ground lead of the signal generator to the chassis and leave it there throughout the entire alignment procedure.
4. Turn the volume control to maximum volume position. Turn the tone control to the brilliant position.
5. KEEP THE GROUND AND DOUBLET CONNECTIONS, ON THE ANTENNA TERMINAL STRIP, CONNECTED TOGETHER THROUGHOUT THE ENTIRE ALIGNMENT PROCEDURE.

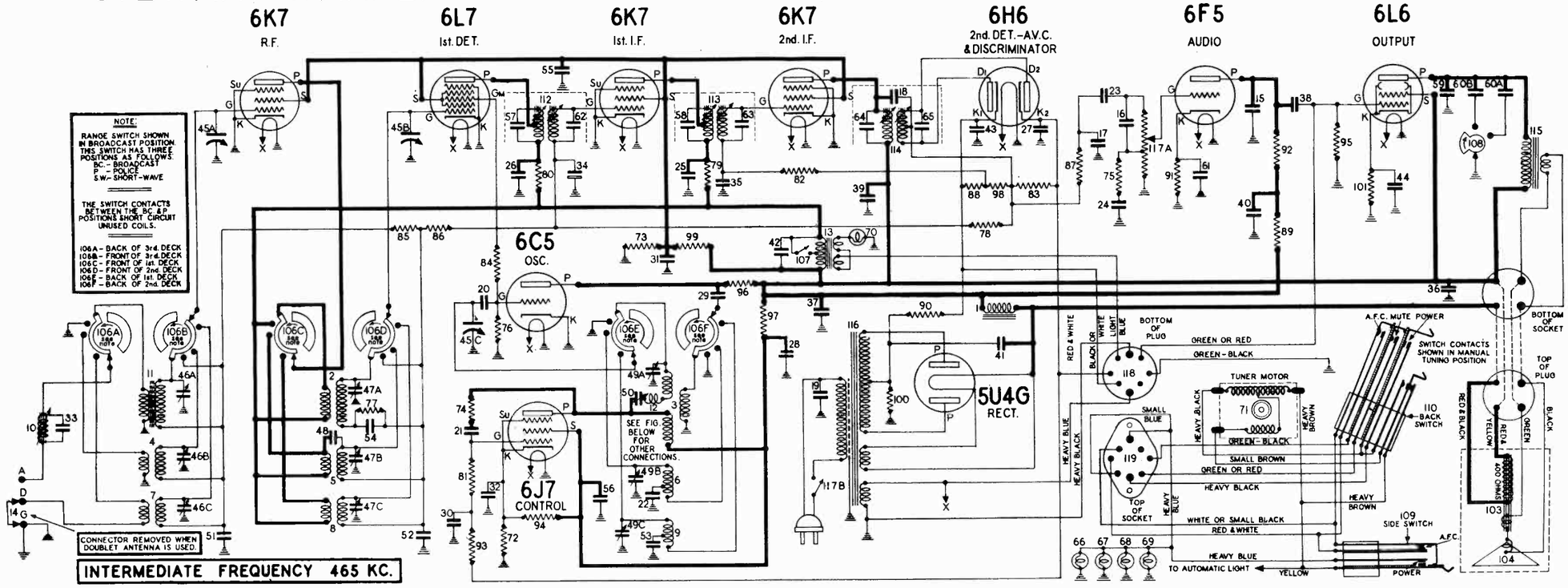
DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6L7 TUBE	465 KC.	BROADCAST (Counter-clock-wise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Counter-clock-wise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT WITH STRONG SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clock-wise)	1500 KC.	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clock-wise)	TUNE TO 1500 KC. GENERATOR SIGNAL	7	BROADCAST R.F.	ADJUST FOR MAXIMUM OUTPUT.
					8	BROADCAST ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Counter-clock-wise)	TUNE TO 600 KC. GENERATOR SIGNAL	9	BROADCAST OSCILLATOR SERIES PADDER	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	10	POLICE OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	11	POLICE R.F.	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
					12	POLICE ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE (Clock-wise)	16.0 MC.	13	SHORT-WAVE OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE (Clock-wise)	TUNE TO 16.0 MC. GENERATOR SIGNAL	14	SHORT-WAVE R.F.	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
					15	SHORT-WAVE ANTENNA	





MODELS 1841-1849 incl.
Chassis R-184
Schematic, Socket, Voltage
Parts, Data

STEWART-WARNER MODEL R-184 (RECEIVER MODELS 1841 TO 1849)



MODEL R-184 PARTS LIST

(SEE OPPOSITE SIDE FOR OTHER PARTS)

DIAGRAM NUMBER	DESCRIPTION	LIST PRICE
1	112097—Choke - Filter (for model R-184-A only	$1.40
	112327—Choke - Filter (for model R-184-W only	1.60
2	111056—Coil - R. F. (broadcast)	1.25
3	111057—Coil - oscillator (broadcast)	1.00
4	111058—Coil - antenna (police)	.80
5	111059—Coil - R. F. (police)	1.00
6	111060—Coil - oscillator (police)	1.00
7	111062—Coil - antenna (short-wave)	.90
8	111063—Coil - R. F. (short-wave)	.90
9	111064—Coil - oscillator (short-wave)	.85
10	111079—Coil - wave trap	1.20
11	111125—Coil - antenna (broadcast)	1.82
12	111488—Coil - compensating inductance	.38
13	112103—Coil - reactance dimmer (60 cycle models only)	2.50
	112204—Coil - reactance dimmer (25 to 80 cycle) for model R-184-B only	3.25
	112328—Coil - reactance dimmer (for model R-184-W only)	2.70
14	85321—Connector - ground	.01
15-16-17-18	82783—Condenser - mica, 110 mmf.	.20
19	83976—Condenser - .012 mfd. - 1000 volt	.40
20	85061—Condenser - mica, 51 mmfd.	.15
21	85394—Condenser - mica, 510 mmf.	.25
22	85467—Condenser - mica, 1370 mmfd. (3%)	.30
23	88189—Condenser - paper .05 mfd. - 200 volt	.25
24-25-26-27	88030—Condenser - paper .01 mfd. - 400 volt	.25
28-29		
30	88046—Condenser - paper .1 mfd. - 150 volt	.25
31	88191—Condenser - paper .1 mfd. - 300 volt	.25
32	88193—Condenser - paper .25 mfd. - 150 volt	.35
33	88826—Condenser - mica, 2100 mmfd.	.35
34-35	88834—Condenser - paper .05 mfd. - 150 volt	.25
36-37	111469—Condenser - electrolytic 16 mfd.-450 volt	1.30
38	111252—Condenser - paper .05 mfd. - 400 volt	.17
39-40	88682—Condenser - paper .1 mfd. - 400 volt	.25
41	89937—Condenser - electrolytic 30 mfd.-450 volt	1.80
42-43-44	110977—Condenser - electrolytic 10 mfd. -25 volt	.80
	112113—Condenser - elect. 10 mfd. 50 volt (for model 184-W only)	.85
45A to 45C	111073—Condenser - variable gang	8.25
46A to 46C	111076—Condenser - trimmer (3 section) for R.F. or antenna (all bands)	.75
47A to 47C		
48	111090—Condenser - 3 mmfd. (wire)	.10
49A to 49C	111089—Condenser - trimmer (3 section) for oscillator (all bands)	.75
50	111115—Condenser - pad (single section)	.63
51-52	111117—Condenser - low loss .05 mfd. 150 volt	.35
53	111122—Condenser - mica, 3580 mmfd. (3%)	.48
54	111123—Condenser - mica, 7750 mmfd. (5%)	.65
55-56	112467—Condenser - electrolytic 4 mfd. 200 volt (used on model R-184-W only)	.80
	111298—Condenser - electrolytic 4 mfd. 200 volt	.75
57-58	111342—Condenser - mica, 200 mmfd. (5%)	.18
59	89626—Condenser - paper .004 mfd. - 750 volt	.24
60A - 60B	111364—Condenser - shielded (Section A - .02 mfd. - 600 volt) (Section B - .03 mfd. - 600 volt)	.85

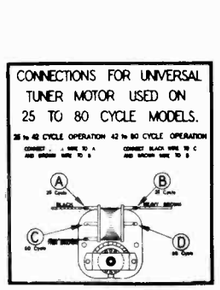
DIAGRAM NUMBER	DESCRIPTION	LIST PRICE
61	110377—Condenser - electrolytic 10 mfd. 25 volt	.80
	112113—Condenser - electrolytic 10 mfd. 50 volt (for model 184-W only)	.85
62-63-64-65	111575—Condenser - mica 220 mmfd. (5%)	.20
66-67-68-69	110629—Lamp - 6.3 volt - .25 amps.	.15
70	110911—Lamp - dimmer reactor 2.5 volt .5 amp.	.15
71	111380—Motor - 6 volt - 80 cycles	4.40
	112364—Motor - 6 volt, 25 to 80 cycles	5.50
72	112096—Resistor - wire wound 130 ohms 1/2 watt	.12
73	110551—Resistor - carbon 15,000 ohm 1 watt	.15
74	110599—Resistor - carbon 56,000 ohm 1/4 watt	.12
75	110598—Resistor - carbon 33,000 ohm 1/4 watt	.12
76	110562—Resistor - carbon 47,000 ohm 1/4 watt	.12
77	110553—Resistor - carbon 220,000 ohm 1/4 watt	.12
78	110554—Resistor - megohm 1/4 watt	.12
79-80	110557—Resistor - carbon 4700 ohm 1/4 watt	.12
81-82-83	110559—Resistor - carbon 470,000 ohm 1/4 watt	.12
84	110560—Resistor - carbon 100 ohm 1/4 watt	.12
85-86-87-88	110564—Resistor - carbon 100,000 ohm 1/4 watt	.12
89	110552—Resistor - carbon 47,000 ohm 1/4 watt	.12
90	110597—Resistor - carbon 1700 ohm 1/4 watt	.12
91	110387—Resistor - carbon 3900 ohm 1/4 watt	.12
92	110564—Resistor - carb. 100,000 ohm 1 watt	.12
93	110580—Resistor - carbon 3.3 megohm 1/4 watt	.12
94	110575—Resistor - carbon 12,000 ohm - 2 watt	.30
95	110553—Resistor - carbon 220,000 ohm 1/4 watt	.12
96	110596—Resistor - carbon 82,000 ohm 1 watt	.12
97	110593—Resistor - carbon 18,000 ohm 3 watt	.20
98	110594—Resistor - carbon 390,000 ohm 1/4 watt	.12
99	110596—Resistor - carbon 15,000 ohm 2 watt	.25
100	111515—Resistor - wire wound 27 ohm 1/2 watt(5%)	.12
101	111514—Resistor - wire wound 170 ohm 2 watt	.15
102	111111—R. F. unit - coils, range switch, gang & trimmers - complete	25.00
103	R-281-A—Speaker - dynamic 12 inch	10.00
104	111490—Cone - voice coil assem. for R-281 spkr.	2.50
105A - 105B	88404—Switch - phono toggle	1.10
106A - 106F	111077—Switch - range	3.30
107	111218—Switch - for reactance dimmer	.28
108	111381—Switch - tone control	.55
109	111874—Switch - multiple contact (above tuning shaft)	.95
110	112564—Switch - at rear	1.25
111	89709—Terminal Strip - phono (for model R-184-W only)	.15
112	111336—Transformer - 1st I.F.	2.70
113	111875—Transformer - 2nd I.F.	2.00
114	111340—Transformer - I.F. discriminator	2.70
115	111361—Transformer - output (for Model R-184-A and R-184-B only)	1.75
	112328—Transformer - output (for 184-W only)	1.95
	111447—Transformer - power 115 volt-60 cycle	8.00
	112176—Transformer - power 115 volt-25 cycle	11.00
116	111300—Transformer - power 100 to 240 volt - 50 to 133 cycles	11.00
117A - 117B	111358—Volume control - 1 meg. (with off-on switch)	1.40

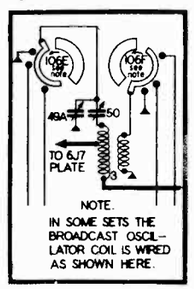
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

FOR "MAGIC KEYBOARD" TUNER

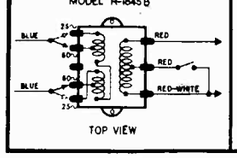
SEE INDEX ,VOL. IX

CONNECTIONS FOR UNIVERSAL TUNER MOTOR USED ON 25 TO 80 CYCLE MODELS.

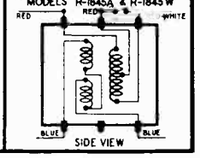




REACTANCE DIMMER CONNECTIONS FOR UNIVERSAL 25 to 80 CYCLE MODEL R-1845B

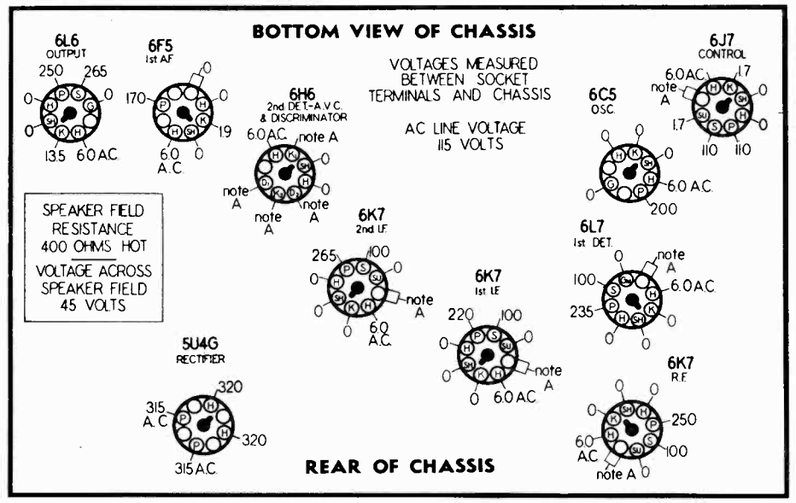


REACTANCE DIMMER CONNECTIONS 60 CYCLES & 50 TO 133 CYCLES MODELS R-1845A & R-1845W



SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 525 K.C.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A; The bias for the control grids of the 6L7 1st Det., 6K7 R.F., 6K7 1st I.F. and 6K7 2nd I.F. tubes, also the voltage on the 6H6 diodes and cathodes and the control grid of the 6J7, is -3.6 volts measured across resistor number 100.

Alignment

STEWART-WARNER CORP.

MODELS 1841-1849 incl. Chassis R-184

MODEL R-184 CHASSIS (RECEIVER MODELS 1841 TO 1849)

FOR INFORMATION ON TUNING MECHANISM,- MAGIC KEYBOARD SERVICE, SEE THE INDEX

The model R-184 chassis is a ten tube, three band, automatic-tuning superheterodyne receiver. It has an intermediate frequency of 465 KC. and a tuning range of 525 KC to 18,100 KC. This chassis also incorporates such recent engineering refinements as a reactance dimmer tuning indicator, automatic frequency control, iron core I.F. transformers, a high efficiency R.F. unit, and the Stewart-Warner "Magic Keyboard" for automatic tuning.

ALIGNMENT EQUIPMENT & PROCEDURE

(1)—Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial when the gang condenser is in full mesh. Also when the gang condenser is in full mesh the stop pin on the left side of the tuner should be resting against the back stop. If after examination it is found that the gang is in full mesh and the stop pin is against the back stop, but the pointer is set to the wrong position, it will only be necessary to loosen the set screw on the dial drive gear at the left side of the mechanism; then grasp the large drum on the same side of the tuner and turn it until the pointer is set correctly. Now retighten the set screw on the gear being careful to see that the gear is meshing properly.

On the other hand if the stop pin does not rest against the back stop with the gang condenser in full mesh, loosen the set screw on the gang condenser side of the flexible coupler. Then turn the tuning knob until the stop pin rests against the back stop on the tuner. Now retighten the set screw in the flexible coupler and proceed to set the pointer to its correct position by the method described in the previous paragraph.

(2)—Connect the output meter between the plate of the 6L6 power output tube and ground or across the voice coil of the speaker, depending on the type of meter. The more sensitive type should be connected across the voice coil.

(3)—Connect the ground lead of the signal generator to the chassis and leave it there throughout the entire alignment procedure.

(4)—Turn the volume control to the maximum volume position.

(5)—Keep the Ground and Doublet connections on the antenna terminal strip connected together throughout the entire alignment procedure.

TYPE OF DUMMY ANT. IN SERIES WITH SIG.GEN.	POINT TO CONNECT OUTPUT OF SIGNAL GENERATOR.	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER (see diag. next page)	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7 TUBE	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2 3-4 5	1ST I.F. 2ND I.F. 3RD I.F.	Adjust for maximum output. Then repeat adjustment.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	6	WAVE TRAP	Adjust for minimum output using a strong generator signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	1500 KC.	7	BROADCAST OSCILLATOR (Shunt)	Adjust trimmer to bring in signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	TUNE TO 1500 KC. GENERATOR SIGNAL	8 9	BROADCAST DETECTOR BROADCAST ANTENNA	Adjust for maximum output.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Counter-clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	10	BROADCAST OSCILLATOR (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	5 MC.	12	POLICE OSCILLATOR (Shunt)	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 4.1 MC. If image does not appear realign at 5 MC. with trimmer screw farther out. Recheck image.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	TUNE TO 5 MC. GENERATOR SIGNAL	13 14	POLICE DETECTOR POLICE ANTENNA	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	15	SHORT-WAVE OSCILLATOR (Shunt)	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 15.1 KC. If image does not appear realign at 16 KC. with trimmer screw farther out. Recheck image.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	16 17	SHORT-WAVE DETECTOR SHORT-WAVE ANTENNA	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

SEE THAT NONE OF THE PUSH BUTTONS ARE DEPRESSED WHEN ALIGNING. IMPORTANT: ALLOW RECEIVER TO WARM UP 15 MINUTES BEFORE ALIGNING.

A.F.C. ALIGNMENT.

IMPORTANT: The following adjustment must be made after every re-adjustment of the I.F. and broadcast band trimmers.

The A.F.C. Discriminator should be adjusted as follows:

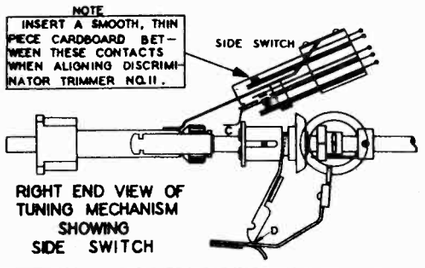
1. Be sure no buttons are depressed. Loosely couple the output of the signal generator to the 6L7 control grid by clipping the signal generator output lead to the insulation on the control grid wire, or connect to the grid clip through a .50 mmfd. mica condenser. BE SURE THE RANGE SWITCH IS IN THE BROADCAST (COUNTER-CLOCKWISE) POSITION.
2. Adjust the signal generator to resonance with I.F. system by tuning the signal generator dial for maximum output meter deflection. Be sure that the receiver dial is at some point where it has no tuning effect on the generator signal. Switch off the modulation.
3. With the signal generator connected and operating as in #2, connect antenna and manually tune in powerful local station in region of 1000 KC. or lower. (Avoid stations around 930 KC. which might beat with second harmonic of test oscillator.)
4. Adjust receiver tuning dial to obtain zero beat between the test oscillator and the incoming signal. (A very slight adjustment is all that is required. Be careful not to tune off signal.)
5. Refer to the figure on the right. It is now necessary to open the A.F.C. contacts & allow it to function. This may be done by placing a piece of smooth cardboard between the A.F.C. contacts as shown in the figure. Be careful not to bend or malform the switch in any way.
6. Now, adjust the secondary of the discriminator transformer (Trimmer #11) to restore zero beat. NOTE: This trimmer should be adjusted to the point where the frequency of the beat note increases rapidly if the trimmer is turned in either direction. Other zero beat points may be found with the trimmer all the way in or all the way out, but these settings are incorrect.

If this operation has been performed correctly, the opening or closing of the A.F.C. contacts on the side switch by inserting or removing the cardboard, should not change the beat note by more than a slight rumble.

NOTE:- Where a second signal generator is available step #3 above may be varied as follows:

Connect second signal generator (set at about 1000 KC.) to antenna and tune in its signal. Switch off modulation and proceed as before.

This method is somewhat preferable to the first as the zero beat setting is more easily determined when both signals are unmodulated.



RIGHT END VIEW OF TUNING MECHANISM SHOWING SIDE SWITCH

MODELS 1841-1849 incl. Chassis R-184

STEWART-WARNER CORP.

AFC Data, Socket, Trimmers Tuner Data, R-1845-W Phono. Data

TESTING THE AFC SYSTEM

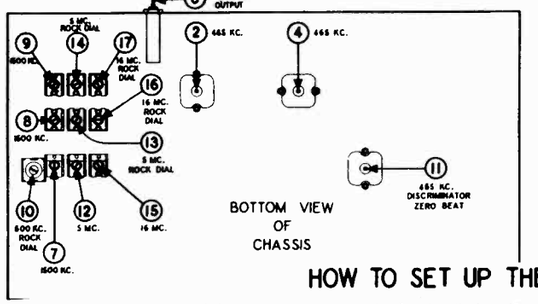
Connect the antenna and tune in a powerful local station. Remove the cardboard that you placed between the A.F.C. contacts on the side switch when aligning. The A.F.C. is now off.

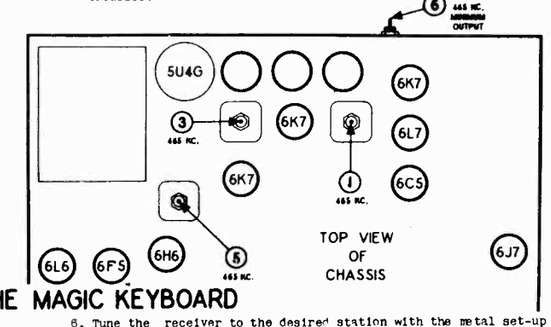
Next, detune the receiver dial until the music or speech becomes somewhat distorted. Now place a piece of smooth cardboard between the A.F.C. contacts on the side switch as shown in the illustration on the bottom of the previous page. This allows A.F.C. to function and it should improve the quality of the program.

Similarly detune the receiver dial in the opposite direction, with the cardboard removed from between the A.F.C. contacts (contacts closed). Then place the cardboard between the contacts again and check for improved quality of reception.

It will be noted that the correction for mistuning afforded by the A.F.C. system is not as marked at stations near the low frequency end of the dial scale as it is at the higher broadcast frequencies. This is characteristic of A.F.C. systems. However, if opening the A.F.C. contacts on the side switch (by inserting the piece of cardboard between the contacts) has no effect on the signal, or if it corrects for mistuning in one direction only, check the receiver as follows:

1. Re-align I.F., broadcast band, and discriminator trimmers.
2. Check all the tubes in the receiver. Defective 6H6 and 6J7 tubes, also the R.F., 1st Detector, and I.F. tubes may cause poor A.F.C. action.
3. If the above procedure fails to remedy the defect in A.F.C. action, check the entire A.F.C. circuit itself for possible troubles.





HOW TO SET UP THE MAGIC KEYBOARD

SELECTING THE PROPER STATIONS: When setting up the "Magic Keyboard" select powerful nearby stations. Avoid weak or fading stations.

LABELLING THE PUSH BUTTONS: Call letter labels are supplied with each set. To label any button remove the cap of the push button, BY PULLING ON THE TOP END. Remove the black cardboard disc, and insert the call letter tab. IN REPLACING THE CAP START AT THE BOTTOM AND PRESS ON THE TOP.

STEP BY STEP PROCEDURE:

1. Connect a good outside aerial to the receiver and allow the receiver to operate for 20 minutes before setting-up.
2. Pull off the large tuning knob. As this knob is removed another small "set-up" knob on the same shaft will appear partly hidden behind the panel face.
3. Pull out this set-up knob AS FAR AS IT WILL GO.
4. Rotate the set-up knob clockwise. After dial pointer reaches the end of the dial scale continue to turn the knob clockwise until you have forced it to a definite stop. This last twist unlocks the cams.
5. Push any button you wish to set to a station. The tuner will operate and carry the pointer to some new point on the dial scale.

Wherever the word RIGHT or LEFT appears in the following list, it is understood that you are standing in front of the receiver.

PART NUMBER	DESCRIPTION	LIST PRICE
111930	Band Indicator - and frame assembly	$ .40
112858	Belt - for range switch drive	.06
111261	Bolt - chassis mtg. (#14 X 1-1/4)	.03
111260	Bushing - rubber (for chassis mtg.)	.06
111892	Bushing - hard rubber, mystic mechanism mtg. to chassis	.02
111858	Clip - for pulley retaining	.01
110716	Cord - for band ind. (2 ft. required)	Per Ft. .04
111302	Cord - dial drive (6 ft. lengths)	.30
111226	Escutcheon - for dial (with glass)	3.00
111227	Escutcheon - around push button opening	1.20
111865	Frame - dial, with scale	2.50
111496	Knob - tuning or volume	.20
111497	Knob - range or tone	.20
111197	Lever - for band indicator (on shaft)	.12
111370	Link & Lever - for range sw. drive (used in early production)	.20
112633	Plug - for mechanism connecting (8 prong)	.20
110496	Plug - speaker (4 prong)	.12
111859	Pointer - for dial, with slider	.18
111822	Pulley - dial cord drive	.35
111630	Pulley & Bracket - for band indicator	.10
112628	Pulley - on range switch shaft under chassis	.20
84214	Retaining Ring - for dial drum shafts	.02
89837	Retaining Spring - for retaining escut. to cabinet	.01
111222	Scale - dial	1.20
110716	Screw - band indicator pivot	.03
111116	Screw - #5 X 5/8, mystic mechanism mtg.	.02
85827	Set Screw - 8/32 square head	.02
111403	Set Screw - 8/32, fluted head	.12
112138	Set Screw - 8/32 slotted head	.03
111373	Shaft - for range switch	.08
85427	Socket - octal base	.15
110501	Socket - 4 prong (for spkr.)	.18
110827	Socket - dial lamp & automatic lamp	.12
111008	Socket - reactance dimmer lamp	.12
112630	Socket & Bracket - for elect. conn. to mech.	.75
111232	Spring - torsion for band indicator	.05
111862	Spring - drive cord tension	.03
112490	Spring - in flexible coupler	.02
111678	Stud - lower left idler pulley	.10
112667	Stud - for pulley mtg. (for top pulleys)	.10
112005	Tabs - station call letters (6 sheets)	.60
85068	Terminal Strip - G.D.A.	.20
89709	Terminal Strip - Phono.	.15
67568	Washer - embossed (for mtg. electrolytic cond.)	.05
89746	Washer - (paper) for back of knobs	.005
89027	Washers - spring for range shaft	.01
111282	Washer - flat steel mtg. (15/16" O.D.)	.02

6. Tune the receiver to the desired station with the metal set-up knob. TUNE CAREFULLY AND WATCH THE "REACTANCE DIMMER" FOR THE POINT OF MINIMUM ILLUMINATION SO THAT THE RECEIVER WILL BE CORRECTLY TUNED TO THE STATION.

7. Push in the next button you want to set up for a station. This automatically completes the setting up of the previous station, and causes its button to pop out. Do not push in any buttons that are already set up and which you do not wish to change, since pushing a button with the cams unlocked will shift its setting.

8. Tune in the station for the button that is now depressed.

9. Set-up other buttons as desired in the same manner, that is, push in the button, tune in the station, then push in the next button.

10. To release the last button grasp the set-up knob on the station selector shaft and push it in until the last button is released. Then pull the knob out again.

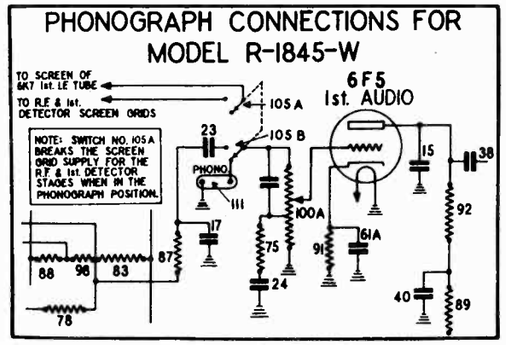
11. Turn the set-up knob to the LEFT (Counter-clockwise). CONTINUE TO TURN THE KNOB TO THE LEFT even after the pointer reaches the end of the dial scale. FORCE THE KNOB COUNTER-CLOCKWISE TO A DEFINITE STOP.

12. Push the "set-up" knob back into the cabinet again and replace the large tuning knob.

13. Your "Magic Keyboard" is now ready for operation.

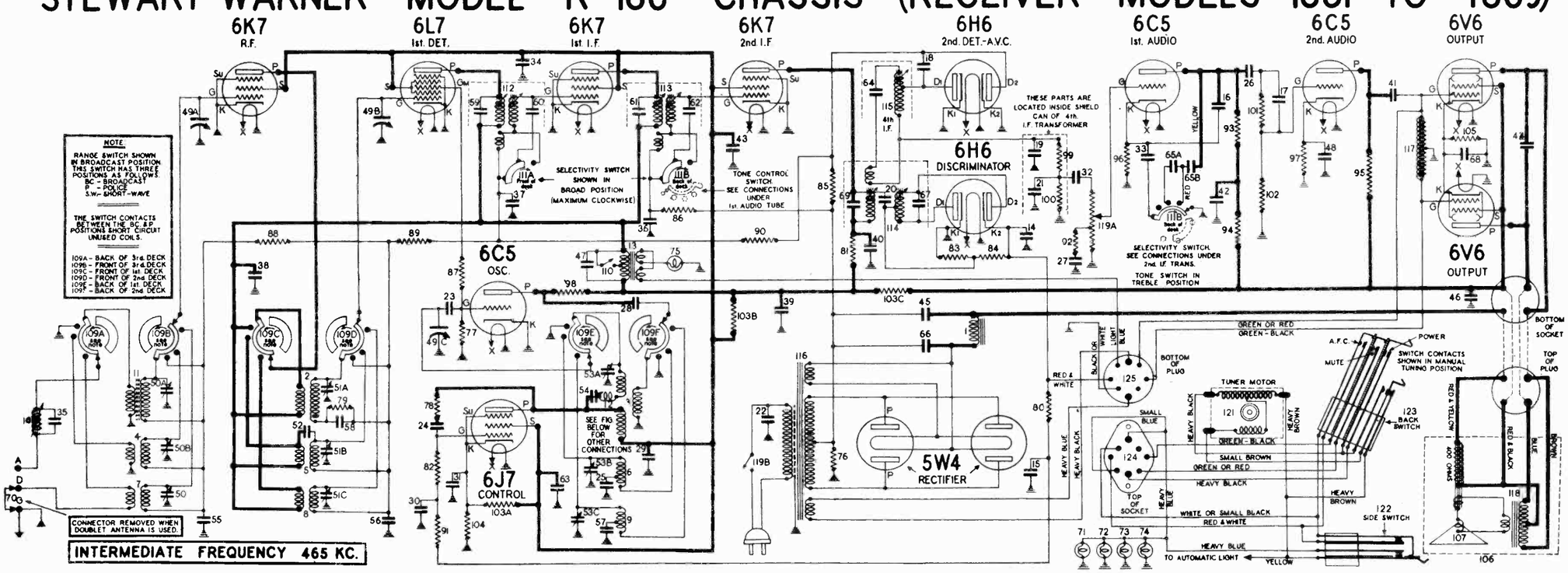
PART NUMBER	DESCRIPTION	LIST PRICE
112727	Mystic Mechanism - complete with all dials - ready to mount on chassis	$60.00
111350	Mystic Mechanism only, less dial frame assembly	35.00
112428	Button Body - for tuner	.10
112545	Button Cap - for push button	.06
111878	Button Window - celluloid for push button	.01
112547	Button Reinforcing Disc - for push button	.01
111633	Button Retaining Spring - inside push button	.02
111577	Button Spring - in push button	.005
111576	Button Washer - in push button	.005
112583	Cam - bakelite - less operating arm	.10
111146	Clutch - bushing, spring and gear	.55
111137	Drive Ring - rubber	.05
111360	Motor - 6 volt, 60 cycles	4.40
112354	Motor - 6 volt, 25 to 80 cycles	5.50
112736	Plug - with cable for tuner connections	.75
111138	Spring - horseshoe shaped on clutch	.02
111674	Switch Side - multiple contact (above tuning shaft)	.95
112564	Switch Back - (multiple contact)	1.25
112521	Tip - adjustable for key stop and kickout arm	.06
112483	Wrench - for fluted head set screws #6	.07
112484	Wrench - for fluted head set screws #8	.07
117468	Spring Benders	.75

PHONOGRAPH CONNECTIONS FOR MODEL R-1845-W



MODELS 1861-1869 incl.
Chassis R-186
Schematic, Socket, Voltage
Parts, Speaker, Tuner Data

STEWART-WARNER MODEL R-186 CHASSIS (RECEIVER MODELS 1861 TO 1869)



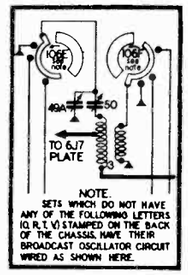
MODEL R-186 PARTS LIST

(SEE OPPOSITE SIDE FOR OTHER PARTS)

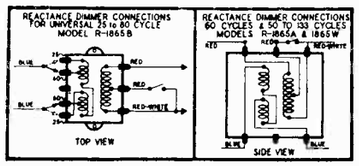
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	111330	Choke - filter (for model R-186-A and R-186-B)	$ 1.50
1	112330	Choke - filter (Models R-186-W and R-186-P)	1.50
2	111056	Coil - R.F. Broadcast	1.25
3	111057	Coil - oscillator broadcast	1.05
4	111058	Coil - antenna (police)	.80
5	111059	Coil - R.F. (police)	1.00
6	111060	Coil - oscillator (police)	1.00
7	111062	Coil - antenna (short wave)	.90
8	111063	Coil - R.F. (short wave)	.90
9	111064	Coil - oscillator (short wave)	.85
10	111079	Coil - wave trap	1.20
11	111103	Coil - antenna broadcast	1.85
12	111486	Coil - compensating inductance	.36
13	112103	Coil - reactance dimmer (60 cycle) models only	2.50
13	112204	Coil - reactance dimmer (25 to 80 cycle) for model R-186-W)	3.25
	112328	Coil - reactance dimmer (for models R-186-W and R-186-P)	2.70
14-15-16-17-18	83539	Condenser - mica 260 mmfd.	.20
19-20-21	83783	Condenser - mica, 110 mmf.	.20
22	83976	Condenser - shielded .012 mfd. 1000 volt	.40
23	86061	Condenser - mica .51 mmfd.	.15
24	86394	Condenser - mica 510 mmf.	.25
25	86487	Condenser - mica, 1370 mmfd. (3%)	.30
26	86826	Condenser - paper .02 mfd. 400 volt	.25
27-28-29	86830	Condenser - paper .01 mfd. 400 volt	.25
30-31	86846	Condenser - paper .1 mfd. 150 volt	.25
32-33	86189	Condenser - paper .05 mfd. 200 volt	.25
34	86191	Condenser - paper .1 mfd. 300 volt	.25
35	86205	Condenser - mica, 2100 mmfd.	.35
36-37	86834	Condenser - paper .05 mfd. 150 volt	.25
38-39-40-41-42	88982	Condenser - paper .1 mfd. 400 volt	.25
43	89532	Condenser - paper .25 mfd. 200 volt	.32
44	89826	Condenser - paper .004 mfd. 750 volt	.24
45-46	89937	Condenser - electrolytic 30 mfd.460 volt	1.60
47-48	110377	Condenser - electrolytic 10 mfd. 25 volt	.80
	112480	Condenser - electrolytic 10 mfd. 25 volt (for R-186-W or R-186-P only)	.80
49A to C	111073	Condenser - variable gang	6.25
50A to C	111078	Condenser - trimmer (three section) for R.F. or Ant.)	.75
52	111080	Condenser - wire 1.8 mmfd.	.10
53A to C	111089	Condenser - trimmer (3 section)for osc.	.75
54	111115	Condenser - padder	.63
55-56	111117	Condenser - low loss .05 mfd. 150 volt	.35
57	111122	Condenser - mica, 3580 mmfd. (3%)	.48
58	111123	Condenser - mica, 7750 mmfd.	.85
59-60-61-62-63-64	111342	Condenser - mica, 200 mmfd. (5%)	.18
65A - 65B	111387	Condenser - Shielded Dual (Section A - .01 mfd. 600 volt) (Section B - .02 mfd. 600 volt)	.85
66	111469	Condenser - Electrolytic 16 mfd. 450 V.	1.30
67	111852	Condenser - electrolytic 12 mfd.150 volt	1.36
	112476	Condenser - electrolytic 12 mfd.150 volt (For Model 186-W or 186-P only)	1.36

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

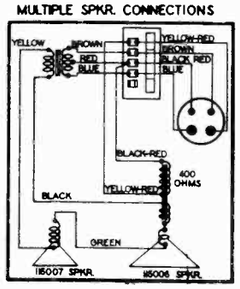
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
68	111689	Condenser - electrolytic 20 mfd. 25 volt	1.20
	112481	Condenser - electrolytic 20 mfd. 25 volt (For Model 186-W or 186-P only)	1.20
69	111910	Condenser - mica, 150 mmfd. (5%)	.18
70	85321	Connector - ground doublet	.01
71-72-73-74	110629	Lamp - dial 6 to 8 volt .25 amp.	.15
75	110911	Lamp - reactance dimmer 2.5 volt .5 amp.	.15
76	89769	Resistor - wire wound 40 ohm 1 watt	.12
77-78	110582	Resistor - carbon 47,000 ohm 1/4 watt	.12
79	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
80	110554	Resistor - carbon 1 megohm 1/4 watt	.12
81	110507	Resistor - carbon 470,000 ohm 1/4 watt	.12
82-83-84	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
85-86-87	110560	Resistor - carbon 100 ohm 1/4 watt	.12
88-89-90	110584	Resistor - carbon 100,000 ohm 1/4 watt	.12
91	110580	Resistor - carbon 3.3 megohm 1/4 watt	.12
92-93-94-95	110585	Resistor - carbon 33,000 ohm 1/4 watt	.12
96-97	110586	Resistor - carbon 2,200 ohm 1/4 watt	.12
98	110592	Resistor - carbon 22,000 ohm 1/4 watt	.12
99-100	110597	Resistor - carbon 100,000 ohm 1/4 watt	.12
101-102	110598	Resistor - carbon 330,000 ohm ± W.(10%)	.12
103A - 103C-111417		Resistor - bleeder: Section A 5600 ohms; Section B 5600 ohms; Section C 1500 ohms	1.15
104	111865	Resistor - wire wound 280 ohms ± W. (5%)	.16
105	111686	Resistor - wire wound 250 ohms 2 watt	.20
	111111	R. F. Unit - coils, range switch, gang and trimmers - complete	25.00
106	R-288	Speaker - dynamic 12" (Models 1865 & 1869)	15.00
	115006	Speaker - dynamic 10" (Model R-1866)	13.50
	115007	Speaker - P.M. dynamic 8" (Model R-1868)	8.15
107	112109	Cone - voice coil assem. for R-288 spkr.	2.30
	112575	Cone - voice coil for 115006 spkr.	2.25
	112875	Cone - voice coil assem (115007 spkr.)	2.30
108A - 108B-84404		Switch - phono tone	1.10
109A to F	111077	Switch - range	3.30
110	111218	Switch - reactance dimmer	.28
111A - 111B-111401		Switch - tone & selectivity control	.95
112-113	111425	Transformer - 1st or 2nd I.F.	2.75
114	111426	Transformer - discriminator I.F.	3.15
115	111427	Transformer - 4th I.F.	2.50
116	111393	Transformer - Power 115 volt 60 cycle	9.00
	112183	Transformer - Power 117 volt 25 cycle	12.00
	112333	Transformer - Power 100 to 240 volt, 50 to 133 cycles	12.00
117	111331	Transformer - impedance coupler (for models R-186-A or R-186-B)	2.10
	112331	Transformer - impedance coupler (for models R-186-W and R-186-P)	2.35
118	111398	Transformer - output for R-288 spkr.	3.00
	112573	Transformer - output for 115006 spkr.	3.25
119A - 119B	111359	Vol. Cont. - 1 meg. (with off-on switch)	1.40
120	86 79	Terminal Strip - phono	.15
121	112354	Motor - 6 volt, 25 to 80 cycles	5.50
	111380	Motor - 6 volt, 60 cycles	4.40
122	111674	Switch - multiple contact (above tuning shaft)	.85
123	112564	Switch - at rear	1.25
124	112830	Socket & Bracket - for electrical connections to mechanism	.75
125	112833	Plug - for mechanism conn. (8 prong.)	.20



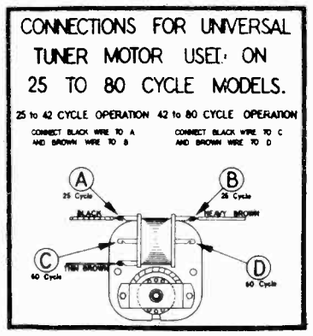
FOR "MAGIC KEYBOARD" TUNER SEE INDEX, VOL. IX



MULTIPLE SPKR. CONNECTIONS

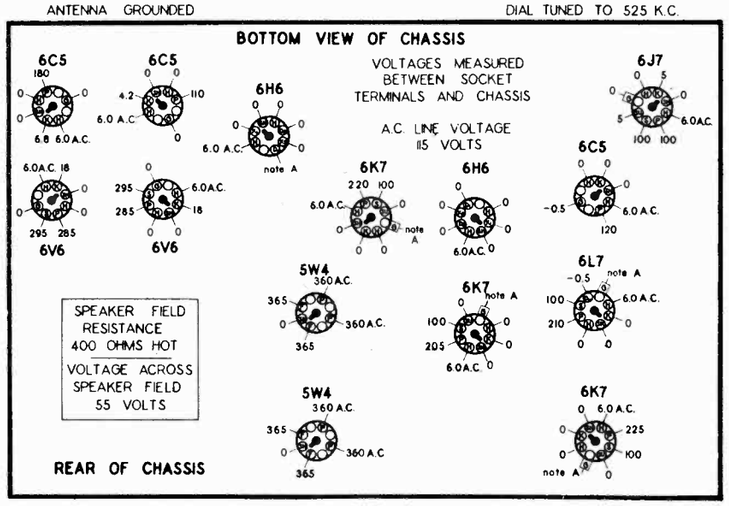


CONNECTIONS FOR UNIVERSAL TUNER MOTOR USED ON 25 TO 80 CYCLE MODELS.



SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 525 K.C.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7 1st Det., 6K7 R.F., 6K7 1st I.F. and 6K7 2nd I.F. tubes, also the voltage on the 6H6 A.V.C. diode, is -4 volts measured across resistor number 76.

STEWART-WARNER CORP.

MODELS 1861-1869 incl.
Chassis R-186
Alignment

MODEL R-186 CHASSIS (RECEIVER MODELS 1861 TO 1869)

FOR THE MAGIC KEYBOARD SERVICE, — INFORMATION ON TUNING MECHANISM, SEE INDEX

The model R-186 chassis, is a 14 tube, three band, automatic tuning, superheterodyne receiver. It has an intermediate frequency of 465 KC. and tuning range of 525 KC.to 18,100 KC. The circuit is of the latest design incorporating such refinements as a special high efficiency R.F. unit automatic frequency control, reactance dimmer, tuning indicator, and iron core I.F. transformers.

ALIGNMENT EQUIPMENT AND PROCEDURE

① Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial when the gang condenser is in full mesh. Also when the gang condenser is in full mesh the stop pin on the left side of the tuner should be resting against the back stop. If after examination it is found that the gang is in full mesh and the stop pin is against the back stop, but the pointer is set to the wrong position, it will only be necessary to loosen the set screw on the dial drive gear at the left side of the mechanism; then grasp the large drum on the same side of the tuner and turn it until the pointer is set correctly. Now retighten the set screw on the gear being careful to see that the gear is meshing properly.

② On the other hand if the stop pin does not rest against the back stop with the gang condenser in full mesh, loosen the set screw on the gang condenser side of the flexible coupler. Then turn the tuning knob until the stop pin rests against the back stop on the tuner. Now retighten the set screw in the flexible coupler and proceed to set the pointer to its correct position by the method described in the previous paragraph.

③ Connect the output meter across the two plates of the two 6V6 power output tubes or across the voice coil of the speaker, depending on the type of meter. The more sensitive type should be connected across the voice coil.

Connect the ground lead of the signal generator to the chassis and leave it there throughout the entire alignment procedure.

④ Turn the volume control to the maximum volume position.

Keep the Ground and Doublet connections on the antenna terminal strip connected together throughout the entire alignment procedure.

TYPE OF DUMMY ANT. IN SERIES WITH SIG.GEN.	POINT TO CONNECT OUTPUT OF SIGNAL GENERATOR.	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER (see diag. next page)	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7 TUBE	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	Adjust for maximum output. Then repeat adjustment. The tone control switch must be in the SHARP-POSITION (Counter-clockwise),or the alignment will be incorrect.
					3-4	2ND I.F.	
					5	3RD I.F.	
					6	4TH I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	7	WAVE TRAP	Adjust for minimum output using a strong generator signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	1500 KC.	8	BROADCAST OSCILLATOR (Shunt)	Adjust trimmer to bring in signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	TUNE TO 1500 KC. GENERATOR SIGNAL	9	BROADCAST DETECTOR	Adjust for maximum output.
					10	BROADCAST ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Counter-clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	11	BROADCAST OSCILLATOR (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	5 MC.	12	POLICE OSCILLATOR (Shunt)	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 4.1 MC. If image does not appear realign at 5 MC. with trimmer screw farther out. Recheck image.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	TUNE TO 5 MC. GENERATOR SIGNAL	13	POLICE DETECTOR	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					14	POLICE ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	15	SHORT-WAVE OSCILLATOR (Shunt)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	16	SHORT-WAVE DETECTOR	
					17	SHORT-WAVE ANTENNA	

IMPORTANT
THE TONE SWITCH MUST BE IN THE SHARP COUNTER-CLOCKWISE POSITION AT ALL TIMES
SEE THAT NONE OF THE PUSH BUTTONS ARE DEPRESSED WHEN ALIGNING.
ALLOW RECEIVER TO WARM UP 15 MINUTES BEFORE ALIGNING.

A.F.C. ALIGNMENT.

IMPORTANT: The following adjustment must be made after every re-adjustment of the I.F. and broadcast band trimmers.

The A.F.C. Discriminator should be adjusted as follows:

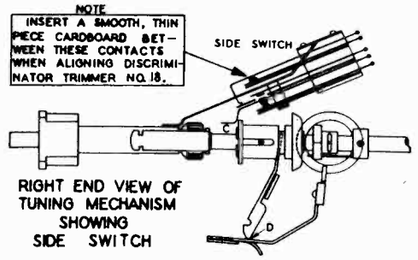
1. Be sure no buttons are depressed. Loosely couple the output of the signal generator to the 6L7 control grid by clipping the signal generator output lead to the insulation on the control grid wire, or connect to the grid clip through a .50 mmfd. mica condenser. BE SURE THE RANGE SWITCH IS IN THE BROADCAST (COUNTER-CLOCKWISE) POSITION.
2. Adjust the signal generator to resonance with I.F. system by tuning the signal generator dial for maximum output meter deflection. Be sure that the receiver dial is at some point where it has no tuning effect on the generator signal. Switch off the modulation.
3. With the signal generator connected and operating as in #2, connect antenna and manually tune in powerful local station in region of 1000 KC. or lower. (Avoid stations around 930 KC. which might beat with second harmonic of test oscillator.)
4. Adjust receiver tuning dial to obtain zero beat between the test oscillator and the incoming signal. (A very slight adjustment is all that is required. Be careful not to tune off signal.)
5. Refer to the figure on the right. It is now necessary to open the A.F.C. contacts & allow the A.F.C. to function. This may be done by placing a piece of smooth cardboard between the A.F.C. contacts as shown in the figure. Be careful not to bend or malform the switch in any way.
6. Now, adjust the secondary of the discriminator transformer (Trimmer #18) to restore zero beat. NOTE: This trimmer should be adjusted to the point where the frequency of the beat note increases rapidly if the trimmer is turned in either direction. Other zero beat points may be found with the trimmer all the way in or all the way out, but these settings are incorrect.

If this operation has been performed correctly, the opening or closing of the A.F.C. contacts on the side switch by inserting or removing the cardboard,should not change the beat note by more than a slight rumble.

NOTE:- Where a second signal generator is available step #3 above may be varied as follows:

Connect second signal generator (set at about 1000 KC.) to antenna and tune in its signal. Switch off modulation and proceed as before.

This method is somewhat preferable to the first as the zero beat setting is more easily determined when both signals are unmodulated.



MODELS 1861-1869 incl.
Chassis R-186

STEWART-WARNER CORP.

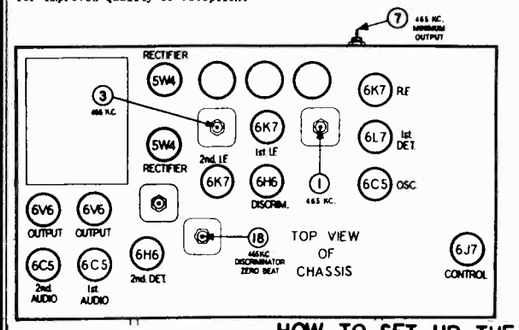
AFC Data, Trimmers, Tuner Parts for Dial and Tuner Chassis R-186W Phono. Data

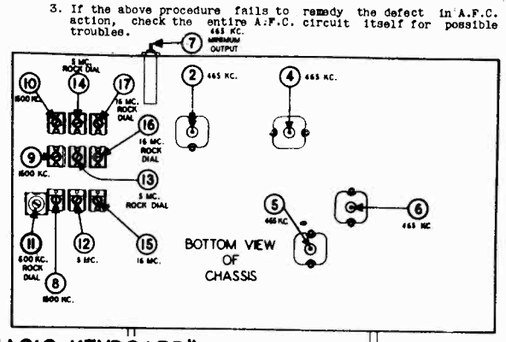
TESTING THE A.F.C. SYSTEM.

Connect the antenna and tune in a powerful local station. BE SURE THE TONE SWITCH IS IN THE MAXIMUM COUNTER-CLOCKWISE POSITION. Remove the cardboard that you placed between the A.F.C. contacts on the side switch when aligning. The A.F.C. is now off.

Next, detune the receiver dial until the music or speech becomes somewhat distorted. Now place a piece of smooth cardboard between the A.F.C. contacts on the side switch as shown in the illustration on the bottom of the previous page. This allows A.F.C. to function and it should improve the quality of the program.

Similarly detune the receiver dial in the opposite direction, with the cardboard removed from between the A.F.C. contacts (contacts closed). Then place the cardboard between the contacts again and check for improved quality of reception.





HOW TO SET-UP THE "MAGIC KEYBOARD"

SELECTING THE PROPER STATIONS: When setting up the "Magic Keyboard" select powerful nearby stations. Avoid weak or fading stations.

LABELLING THE PUSH BUTTONS: Call letter labels are supplied with each set. To label any button remove the cap of the push button, BY PULLING ON THE TOP END. Remove the black cardboard disc, and insert the call letter tab. IN REPLACING THE CAP START AT THE BOTTOM AND PRESS ON THE TOP.

STEP BY STEP PROCEDURE:

1. Connect a good outside aerial to the receiver and allow the receiver to operate for 20 minutes before setting-up.
2. Pull off the large tuning knob. As this knob is removed another small "set-up" knob on the same shaft will appear partly hidden behind the panel face.
3. Pull out this set-up knob AS FAR AS IT WILL GO.
4. Rotate the set-up knob clockwise. After dial pointer reaches the end of the dial scale continue to turn the knob clockwise until you have forced it to a definite stop. This last twist unlocks the cams.
5. Push any button you wish to set to a station. The tuner will operate and carry the pointer to some new point on the dial scale.
6. Tune the receiver to the desired station with the metal set-up knob. TUNE CAREFULLY AND WATCH THE "REACTANCE DIMMER" FOR THE POINT OF MINIMUM ILLUMINATION SO THAT THE RECEIVER WILL BE CORRECTLY TUNED TO THE STATION.
7. Push in the next button you want to set up for a station. This automatically completes the setting up of the previous station, and causes its button to pop out. Do not push in any buttons that are already set up and which you do not wish to change, since pushing a button with the cams unlocked will shift its setting.
8. Tune in the station for the button that is now depressed.
9. Set-up other buttons as desired in the same manner, that is, push in the button, tune in the station, then push in the next button.
10. To release the last button grasp the set-up knob on the station selector shaft and push it in until the last button is released. Then pull the knob out again.
11. Turn the set-up knob to the LEFT (Counter-clockwise). CONTINUE TO TURN THE KNOB TO THE LEFT even after the pointer reaches the end of the dial scale. FORCE THE KNOB COUNTER-CLOCKWISE TO A DEFINITE STOP.
12. Push the "set-up" knob back into the cabinet again and replace the large tuning knob.
13. Your "Magic Keyboard" is now ready for operation.

DIAL DRIVE & MISCELLANEOUS PARTS.

FOR A COMPLETE PARTS LIST SEE THE SPECIAL "MAGIC KEYBOARD" SERVICE MANUAL FORM 8529 WHICH MAY BE OBTAINED FROM STEWART-WARNER CORP.

Wherever the word RIGHT or LEFT appears in the following list, it is understood that you are standing in front of the receiver.

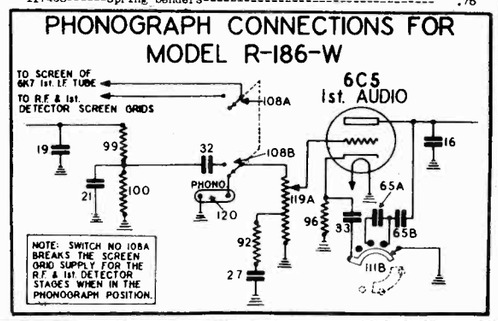
PART NUMBER	DESCRIPTION	LIST PRICE
111930	Band Indicator - and frame assembly	$ .40
112858	Belt - for range switch drive	.06
111261	Bolt - chassis mtg. (#14 X 1-1/4)	.03
111260	Bushing - rubber (for chassis mtg.)	.06
111892	Bushing - hard rubber, mystic mechanism mtg. to chassis	.02
111658	Clip - for pulley retaining	.01
110762	Cord - for band ind. (2 ft. required)	Per Ft. .04
111302	Cord - dial drive (6 ft. lengths)	.30
111226	Escutcheon - for dial (with glass)	3.00
111227	Escutcheon - around push button opening	1.20
111865	Frame - dial, with scale	2.50
111496	Knob - tuning or volume	.20
111497	Knob - range or tone	.20
111197	Lever - for band indicator (on shaft)	.12
111370	Link & Lever - for range sw. drive (used in early production)	.20
112633	Plug - for mechanism connecting (8 prong)	.20
110496	Plug - speaker (4 prong)	.12
111859	Pointer - for dial, with slider	.18
111622	Pulley - dial cord drive	.35
111530	Pulley & Bracket - for band indicator	.10
112628	Pulley - on range switch shaft under chassis	.20
84214	Retaining Ring - for dial drum shafts	.02
89837	Retaining Spring - for retaining escut.to cabinet	.01
111222	Scale - dial	1.20
110716	Screw - band indicator pivot	.03
111115	Screw - #5 X 5/8, mystic mechanism mtg.	.02
85827	Set Screw - 8/32 square head	.02
111403	Set Screw - 8/32 fluted head	.12
112138	Set Screw - 8/32 slotted head	.03
111375	Shaft - for range switch	.06
85427	Socket - octal base	.15
110501	Socket - 4 prong (for spkr.)	.16
110627	Socket - dial lamp & automtic lamp	.12
111008	Socket - reactance dimmer lamp	.12
112630	Socket & Bracket - for elect. conn. to mech.	.75
111232	Spring - torsion for band indicator	.05
111862	Spring - drive cord tension	.03
112490	Spring - in flexible coupler	.02
111676	Stud - lower left idler pulley	.10
112667	Stud - for pulley mtg. (for top pulleys)	.10
112005	Tabs - station call letters (6 sheets)	.60
84412	Terminal Strip - phono (for Model R-186-P only)	.03
85066	Terminal Strip - G.D.A.	.20
89709	Terminal Strip - phono (for Model R-186-W only)	.15
87568	Washer - embossed (for mtg. electrolytic cond.)	.05
89746	Washer - (paper) for back of knobs	.005
89027	Washers - spring for range shaft	.01
111282	Washer - flat steel mtg. (15/16" O.D.)	.02

"MAGIC KEYBOARD" PARTS LIST

FOR A COMPLETE PARTS LIST SEE THE SEPCIAL "MAGIC KEYBOARD" SERVICE MANUAL FORM 8529 WHICH MAY BE OBTAINED FROM STEWART-WARNER CORP.

PART NUMBER	DESCRIPTION	LIST PRICE
112727	Mystic Mechanism - complete with all dials - ready to mount on chassis	$80.00
111350	Mystic Mechanism only,less dial frame assembly	35.00
112428	Button Body - for tuner	.10
112545	Button Cap - for push button	.06
111878	Button Window - celluloid for push button	.01
112547	Button Reinforcing Disc - for push button	.01
111633	Button Retaining Spring - inside push button	.02
111577	Button Spring - in push button	.005
111578	Button Washer - in push button	.005
112563	Cam - bakelite - less operating arm	.10
111146	Clutch - bushing, spring and gear	.55
111137	Drive Ring - rubber	.05
111380	Motor - 6 volt 60 cycles	4.40
112354	Motor - 6 volt, 25 to 80 cycles	5.50
112736	Plug - with cable for tuner connections	.75
111136	Spring - horseshoe shaped on clutch	.02
111674	Switch Side - multiple contact(above tuning shaft)	.95
112564	Switch Back - (multiple contact)	1.25
112521	Tip - adjustable for key stop and kickout arm	.06
112483	Wrench - for fluted head set screws #6	.07
112484	Wrench - for fluted head set screws #8	.07
117468	Spring Benders	.75

PHONOGRAPH CONNECTIONS FOR MODEL R-186-W



PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SELECTIVITY & TONE CONTROL SWITCH.

When the switch is in this position (clockwise), the auxiliary coils in the I.F. transformers are connected into the circuit to broaden the tuning.

All alignment and set-up operations must be made with the tone selectivity switch in one of the sharp positions.

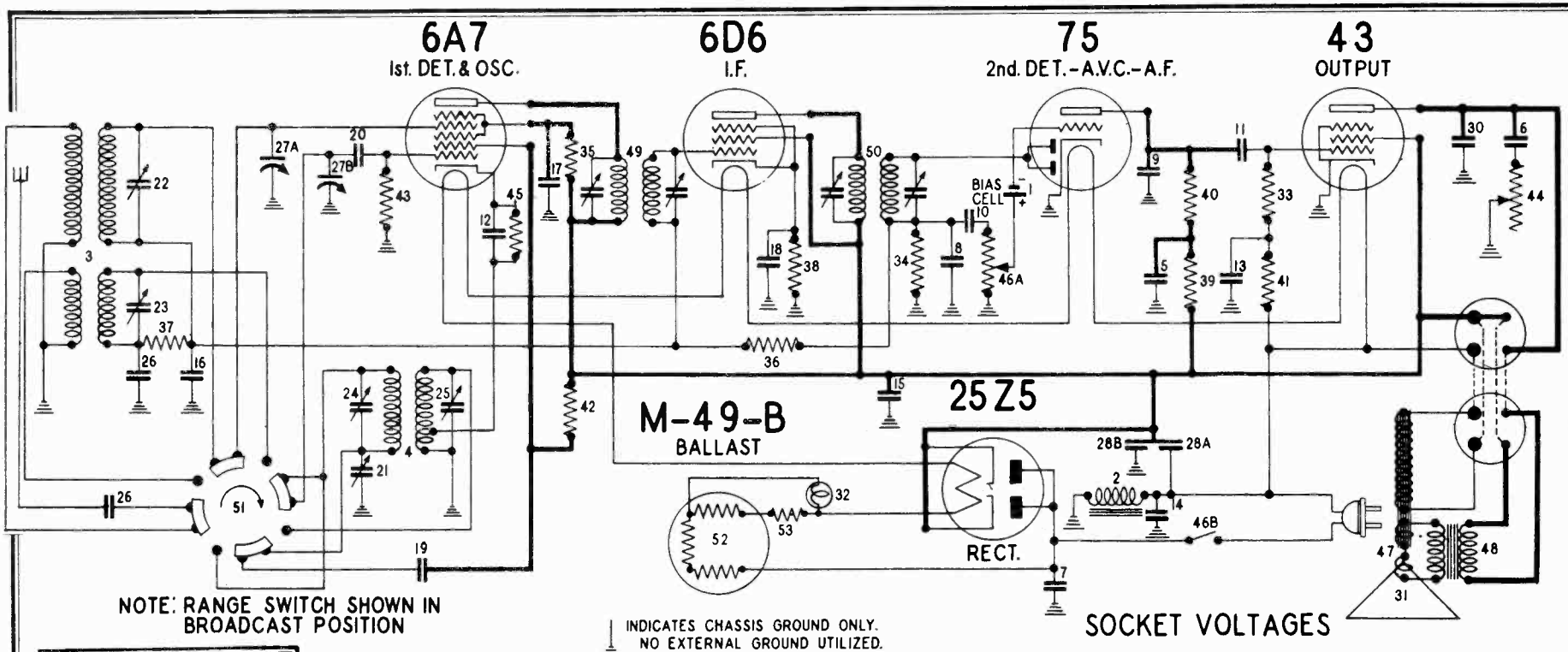
The lower left hand knob on the receiver panel is combination four point tone control and selectivity control. This switch controls the tone and selectivity simultaneously. The switch turned clockwise the tone is varied from base to treble. The selectivity is sharp in all positions except the maximum clockwise position (treble).

MODELS 1881-1889 incl.

Chassis R-188

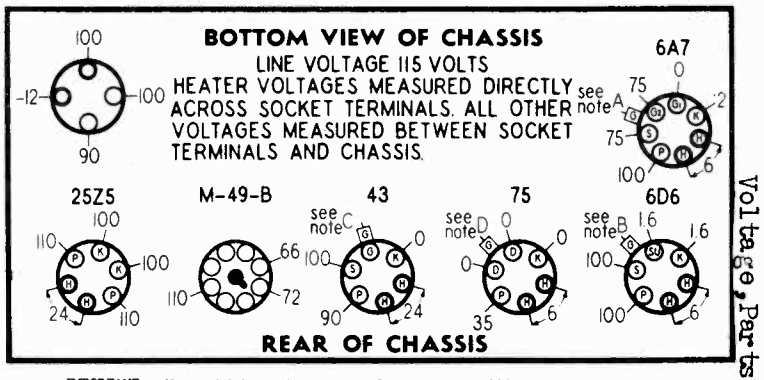
Schematic, Socket Voltage, Parts

STEWART WARNER CORP.



SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE A: The self bias of the control grid of the 6A7 is -2 volts measured across resistor 45.
NOTE B: The self bias of the control grid of the 6D6 is -1.6 volts measured across resistor 38.
NOTE C: The bias on the control grid of the 43 is -12 volts measured across the filter choke 2.
NOTE D: The bias on the grid of the triode section of the 75 is -1 volts supplied by a bias cell. CAUTION:- Use only a very high resistance voltmeter when checking this voltage, otherwise the cell may be damaged.

INTERMEDIATE FREQUENCY 465 K.C.

MODEL R-188 PARTS LIST

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	89849	Cell - bias (1.25 volt)	$.22
2	112266	Choke - filter	1.50
3	112267	Coil - antenna	1.50
4	112268	Coil - oscillator	1.50
5	67297	Condenser - paper .25 mfd. 200 volt	.40
6-7	67338	Condenser - paper .05 mfd. 600 volt	.35
8-9	81157	Condenser - mfca 250 mmfd.	.30
10-11-12	83437	Condenser - paper .05 mfd. 200 volt	.30
13	89962	Condenser - paper .2 mfd. 200 volt	.23
14-15-16 17-18	83974	Condenser - paper .1 mfd. 200 volt	.25
19	84200	Condenser - mica .004 mfd.	.50
20	83109	Condenser - mica 100 mmfd.	.20
21	112048	Condenser - padding (200-600 mmfd.)	.60
22-23 24-25	112213	Condenser - trimmer (3-45 mmfd.)	.25
26	112215	Condenser - mica .0045 mfd.	.50
27A-27B	112269	Condenser - variable gang	3.60
28A-28B	112270	Condenser - electrolytic (Sect. A-40 mfd. 150 volt) (Sect. B- 8 mfd. 150 volt)	2.40
29-30	112271	Condenser - paper .005 mfd. 400 volt	.25
31	112463	Cone & voice coil assem. for 8" spkr	3.00
	112383	Cone & voice coil assem. for 6" spkr	2.75
32	84068	Lamp - pilot 6.3 volt .2 amp.	.15
33-34	67262	Resistor - carbon 1/2 meg. 1/4 watt	.12
35	67580	Resistor - carbon 6000 ohms 1/4 watt	.25
36-37	67939	Resistor - carbon 1 meg. 1/2 watt	.25
38	81153	Resistor - carbon 150 ohms 1 watt	.25
39-40-41	81161	Resistor - 250,000 ohms 1/2 watt	.20
42	83285	Resistor - carbon 10,000 ohms 1/2 w.	.25
43	67260	Resistor - carbon 100,000 ohms 1/4 w.	.15
44	112056	Resistor - tone control 50,000 ohms	1.05
45	112272	Resistor - carbon 250 ohms 1/3 watt	.15
46A-46B	112275	Resistor - volume control 1/2 meg. (with on-of switch)	1.48
47	112462	Speaker - dynamic 8"	9.50
	112273	Speaker - dynamic 6"	7.50
48	112384	Transformer - output	2.00
49	112058	Transformer - 1st I.F.	2.00
50	112059	Transformer - 2nd I.F.	2.00
51	112274	Switch - range	1.05
52	M-49-B	Tube - ballast	1.25
53	112248	Resistor - wire wound 15.4 ohm 1 watt	.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS 1381-1889 incl.
Chassis R-1881
Alignment, Trimmers
Circuit Data

STEWART-WARNER CORP.

MODEL R-188 CHASSIS (RECEIVER MODELS 1881 to 1889)

CIRCUIT DESCRIPTION

The model R-188 chassis is a 115 volt A.C. or D.C. six tube superheterodyne receiver. It has an intermediate frequency of 465 KC.; and tuning ranges of 540 to 1720 KC.; and 5.8 to 18 MC.

The incoming signal picked up by the antenna is induced in the tuned secondary of the antenna coil and impressed upon the control grid of the 6A7 first detector and oscillator. The 465 KC. output of the 6A7 is amplified in the I.F. stage using a 6D6 tube. The amplified voltage is then impressed upon the diodes of the 75 twin diode triode tube. The two diodes are tied together and function as a linear second detector and A.V.C. The direct current voltage developed across the 1/2 megohm diode load resistor is used as A.V.C. voltage and applied to the control grids of the 6D6 and 6A7 tubes through a resistance capacity filter system.

The potentiometer type volume control 46A serves as a continuous voltage divider of the audio frequency voltage developed. Hence any portion of the audio voltage developed can be applied to the control grid of the triode section of the 75 tube. It should be noted the grid bias of the 75 tube is obtained from a bias cell. The 75 tube is now resistance coupled to the 43 power output tube. Grid bias for the output tube is obtained across the filter choke number 2.

The heaters of all the tubes in the receiver are connected in series and are supplied by a type M-49-B ballast tube. The pilot lamp supply is taken from a tapped portion of the voltage drop across the ballast tube and resistor number 53 in series. The 25Z5 tube is used as a conventional half wave rectifier. When the receiver is operated on direct current the line cord plug must be so inserted that the plates of the rectifier are on the positive side of the line. Under this condition the rectifier acts as a device passing direct current to the plates of the other tubes.

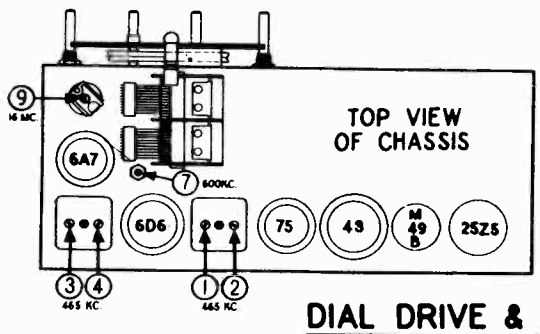
ALIGNMENT EQUIPMENT & PROCEDURE

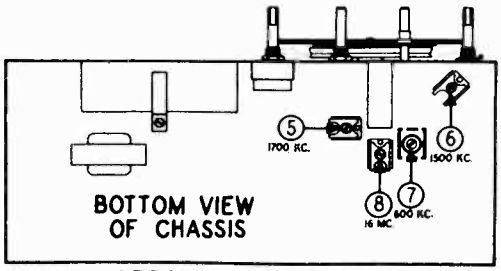
For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18 MC. are required.

1. Connect the output meter between the plate of the 43 tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer on the black horizontal line below 550 KC. on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 6D6 TUBE	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL.	1 2	2ND. I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	.1 MFD. CONDENSER	CONTROL GRID OF 6A7 TUBE	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL.	3 4	1ST. I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2. SEE NOTE A BELOW.
C	400 OHM CARBON RESISTOR	ANTENNA LEAD	1700 KC.	BROADCAST (Clockwise)	1700 KC.	5	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
D	400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GENERATOR SIGNAL	6	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
E	400 OHM CARBON RESISTOR	ANTENNA LEAD	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	7	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
F	400 OHM CARBON RESISTOR	ANTENNA LEAD	16 MC.	SHORT-WAVE (Counter-clockwise)	16 MC.	8	SHORT-WAVE OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 16.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
G	400 OHM CARBON RESISTOR	ANTENNA LEAD	16 MC.	SHORT-WAVE (Counter-clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	9	SHORT-WAVE ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

NOTE A: Now repeat adjustment of trimmers 3 and 4 again for greater sensitivity. This may cause oscillation. If oscillation occurs repeat steps A and B and disregard the repeat adjustment mentioned in this note.





PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
112065	Dial - complete assembly	$2.50
112067	Glass - escutcheon window	1.75
112068	Knob - volume, tuning, tone, band switch	$0.25
112276	Scale - dial (gold colored)	.85

8-19-37

STEWART-WARNER MAGIC KEYBOARD

(USED IN MODELS 1845 to 1869)

REFER TO INDIVIDUAL CHASSIS FOR OTHER DATA.

The Mystic Mechanism with the Magic Keyboard is used on Models 1845 to 1869 Stewart-Warner radios. It is an electrically driven device for automatically tuning the receiver to any one of fifteen preselected frequencies. The receiver can be tuned either automatically or manually without the need of turning a switch.

The operating mechanism of this tuning device consists of fifteen sets each of keys, station selector cams and pawls. In addition it has two multi-contact control switches.

The back switch, mounted on the rear of the tuner, has four sets of contacts. From front to rear, they are:

1. REVERSING: for reversing the direction of motor rotation.
2. POWER: for opening and closing the motor power supply line.
3. MUTE: for killing the audio system to prevent noises during automatic tuning.
4. A.F.C.: for cutting out A.F.C. during automatic tuning.

The side switch, mounted on the right end of the tuner, has two sets of contacts. From the top down, they are:

1. A.F.C.: for cutting out A.F.C. during manual tuning and during setting up.
2. POWER: for opening and closing the motor and automatic light power supply line.

With the tuner in the manual tuning position all switch contacts are in the position shown in figure 1. As a button is pressed in, its pawl is pulled against a station selector cam. It will be noted that these cams have two different heights, that is, a high and a low side. If the pawl comes to rest against the high side of the cam, the reversing contacts on the back switch are closed to the front for one direction of motor rotation. If the pawl comes to rest against the low side of the cam, the reversing contacts close to the back for the other direction of motor rotation. The direction of rotation will always be such as to bring the notch on the cam around to the pawl by the shortest route.

Regardless of whether the pawl rests against the high or low side of the station selector cam, the bakelite cam will close the Power, Mute and A.F.C. contacts on the back switch. After these and the reversing contacts have closed, the power contacts on the side switch close and cause the motor to run.

The motor drives the mechanism to the proper position for the desired station. Then the pawl falls into the notch on the selector cam and causes the bakelite cam to set the back switch contacts in new positions. The Power contacts open, shutting off the motor. The Mute contacts open allowing the signal to come in. The A.F.C. contacts open and A.F.C. puts the finishing touch to the automatic tuning operation.

A friction clutch in the gear train, driving the cam shaft, acts as a buffer and absorbs the shock of the sudden stop when the pawl falls into the notch on station selector cam.

During automatic tuning the manual tuning shaft is disengaged by moving the friction roller. This roller is slid away from engagement with a friction wheel as a button is pushed in. The arm that does this, also allows a kickout arm to engage a star wheel. To tune manually, a slight rotary movement of the tuning shaft causes the star wheel to force down the kickout arm. This releases the depressed button and slides back the friction roller into engagement with the friction wheel for manual tuning.

The flywheel on the back end of the tuning shaft provides a "spinner" action while tuning manually.

The station selector cams are prevented from turning on their shaft by an expansion and contraction type locking mechanism. The assembly is locked when the device is expanded or unmeshed as shown in figure 9B. Unlocking is accomplished by pulling out the set-up knob and turning it clockwise until a click is heard. This contracts the locking mechanism and allows the selector cams to turn on the shaft for setting up. See set-up instructions in section 45.

TROUBLE CHART

The following service chart lists the most typical troubles, gives the most likely causes, and indicates the figures and paragraphs in which information may be found to aid in correcting the troubles. While this chart is necessarily incomplete, its careful study will enable the serviceman to diagnose most of the service complaints he receives on the Mystic Mechanism.

No reference is made to failures of the Mystic Mechanism when such failures are due to broken leads, loose connections, etc. It must be borne in mind, however, that certain indications are common to both radio and tuner troubles. For examples, Automatic Frequency Control may not be functioning because of improper contact adjustment of the tuner switches or because of an electrical defect in the chassis. Therefore, when servicing the tuner, check the possibilities of radio troubles causing the same symptoms.

BUTTON DOES NOT STAY IN OR DOES NOT RELEASE

COMPLAINT	PROBABLE CAUSE	FOR REMEDY SEE
Button will not stay in when pushed in.	Kickout pointer tip improperly adjusted.	Section 34.
	Kickout spring bent down too far.	Section 35.
	Insufficient tension in key stop bar return spring.	Section 35.
	Jammed or stuck key stop bar.	
	Star wheel stuck or not moving freely on tuning shaft.	Section 37.
	Bent or sprung key stop bar.	
Depressed button does not release when another button is pushed in.	Kickout tip jams against star wheel.	Section 36.
	Stuck or jammed pawl.	Sections 25, 26 and 36.
	Stuck or jammed key.	
Depressed button will not release when tuning knob is turned.	Kickout tip not engaging star wheel.	Section 34.
	Also check those listed for previous fault.	Section 36.

POINTER DOES NOT MOVE WHEN BUTTON IS PUSHED

Motor hums but does not run.	Reversing contacts on back switch not closing.	Secs. 1 & 3 or 1 & 9
	Motor stalled due to mechanical overload and clutch not slipping.	Secs. 20 and 22.
	Defective motor.	
	Low line voltage or improper frequency	Section 49.
Motor runs but pointer does not move.	Clutch slipping.	Sections 20, 21 & 22.
	Pointer drive gear slipping on shaft or out of mesh.	Section 52.
	Pointer loose on cord.	
	Pointer sticking on guide rail due to rust.	
Motor does not hum and tuner does not move with button in.	Power contacts on back switch not closing	Secs. 1,4,5, or 1,10,11.
	Power contacts on side switch not closing	Sections 14, 15 & 16.
	Bakelite back switch operating cam binding on contact arms or out of position.	Section 13.

POINTER MOVES BUT DOES NOT TUNE STATION PROPERLY

COMPLAINT	PROBABLE CAUSE	FOR REMEDY SEE
Pointer stops at wrong point.	Improper setting-up of mechanism.	Sections 44, 45, 46 and 47.
	Not locked up tight.	
Pointer stops at proper point, but		
(A) No signal is heard.	Mute contacts on back switch not opening. (No noise will be heard in this case).	Secs. 1 & 5 or 1 & 11
	Tuning backlash.	See "Tuning Backlash" below.
	Gang condenser drive gears out of mesh or slipping on shaft.	Section 52.
	Flexible coupling slipping on shaft.	
	Station not broadcasting or signal too weak as in daytime or during period of fading.	
(B) Signal is not heard clearly.	A.F.C. contacts on back or side switch not opening.	1,5,17,57 or 1,11,17, 57.
	A.F.C. not functioning.	Sections 55 to 57.
	Weak signal or no aerial.	Section 44.
(C) Wrong station comes in.	Desired signal off, weak or faded.	Section 44.
	Not set up properly.	Sections 44, 45, 46 and 47.
	Set off calibration.	Sections 51 and 54.
(D) Motor continues to run.	Pawl does not fall far enough into station selector cam to cut power off.	Burrs on pawl or cam. Sticking pawl.
	Power contacts on back switch not adjusted properly.	Sections 1, 4, 5 or 1, 10, 11
Pointer stops at a different place each time for a certain button.	Mechanism not locked up tight.	Sections 31 and 44g.
	Dial pointer slipping on cord.	Section 53g.
	Left end bearing bracket loose.	Sections 54 and 60.
	Pointer drive gears slipping out of mesh or on shaft.	Sections 52.
	Loose set screw.	
Pointer stops off station occasionally.	Pointer backlash. (Note pointer backlash will cause apparent rather than actual mistuning.)	Section 60.
	Pawl does not fall far enough into station selector cam.	Sec. 1 & 5a, 1& 11a, and 24
Pointer goes to end of dial and motor stalls and hums, or continues to run by slipping the clutch.	Station selector cam turned around beyond its normal operating range.	Section 27.
	Reversing contacts on back switch not adjusted properly.	Secs. 1 & 3 or 1 & 9.
	Bakelite cam binding on contact arm or out of position.	Section 13.
Motor continues to operate, moving the pointer back and forth over a short distance, after tuning to the approximate frequency to which the button is set.	Reversing contacts on back switch are not adjusted properly - set too close.	Secs. 1 & 3 or 1 & 9.
Motor starts before button is pushed in far enough to catch. Motor starts in the wrong direction then corrects itself as the button is pushed the rest of the way in.	Side switch power contacts are being closed too soon.	Section 16.
Intermittent operation of motor, lights, etc.	Insufficient contact pressure or dirty contacts on back or side switch.	Sections 3a, 4b and 15 or 9a, 10b and 15.
	Loose silver contact in contact blade of switches.	
	Bakelite cam binding on contact arms or out of position.	Section 13.
Tuning backlash. (Note: the high tuning ratio greatly exaggerates the effect of most of these conditions.)	Clutch slips.	Sections 21 and 22.
	Play between gang condenser drive gears due to insufficient compression in thrust spring in flexible coupling.	Sections 41 and 42.
	Play between gears due to improper setting of anti-backlash springs.	Section 40.
	Play between gear and stud.	
	Gear stud loose.	
	Gang condenser sways.	Section 59.
	Loose set screw in coupling or gear.	
	Loose or worn bearings.	
	Friction roller rotates relative to tuning shaft.	
Calibration incorrect.	Dial pointer or gang condenser drive gears jump teeth, slip on cam shaft or out of mesh.	Sections 42 and 52.
	Loose set screw in gear or coupling.	
	Dial pointer slips on dial cord.	Section 53g.
	Left end bearing bracket loose.	Sections 54 and 60.
	Excessive pointer backlash.	Section 60.

MAGIC KEYBOARD
Trouble Chart, Back Switch

STEWART-WARNER CORP.

MANUAL TUNING DIFFICULTIES

COMPLAINT	PROBABLE CAUSE	FOR REMEDY SEE
Set tunes very broadly	A.F.C. contacts on side switch not closing.	Section 17.
Tuning knob sticks and catches in going from automatic to manual tuning.	Burrs on tip of kickout arm and star wheel.	Sections 38 and 61.
	Adjustable tip of kickout arm set improperly.	Section 34.
Pointer does not move when tuning knob is turned, although works OK in automatic position.	Oil or grease on drive rubber on friction wheel.	Section 58.
	Jammed bar and arm assembly.	
	Insufficient tension in bar and arm assembly return spring.	Section 58.
Pointer does not move when tuning knob is tuned.	Bent tuning shaft.	
	Oil or grease on drive rubber of friction wheel.	Section 58.
	Jammed bar and arm assembly.	
	Insufficient pressure between friction wheel and friction roller.	Section 58
	Gear driving dial cord drum is out of mesh or slipping on shaft.	Section 52.
	Slipping clutch.	Sections 21 and 22.
DIFFICULTIES OCCURRING DURING SET-UP BUT NOT IN NORMAL OPERATION		
Set tunes very broadly.	A.F.C. contacts on side switch not closing when set-up knob is out and a button is in.	Sec. 17 & Fig. 7.
Button does not release when set-up knob is worked in or out.	Kickout spring set too far from kickout arm.	Section 35.
Visual tuning indicator off or flickers on and off. (This applies only to chassis with visual indicator wired to side switch. See section 14.) Automatic light off or flickers on and off.	Improper adjustment of side switch.	Section 15.
	Loose silver contact on contact blade.	
Mechanism locks up during setting up of a station.	Was not completely unlocked.	Section 30.
	Defective locking mechanism.	Section 32.
	Station selector cam sticking.	Section 32.
	Turning the set-up knob too suddenly.	Section 32.
MISCELLANEOUS TUNER TROUBLES		
During automatic tuning visual tuning indicator light is on or flickers on and off. (Applies only to chassis with visual indicator wired to side switch. See section 14.)	Improper adjustment of side switch.	Sections 14 and 15.
	Loose silver contact in switch blade.	
Dial and automatic lights go out and set is killed momentarily when a button is pushed in or released.	Both reversing contacts on back switch closed at once and shorting 6 volt winding of power transformer.	Section 3a or 9a.
	Short operating arm of side switch grounding against friction roller assembly at point C.	Figure 5A.
Gears noisy during automatic tuning.	Motor pinion and first reduction gear not meshing properly.	Section 39.
	Too much compression in anti-backlash springs in gears.	Section 40.
	Burrs, bent teeth, and other irregularities on gears, especially the higher speed ones.	
Black ground lead near 6H6 tube under chassis heats up and smokes.	Short operating arm of side switch grounding against friction roller assembly at point C.	Figure 5A.
	A short between hot 6-V. line and chassis.	
	Tuning shaft bearing stop out of place and grounding power blade of side switch.	Section 48.
Slight hum when button is depressed - not heard when button is released.	Poor or defective discriminator tube.	Change discriminator (6H6) tube.
Short in wiring when turning set-up knob.	Tuning shaft bearing stop out of place grounds power blade of side switch.	Section 48.
Signals are heard when tuning from one station to another automatically.	Mute contact on back switch not closing or making poor contact.	Sections 4b or 10b.
Set noisy electrically when starting and stopping during automatic tuning.	Set used with insufficient antenna or mute contacts on back switch closing too late and opening too soon.	Reduce spacing between mute contacts on Back Switch. (Figure 4).
Mechanism reaches a definite stop before the pointer reaches either end of the dial.	The cam assembly stop pin and the gang condenser stops are not set so they reach their respective stop points at approximately the same time.	Section 51.
Band indicator hangs up when changing ranges.	Knot on band indicator cord jams against visual tuning indicator light bulb.	
	Torsion spring slipped out of place.	
	Link on range switch over dead center.	

ADJUSTMENT OF THE BACK SWITCH

THE SUCCESSFUL OPERATION OF THE ENTIRE MECHANISM DEPENDS TO A LARGE DEGREE ON THE CORRECT ADJUSTMENT OF THE BACK SWITCH: For this reason it is highly important that all contacts be set exactly right.

Two different types of Back Switches, and associated Bakelite Operating Cams, have been used. To determine whether the Switch is of the early or later type, notice the shape of the Bakelite Cam. The shape of the Bakelite Cam used on early units is shown in figure 1A; on later units it is shaped as in figure 1B. The various operating positions of the early type are shown in figures 1A, 2A, 3A and 4A. The positions of the later type are shown in figures 1B, 2B, 3B and 4B. Details of the correct settings for the early type are explained in sections 2 to 6. Details of the correct settings for the later type are explained in sections 8 to 12. MINOR ADJUSTMENTS OF THE BACK SWITCH TO SECURE THESE SETTINGS MAY BE MADE BY BENDING THE VARIOUS BLADES OF THE SWITCH.

EARLY TYPE BACK SWITCH

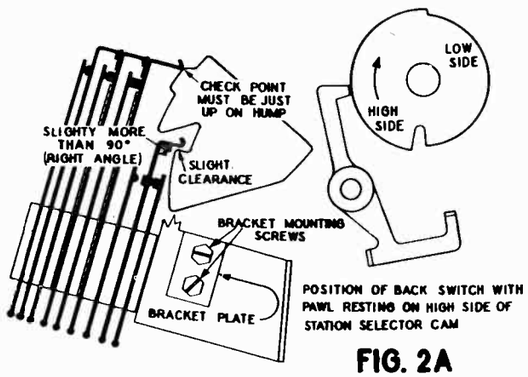
2 Run the dial pointer to 530 KC. Turn the power off. With the mechanism in the manual position, the Back Switch Operating Arms should clear the Bakelite Cam by the amounts indicated in figure 1A. Push any button so that the Pawl falls on the high side of the Station Selector Cam. The Reversing Contacts Operating Arm should clear the Bakelite Cam as indicated in figure 2A. IF THESE CLEARANCES ARE APPROXIMATELY CORRECT, PROCEED WITH SECTION 3. However, if the clearances are not as shown, slight discrepancies can be corrected by bending the Arms, but if the entire switch seems to be out of position, loosen the Bracket Mounting Screws (Figure 2A) and move the entire Back Switch assembly to give the proper clearances.

3 Release any depressed buttons. Move the Bakelite Cam up and down by hand to make sure that the Reversing Contacts make and break properly as follows. These are the three short switch blades nearest the Bakelite Cam.

a. With the Bakelite Cam down as in figure 2A, the center contact should make with the front contact, while with the Bakelite Cam pulled up as in figure 3A, the center contact should make with the Back Reversing Contact. After the instant of closing the blades should move slightly to show adequate contact pressure. IMPORTANT: Make sure that the center contact is not touching both the front and back contacts at any one time, since this may short circuit the 6-volt winding of the power transformer. If the Reversing Contacts do not make or break properly, bend the switch blades to secure proper operation.

b. With the dial pointer at 530 KC. push each button and make sure that the Reversing Contacts Operating Arm does not touch the Bakelite Cam. See figure 2A. The Pawl, in every case, should rest on the High Side of the Station Selector Cam.

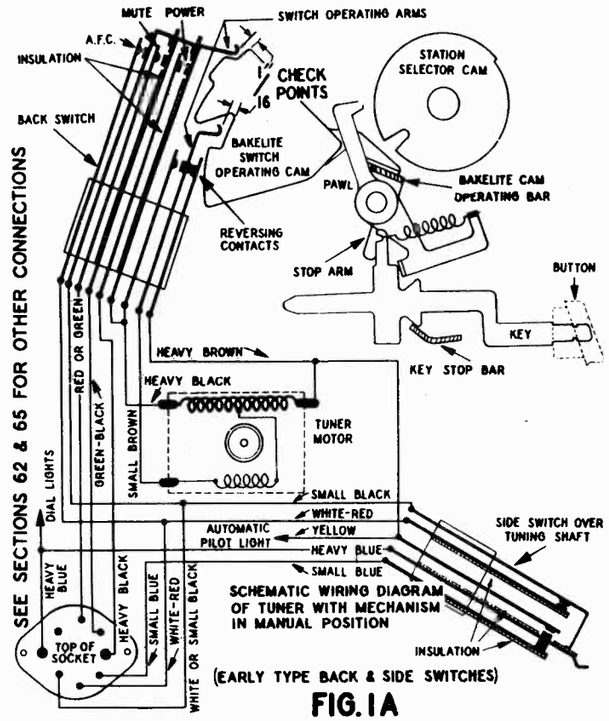
c. Now pull out the Set-up Knob and run the pointer to the high frequency end of the dial by turning the Set-up Knob clockwise. Push each button to make sure that the center contact closes with the back Reversing contact. See figure 3A. In every case the Pawl should rest on the Low Side of its cam.



POSITION OF BACK SWITCH WITH PAWL RESTING ON HIGH SIDE OF STATION SELECTOR CAM

FIG. 2A

4 Turn the Tuning Knob to release the depressed button. This puts the Bakelite Cam in the position shown in figure 1A. so the Power, Mute and A.F.C. contacts of the Back Switch can be checked as follows:

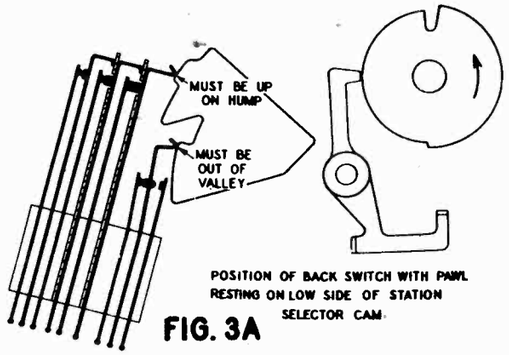


(EARLY TYPE BACK & SIDE SWITCHES)

FIG. 1A

a. The long Mute blade should barely hold the thin bakelite strip against the Power blade, and the long A.F.C. blade should barely hold the thin bakelite strip against the Mute blade.

b. All three sets of contacts should be open approximately 1/64 to 1/32 of an inch. Move the Bakelite Cam up and down by hand and observe the action of the contacts. As the Bakelite Cam is moved up (to the position of figures 2A or 3A) all three sets of contacts should close. After the instant of closing the blades should move slightly to show adequate contact pressure.



POSITION OF BACK SWITCH WITH PAWL RESTING ON LOW SIDE OF STATION SELECTOR CAM

FIG. 3A

5 To finish checking the setting; pull out the Set-up Knob, unlock the Cam Assembly by turning the Set-up Knob clockwise as far as it will go. A slight click should be heard as the mechanism is unlocked. Then proceed as follows:

a. Run the dial pointer to the low frequency end of the dial. Push any button so that the Pawl Falls on the High Side of the Station Selector Cam. The upper Back Switch Operating Arm should rest just up on the "Hump" of the Bakelite Cam, at the "Check Point" shown in figure 2A. If the Operating Arm is not in this position, bend the Arm slightly to secure such setting. If the Operating Arm is down off the "Hump", the Power, Mute or A.F.C. contacts may remain closed after a station is tuned in. If

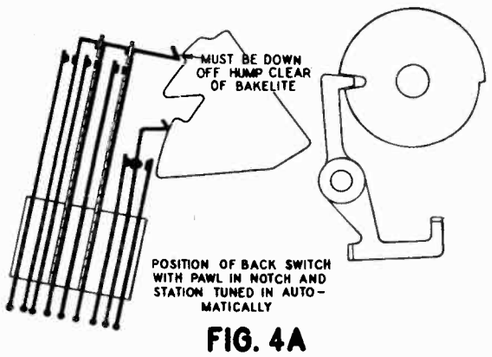


FIG. 4A

the Operating Arm is farther up on the "Hump", the Power contacts may open and cut the power off before the Pawl falls completely into the Notch.

b. Turn the Set-up Knob until the Pawl of the depressed button falls into the Notch on the Station Selector Cam. The Power, Mute and A.F.C. contacts should now be open at least 1/64 inch as shown in Figure 4A.

c. Repeat step 5a. with each of the other buttons then repeat step 5b. with each button. Due to slight variations in the Pawls, it may not be possible to adjust for all buttons so that the Back Switch Operating Arm comes exactly at the "Check Point" but make sure that the Power, Mute and A.F.C. contacts are open at least 1/64 of an inch for each button when the Pawl is in the Notch. Notice, too, that the bending of any switch blade or operating arm may throw out a preceding adjustment. For this reason it is well to check through the entire adjustment procedure a second time.

6 Lock up the Cam Assembly by turning the Set-up Knob as far counter-clockwise as possible. Turn on the power and check the operation of the unit.

REPLACING EARLY TYPE BACK SWITCH

7 If it is necessary to replace the early type Back Switch with the later type, since we stock only the later type, part number 112564, it will also be necessary to change the Bakelite Cam to the later type, part number 112563. To make this change proceed as follows:

a. File off the two rivets holding the Bakelite Cam to its arm.

b. Put the new Cam in place and secure with two 6/32 machine screws.

c. Remove the two screws holding the Back Switch to its bracket and transfer the wires from the old switch to corresponding terminals on the new switch.

d. Fasten the new switch in place and adjust as described in sections 8 to 12.

LATER TYPE BACK SWITCH

8 Run the dial pointer to 530 KC. Turn the power off. Push any button so that the Pawl falls on the High Side of the Station Selector Cam. The Back Switch Operating Arms should clear the Bakelite Cam by the amounts indicated in figure 2B. IF THE CLEARANCES ARE APPROXIMATELY CORRECT, PROCEED WITH SECTION 9. However, if the clearances are not as shown, slight discrepencies can be corrected by bending the Arms, but if the entire switch seems to be out of position, loosen the Bracket Mounting Screws (see figure 2B) and move the entire Back Switch assembly to give the proper clearances.

9 Move the Bakelite Cam up and down by hand to make sure that the Reversing Contacts make and break properly as follows. These are the three short switch blades nearest the Bakelite Cam.

a. With the Bakelite Cam down as in figure 2B, the center contact should make with the front contact, while with the Bakelite Cam pulled up as in figure 3B, the center contact should make with the back Reversing Contact. After the instant of closing the blades should move slightly to show adequate contact pressure. IMPORTANT: Make sure that the center contact is not touching both the front and back contacts at any one time, since this may short circuit the 6-volt winding of the power transformer. If the Reversing Contacts do not make or break, bend the switch blades to secure proper operation.

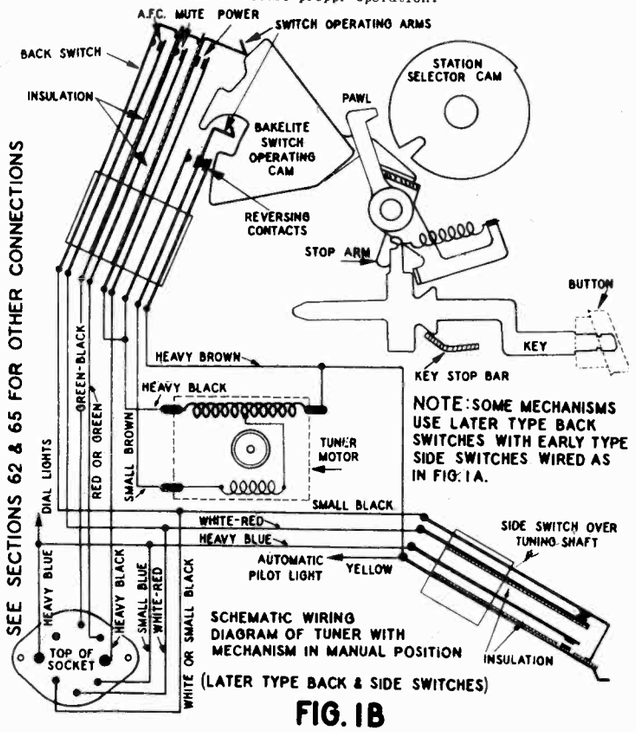


FIG. 1B

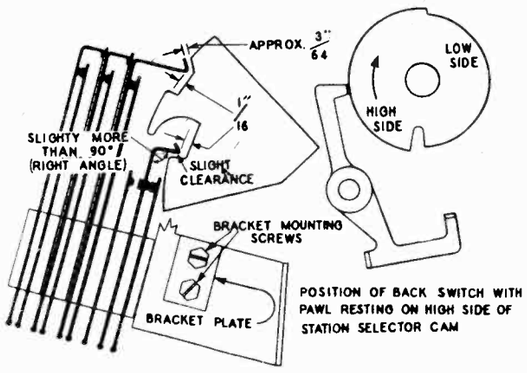


FIG. 2B

b. With the dial pointer at 530 KC. push each button and make sure that the Reversing Contacts Operating Arm does not touch the Bakelite Cam. See figure 2B. The Pawl, in every case, should rest on the High Side of the Station Selector Cam.

c. Now pull out the Set-up Knob and run the pointer to the high frequency end of the dial by turning the Set-up Knob clockwise. Push each button to make sure that the center contact closes with the Back Reversing Contact. In every case the Pawl should rest on the Low Side of the cam. See figure 3B.

10 With the Pawl still resting on the Low Side of the Station Selector Cam, the Power, Mute and A.F.C. contacts of the Back Switch are to be checked as follows:

a. Leave the Bakelite Cam in the Position of figure 3B. The long Mute blade should barely hold the thin bakelite strip against the Power blade, and the long A.F.C. blade should barely hold the thin bakelite strip against the Mute blade.

b. Move the Bakelite Cam up and down by hand and observe the action of the contacts. With the Bakelite Cam up as shown in figure 4B all three sets of contacts should be open approximately 1/32 of an inch. As the Bakelite Cam is moved down (to the position of figure 3B) all three sets of contacts should close. After the instant of closing the blades should move slightly to show adequate contact pressure.

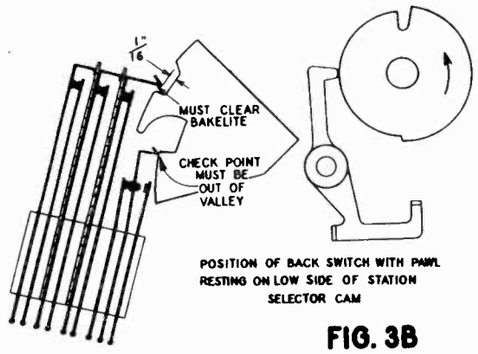


FIG. 3B

11 To finish the checking Pull out the Set-up Knob. Unlock the Cam Assembly by turning the Set-up Knob clockwise as far as it will go. A slight click should be heard as the mechanism is unlocked. Then proceed as follows:

a. Push any button. Turn the Set-up Knob until the Pawl drops into the Notch on the Station Selector Cam. The upper Back Switch Operating Arm should rest just up out of the "Valley" on the Bakelite Cam (See "Check Point" on figure 4B), and

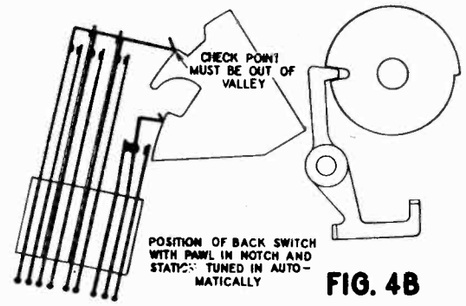


FIG. 4B

the Power, Mute and A.F.C. contacts should be open at least 1/32 of an inch. If the Operating Arm is not out of the "Valley" far enough to open the contacts properly, bend the Operating Arm down slightly. If the Operating Arm is farther out of the "Valley" than indicated by the "Check Point", the Power contacts may open and cut the power off before the Pawl falls completely into the Notch. If the Operating Arm does not come out of the "Valley" far enough, the Power, Mute or A.F.C. contacts may remain closed after a station is tuned in.

b. Repeat the above step for each of the other buttons. This is important. Due to slight variations in the Pawls, it may not be possible to adjust for all buttons so that the Back Switch Operating Arm comes exactly at the "Check Point" of figure 4B, but make sure that the Power, Mute and A.F.C. contacts are open at least 1/32 of an inch for each button, when the Pawl is in the Notch. Notice, too, that the bending of any switch blade or operating arm may throw out a preceding adjustment. For this reason it is well to check through the entire adjustment procedure a second time

12 Lock up the Cam Assembly by turning the Set-up Knob as far counter-clockwise as possible. Turn the power on and check the operation of the unit.

BAKELITE SWITCH OPERATING CAM

13 The Bakelite Cam may stick because of improper adjustment of the Back Switch. The clearances shown in figures 1A or 1B should be maintained. This prevents too much pressure by the Back Switch Operating Arms against the Bakelite Cam. See paragraph 4a or 10a. Other causes for the Bakelite Cam to stick are; rough edges on the Bakelite, and insufficient tension in the Bakelite Cam Return Spring (figure 13). Tension in the Return Spring may be increased, if found necessary, by simply cutting off a few turns and forming a new hook on the end.

The Stop Arm (figure 1B) on the bar carrying the Bakelite Cam, should hit against the Rubber Stop (figure 14). This keeps the Bakelite Cam from jumping too high and catching over the Reversing Contact Arm. If this Rubber Stop is missing, a couple of turns of friction tape around the shaft will serve the same purpose.

SIDE SWITCH ADJUSTMENT

14 There are two general types of Side Switches, namely the early type with five blades and the later type with only four blades. The Side Switch change was made after the Back Switch change, so that there are units equipped with the early Side Switch but with later type Back Switch.

The extra blade in the early Side Switch was used to switch the Visual Tuning Indicator light on during Manual tuning and off during Automatic Tuning. With the later Side Switch this light remains on during both Manual and Automatic tuning. In addition, with the later side switch the 6 volt line and Motor-Automatic light circuit wires were reversed. See figure 1A and 1B for circuit difference.

15 With the power off, adjust to secure the making and breaking of the contacts as illustrated. FOR EARLY TYPE SIDE SWITCH REFER TO FIGURES 5A, 6A AND 7A. FOR LATER TYPE SIDE SWITCH REFER TO FIGURES 5B, 6B and 7B. After the instant of closing the blades should move slightly to show adequate contact pressure. For some adjustments it may be better to bend the Long or Short Switch Operating Arms instead of the Switch blades.

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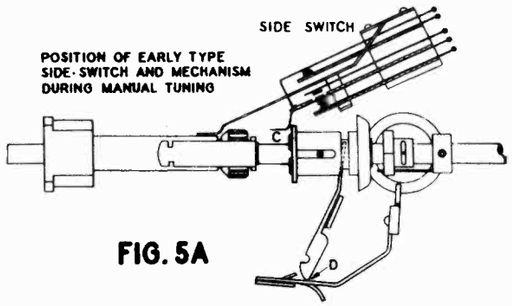


FIG. 5A

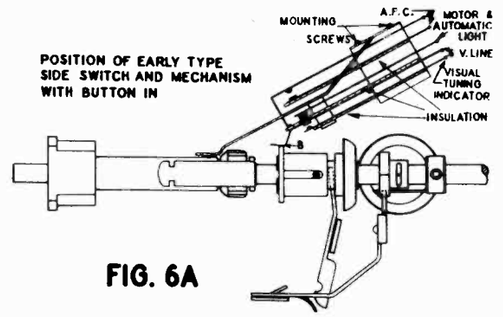


FIG. 6A

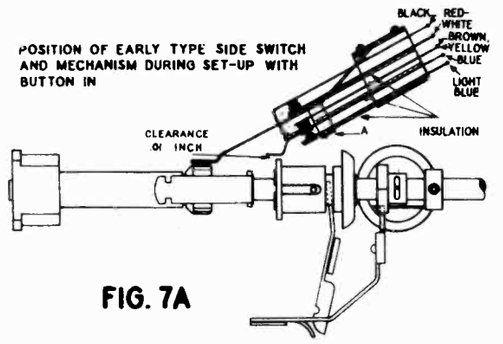


FIG. 7A

EYBOARD
Pawls, Cams, Keys
k, Bar and Arm

16 IT IS IMPORTANT THAT THE MOTOR CONTACTS ON THE SIDE SWITCH DO NOT CLOSE UNTIL AFTER THE REVERSING CONTACTS OF THE BACK SWITCH CLOSE. To secure such sequence of contact closing, the bakelite ring on the Friction Roller Assembly (figure 13) should not come farther forward, under the Short Operating Arm of the Side Switch, than shown at point B, figure 6. If loosening the Switch Mounting Screws does not permit enough movement of the switch to secure this positioning, it may be necessary to bend the Short Switch Operating Arm.

17 Care must be taken that the Automatic Frequency Control contacts on the Side Switch are open during automatic tuning and closed during manual tuning. If they are open when tuning manually the set will appear to tune broadly. The A.F.C. contacts must be closed during setting up, or the Station Selector Cams may be set improperly. If the A.F.C. contacts do not open when tuning automatically, mistuning by the mechanism will result in poor tone quality. In extreme cases of mistuning the station may not be heard at all.

18 When tuning automatically or during set-up, if the automatic Light does not come on and the Motor does not move or the Automatic Light flickers, bend the Side Switch blade, third from the top, down a little. If the blade is bend down too far the light will remain on all the time, even during manual tuning. Also the sequence of contact closing mentioned in section 16 will not be obtained.

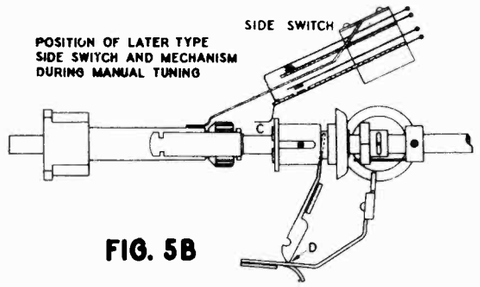


FIG. 5B

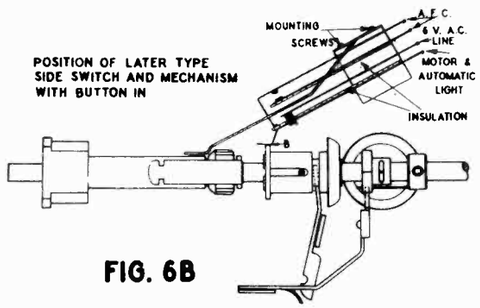


FIG. 6B

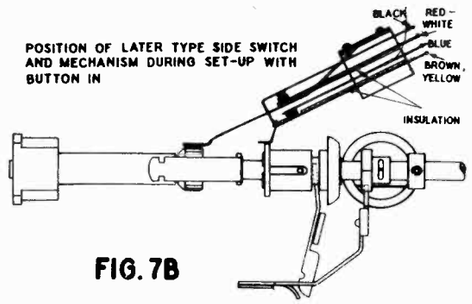


FIG. 7B

19 If the Visual Tuning Indicator Light flickers or goes out during set-up, when a button is pressed, the following may be the cause. The bakelite ring on the Friction Roller Assembly is probably lifting the Short Side Switch Operating Arm, causing it to open the Visual Tuning Indicator circuit. There should be a very slight clearance, about .01 of an inch, between the bakelite ring and the Operating Arm during set-up, with a button in, as shown in figure 7A. Either the end of the Long Switch Operating should be bent down, so it will press harder against the Set-up Gear, or the lifting hook (A, figure 7A) should be bent up slightly.

CLUTCH

20 The Clutch is purely a friction device. It is a standard anti-backlash gear held on a Collar by a flat, horseshoe shaped Spring Washer as shown in figure 8. The frictional resistance between Spring and Collar and the Gear normally can transmit enough power to drive the Cam Shaft, Dial Pointer and Gang Condenser. If an abnormal load is placed on the Clutch it should slip. If the Clutch becomes locked or stuck so it cannot slip when overloaded, other parts of the mechanism may be damaged because of the absence of the "shock absorber" action of the Clutch.

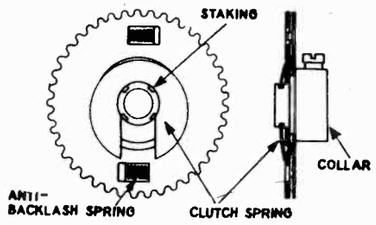


FIG. 8

21 THE CLUTCH MAY SLIP BECAUSE IT IS FULL OF OIL OR GREASE OR THE HORSESHOE SHAPED SPRING HAS CRACKED OR WEAKENED. If oil or grease is present, wash it off with carbon tetrachloride or similar cleaning fluid. The Spring can be slipped out and replaced without any dismantling of the mechanism. NOTICE THAT THE SET SCREW IN THE CLUTCH MUST BE SO POSITIONED, IF THE CLUTCH IS MOVED OR REPLACED, THAT IT WILL NOT JAM AGAINST THE SET-UP CROWN GEAR. Sometimes the Clutch may slip because the Pawl, although falling far enough into the Notch on its Station Selector Cam to prevent the shaft from rotating, does not fall far enough to operate the Back Switch and cut the power off. Check the Back Switch adjustment as outlined in sections 4 to 6 if an early type Back Switch is used, or sections 10 to 12 if the later type Back Switch is used. Also remove any rough edges from Pawl and Notch with emery cloth or a small oil stone.

22 OVERLOAD ON THE CLUTCH MAY ARISE FROM ANY ONE OR COMBINATION OF THE FOLLOWING CAUSES:

a. Binding of the Dial Pointer against the Dial, Dial Frame or cabinet, or rough, rusty or bent Dial Pointer Guide Rail.

b. Dial Pointer drive cable too tight.

c. Jammed or stuck dial cord guide pulley or pulleys.

d. Crossed dial cord on the Drum. Re-thread the dial cord correctly as shown in figure 11 and section 53.

e. Dial Cord Drum binding against Driver Gear or stuck on shaft.

f. The Pointer Driver Gear (figure 15) out of mesh and binding against the Drum Gear. Set Driver Gear to mesh with center of face of gear on Drum and check end play in Cam Shaft (See section 52.)

g. Misalignment or tight Cam Shaft Bearings. Loosen the screws holding the End Bearing Bracket (figures 10 and 15). Hold the Knurled Gears (figure 10) out of mesh by compressing the Flexible Coupling. Rotate the Cam Shaft back and forth a few times to permit the bearings to realign themselves. Then tighten the screws, taking care not to shift the Brackets while doing so. Be sure that both Right End Bearing Bracket Mounting Screws are tight, otherwise dial calibration cannot be maintained. Binding or tightness in the inner bearings is usually the result of sprung End Brackets, which should be straightened.

h. Cam Shaft sprung or bent. In most cases it will be necessary to replace the whole unit.

i. Collar on left end of Cam Shaft (figure 14) binding against Left End Bracket. Push the Cam Shaft as far to the left as it will go. Loosen the Collar Set Screw and reset the Collar so it will have from .006 to .010 of an inch clearance between it and the Left End Bracket.

j. Set-up Crown Gear assembly binding (Fig. 13).

k. Gang Condenser Drive Gears out of mesh and binding (figure 10).

l. Thrust Spring in Flexible Coupling compressed too much. The Thrust Spring should exert just enough pressure on the Condenser Drive Gears (Fig. 10) to prevent backlash.

m. Extension Shaft out of line and binding (Fig. 10).

n. Tight, jammed or sticking Gang Condenser.

If correcting the above conditions does not stop the Clutch from slipping replace the Clutch Spring, part number 111138. In extreme cases it may be necessary to replace the entire Clutch Assembly as indicated below.

23 TO REMOVE THE CLUTCH PROCEED AS FOLLOWS:
a. Remove the L shaped horizontal brace on the back of the Dial Frame. This is the part supported by the brackets screwed to the sides of the chassis.

b. Take the Side Switch Mounting Screws out and swing the switch out of the way.

c. Drive out the pin through the Friction Roller Assembly (Figure 13). Pull out the pin in the Star Wheel. Loosen the set screws in the Star Spring Collar and Flywheel. The Tuning Shaft can now be pulled out. (NOTE that there is a groove around the tuning shaft. The Set Screw of the Star Spring Collar fits into this groove, thus fixing the lateral position of the shaft with respect to the End Bracket.)

d. Take the Set-up Knob off. Remove the Tuning Shaft Bearing and pull the Sleeve and Set-up Gear out of the End Bracket.

e. Take the Retaining Ring off the Set-up Crown Gear Stud and remove the Crown Gear Assembly.

f. Remove the Right End Bearing and Bracket (Figure 10).

g. Take the Knurled Crown Gear off the Extension Shaft (Figure 10).

h. Loosen the Clutch Set Screw, disassemble the Clutch and slide the Collar and Gear Sections off the Cam Shaft to the right.

PAWLS

24 If a Pawl does not fall completely into the Notch on the Station Selector Cam, check the setting of the Back Switch. It is probable that the Power contacts are opening too soon. Notice that in order to fall into the Notch, the Pawl must work against the bar carrying the Bakelite Cam. Anything that makes this Bar operate hard should be corrected. See that the end of the Pawl and Notch on the Station Selector Cam are smooth and free from burrs. Then try closing up the Power contacts on the Back Switch a little more, but only after checking the above points. This may be done by bending the Power blade so the Power contacts are closer together, when the Bakelite Cam is in the position shown in figure 4. DO NOT CHANGE THE OUTLINE OF THE PAWL OR CAM NOTCH.

25 The Pawls can sometimes be made to jam when two Station Selector Cams are set to one station, especially if both Cams are not set exactly to the same frequency and an attempt is made to push one button, then the other button. The Motor will hum or the Clutch will slip until the button is released. What actually happens is this: When such a button is pushed that its Pawl, in falling directly into the Notch on the Station Selector Cam, binds against the high-side wall of the Notch, the Bakelite Cam assumes the position shown in figure 3. The Motor drives the Station Selector Cam tighter against the Pawl and prevents it from falling farther into the Notch. The jammed Pawl may be released by pushing another button and no damage is done. It is possible, with close adjustments of the Back Switch Contacts, to make the Pawls jam as indicated above even when they are set exactly to the same frequency. FOR THIS REASON THE SETTING OF TWO OR MORE BUTTONS TO ONE FREQUENCY ON DEMONSTRATOR SETS IS NOT RECOMMENDED AS GOOD PRACTICE

26 A similar condition may exist when the set is tuned to a station manually, and then the button set for that station is pushed.

STATION SELECTOR CAMS

27 The Cam Assembly is designed to operate through slightly less than 180°. The Cams though, can be rotated all the way around. Obviously then, it is possible to set a Cam so that its Notch will not pass under the Pawl. If a Cam were so set and the button pushed in, the Pointer would run to the end of the Dial and the Motor would continue to operate. This occurs because the Notch has not come around so the Pawl could fall in and cut the power off. TO CORRECT SUCH FAULT: Turn the power off. Pull out the Set-up Knob. Unlock the Cam Assembly by turning the Set-up Knob clockwise as far as it will go. A slight click should be heard as the mechanism is unlocked. Then push in the offending button. Rotate the Set-up Knob to run the Dial Pointer clear to the very end of the Dial in one direction then in the other. The Cam should now be in the proper position, ready to be set up to a station.

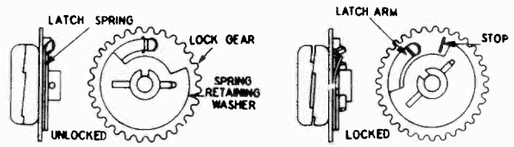
28 A similar condition is when a Cam is set to bring the Pointer to the very end of the Dial. The Pawl may lack just a very little bit of falling in far enough to cause the power to be cut off. Reset the Cam so the Pawl can fall in before the Cam Assembly Stop Pin (Figure 14) hits the stop.

KEYS

29 It is quite unlikely that the Keys will require any adjustment. Their failure to work properly will usually be due to improper adjustment or operation of some other part or parts of the mechanism.

CAM ASSEMBLY LOCK

30 Refer to figure 9. The left saw-tooth section of the Lock, the Spring Retaining Washer and the Latch Spring are keyed to the Cam Shaft. The right saw-tooth section of the Lock and Lock Gear (Figure 13) are free to turn on the Cam Shaft, subject to certain limits. These limits are complete engagement of the teeth on the two sections of the Lock in one direction, and a stop on the Lock Gear in the other direction. Rotating the right half of the Lock counter-clockwise (by turning the Set-up Knob clockwise) will cause the two saw-tooth sections to assume the meshed or unlocked position shown in figure 9A. It should relieve the pressure on the Station Selector Cams and Friction Washers enough so that they can be turned on the Cam Shaft quite freely. In this position the flat Latch Spring Arm should be hooked over the Stop on the Lock Gear (Figure 9A). The Cam Assembly may then be rotated within its working range, by the use of the Set-up Knob, without causing the mechanism to lock up.



CAM ASSEMBLY LOCK

FIG. 9A FIG. 9B

31 The Cam Assembly will be locked up if the Set-up Knob is turned after the Cam Assembly Stop Pin (Figure 14) reaches the Back Stop on the Left End Bracket. This occurs because the Latch Arm slips over the Stop on the Lock Gear and permits expansion of the lock as shown in figure 9B. When fully unmeshed the lock has expanded about .030 of an inch. The stop on the Lock Gear would be against the stop portion of the Spring Retaining Washer, and only the tips of the teeth on the saw-tooth sections would be touching each other. The pressure exerted on the Station Selector Cams will depend upon the amount the saw-tooth sections are unmeshed. When unmeshed (locked up) as far as possible, with the Stop on the Lock Gear against the Stop on the Retaining Washer, if there is still insufficient pressure being exerted to keep the Station Selector Cams from slipping, proceed as follows: Unlock the Cam Assembly and slip a horseshoe shaped shim, about .01 on an inch thick, down between the left Station Selector Cam and the Bushing (Figure 14). Do not make this shim too thick or the mechanism will tend to lock up while attempting to set up stations.

32 Locking up of the mechanism during set-up may be due to a Station Selector Cam not turning freely enough because of dirt, grit, etc. between the Cams and the Friction Spacer Washers. This may also result from defective Latch parts or a quick sudden turn of the Set-up Knob. TO REMOVE THE LATCH SPRING OR THE LOCK GEAR, first remove the Clutch as outlined in section 23. Then remove the Reduction Gears. Unlock the Assembly and pull out the pin through the Cam Shaft, to the right of the Lock (Figure 14). The Retaining Washer, Latch Spring and Lock Gear may now be slid off the right end of the Cam Shaft.

BAR AND ARM ASSEMBLY

33 The lower end of the Arm should rest right on the "hump" of the Kickout as shown at D in figures 5, with the mechanism in the manual tuning position. If the adjustment is correct any movement of the Arm, either forward or backwards, should allow the Kickout Arm to rise. This setting can usually be secured by moving the Friction Wheel in or out on the Motor Shaft, thus sliding the Friction Roller Assembly (Figure 13) backward or forward on the Tuning Shaft. The amount of adjustment possible by this method is limited by the movement of the Friction Wheel possible without causing it to interfere with the

Star Wheel, or the Motor Pinion becoming disengaged from the First Reduction Gear. Further adjustment, if necessary, may be made by bending the Arm slightly, preferably at its upper end. THE ADJUSTMENT SHOULD NOT BE CARRIED OUT TO THE DETRIMENT OF THOSE ADJUSTMENTS REQUIRED FOR THE SIDE SWITCH AS INDICATED IN SECTIONS 15 AND 19.

KEY STOP BAR AND KICKOUT ARM

34 The Adjustable Tip on the Kickout Arm in engaging the Star Wheel (Figure 6) determines the position of the Key Stop Bar (Figures 1B and 13), which holds the buttons in. If the Tip on the Kickout is set too low, the Key Stop Bar swings up so far that the buttons are hard to release. If the Tip is set too high the buttons will not stay depressed, since the Key Stop Bar (Figure 1B) cannot come up far enough to catch and hold the keys in. Therefore, the Adjustable Tip on the Kickout Arm should be set as high as possible and still allow the buttons to stay in.

35 Failure of buttons to stay depressed may also be due to: the Kickout Spring (Figure 13) being bent down too far (it should clear the Kickout Arm by about 1/16 of an inch when the mechanism is in the automatic position); insufficient tension in the Return Spring on the Key Stop Bar; or the Key Stop Bar is sprung down in the middle. Also see section 37.

36 If a button will not release when another is pushed, the Key Stop Bar may be jammed or sprung, or held from normal movement by the Kickout Arm being caught on the Star Wheel; or a Pawl may be sticking in its Station Selector Cam.

STAR WHEEL

37 The Star Spring Collar (Figure 13) should be set so that the spring holds the Star Wheel in such position that the Pin is midway between the ends of the slot in the Star Wheel hub. At the same time the set screw in the Collar should be in the groove around the tuning shaft, to locate the tuning shaft in the End Bracket. Within the limits of movement allowed by the Slot and Pin, the Star Wheel should turn quite freely on the Tuning Shaft except as restrained by the Spring. Otherwise the Tip of the Kickout Arm may sometimes engage one of the points of the Star Wheel and hold the Key Stop Bar down, thus preventing the Key from catching and staying depressed. (Sections 34 to 36 and Figure 6.)

38 All edges and corners of the Star Wheel must be smooth and free from burrs. If not, the Tip of the Kickout Arm (Figure 13) may catch and prevent the buttons from staying in or being released.

MOTOR

39 The Motor is mounted on the Right End Bracket by two Mounting Screws (Figure 13) through oversize holes in the Bracket. The size of the holes permit adjusting the meshing of the Motor Pinion and the First Reduction Gear for minimum noise. Noisy operation may be caused by either too tight or too loose meshing of the Gears. Too tight meshing will also load up the drives because of binding. See section 49 for details on "Universal" type motor.

ANTI-BACKLASH GEARS

40 There are two types of Anti-backlash Gears used in the Mystic Mechanism. One type is made up of two spur gear sections and two small coil springs. Such gears are used in the gear reduction train driving the Cam Shaft (Figure 13), the Clutch (Figure 8) and the Pointer Drive Gear (Figure 15). The springs in these gears should be compressed by displacing the two gear sections one or two teeth with respect to each other. DISPLACEMENT OF THE GEAR SECTION FACING YOU SHOULD ALWAYS BE CLOCKWISE WITH RESPECT TO THE OTHER GEAR SECTION. Too little compression in the springs cause play and backlash. Too much compression causes binding, tending to load up the driver, and noisy operation. The First Reduction Gear (next to the motor pinion, Figure 13) uses light springs, part number 85815; the Second Reduction Gear (next to the Clutch, Figure 13) uses heavier springs, part number 112465; the Clutch and Pointer Drive Gear use still heavier springs, part number 89086. The correct displacement between sections of these gears, when equipped with the proper springs, should be not less than one nor more than two teeth.

41 The other type of gear is used to drive the Gang Condenser (Figure 10). The teeth of such gears are so shaped that, when the gears are kept tightly meshed together, backlash is prevented.

FLEXIBLE COUPLING

42 This device permits some misalignment of the Gang Condenser Shaft and the Extension Shaft (Figure 10), without causing binding in the bearings supporting the shafts. Inside of it is a coiled compression spring which keeps the Knurled Gears in mesh and prevents backlash. TO ADJUST THIS SPRING: Set the Coupling so the end of the Gang Condenser Shaft is flush with the inside edge of the back coupling collar. Tighten the set screw in the back coupling collar. Put the Knurled Gears in mesh, then compress the spring in the Coupling slightly and tighten the set screw in the front collar of the coupling. There now should be just enough thrust by the compressed coil spring to keep the Knurled Gears in mesh and free from backlash. If not, loosen the front set screw in the coupling, compress the spring a little more and retighten the set screw.

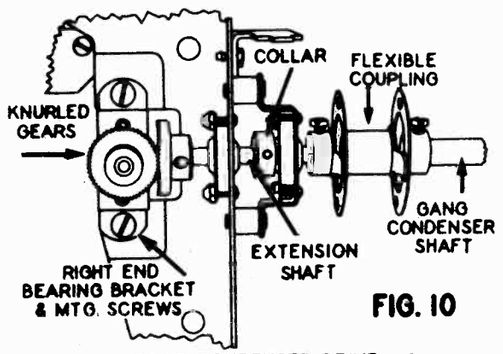


FIG. 10

GANG CONDENSER DRIVE

43 A few of the early chassis used a single section coupling. Later sets use a double section coupling, part number 112450, as shown in figure 10. This latter type is more flexible than the former and consequently, causes less binding when the Extension and Gang Condenser shafts are badly out of line. Only the later type is carried in stock. Therefore, if it is necessary to replace the older type, it will also be necessary to use Spring, part number 112490, and Extension Shaft, part number 112488, with the new coupling. Or in place of the new shaft, the old shaft may be used by cutting off 1 1/16 of an inch and chamfering the end like the piece which was cut off. The new shaft should be 2 3/16 inches long.

SETTING UP

44 THE FOLLOWING POINTS MUST BE OBSERVED DURING THE SETTING UP AND USE OF THE AUTOMATIC MECHANISM IF BEST RESULTS ARE TO BE OBTAINED.

ON MODELS 1865 AND 1866 THE TONE CONTROL BROADENS THE TUNING WHEN IN THE TREBLE POSITION, MAXIMUM CLOCKWISE, THEREFORE THIS POSITION POSITIVELY MUST NOT BE USED DURING SET-UP.

a. Use a GOOD antenna.

b. Allow the set to warm up for twenty minutes before setting it up.

c. Set up the buttons from left to right, that is, the right hand buttons should be the last to be set up.

d. Avoid setting buttons on weak or fading signals.

e. Tune carefully when setting up.

f. After a button is set up, do not push that button again until the mechanism is locked. To do so will spoil the setting of that button.

g. Lock up tight. Continue to force the Set-up Knob in a counter-clockwise direction even after it seems to reach a definite stop. If you do not use force, the settings of the buttons may change.

45 Detailed, illustrated instructions for setting up the Mystic Mechanism are included with each receiver. In brief, the setting up procedure is as follows:

a. Pull off the Tuning Knob. This reveals the Set-up Knob (Figure 13). Pull the Set-up Knob out. Unlock the mechanism by turning the Set-up Knob clockwise until a slight click is heard.

b. Push in a button. After the Pointer has stopped moving, grasp the Set-up Knob and tune in the station to which the button is to be set.

c. Push in another button. After the pointer has stopped moving, again grasp the Set-up Knob and tune in the Station to which this button is to be set.

d. Continue to push in buttons and tune in the stations until as many are set up as desired. Then release the last button set up, by pushing the Set-up Knob part way in.

e. Pull the Set-up Knob back out. Lock up the Cam Assembly by turning the Set-up Knob counter-clockwise as far as it will go. Continue to force the Set-up Knob in a counter-clockwise direction even after it seems to reach a definite stop. If you do not use force, the settings of the buttons may change.

f. Push in the Set-up Knob and replace the Tuning Knob.

46 Occasionally a unit may be encountered in which it is difficult to set up accurately, the extreme right hand buttons. In such case, they should be set to stations at the low frequency end of the dial, or used to locate short wave bands.

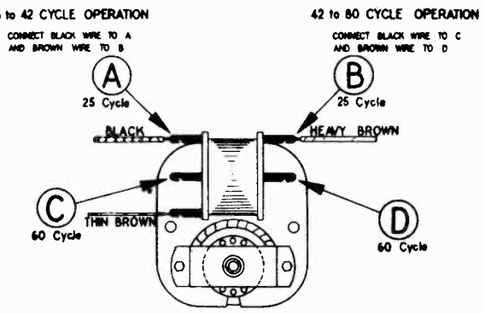
47 In case of complaint that a button set for some frequency, does not tune to that point within 10 K.C., or more, after locking up, it usually develops that the Station Selector Cam has inadvertently been moved before it was locked. This may come about by turning the Set-up Knob slightly when releasing the button, preparatory to locking the mechanism. Another possibility, if the Back Switch is not adjusted properly, is that by pushing a second button the motor will start before the pawl falls clear of the first cam, thus causing this cam to be shifted slightly before it is locked in place.

48 A short may occur in the unit due to the Tuning Shaft Bearing Stop (Figure 13) getting out of place. It then catches on the Set-up Gear. When the gear is turned counter-clockwise it forces the Bearing Stop against the hot blade of the Side Switch. Solder the Bearing Stop in place.

UNIVERSAL MODELS CONNECTIONS

49 The tuner motor may not operate if the line voltage drops very much below 105 volts. The motor used in the 60 cycle models will only operate properly on 50 to 60 cycles. Special motors, used in the B and W models, can be connected for operation on other frequencies as shown below.

MOTOR CONNECTIONS FOR TUNER MOTOR USED ON 25-80 CYCLES UNIVERSAL MODELS.



50 The connections for the Reactance Dimmer, both standard 60 cycles, and universal 25 to 80 cycle types are shown on the various chassis service manuals.

DIAL MECHANISM AND CALIBRATION

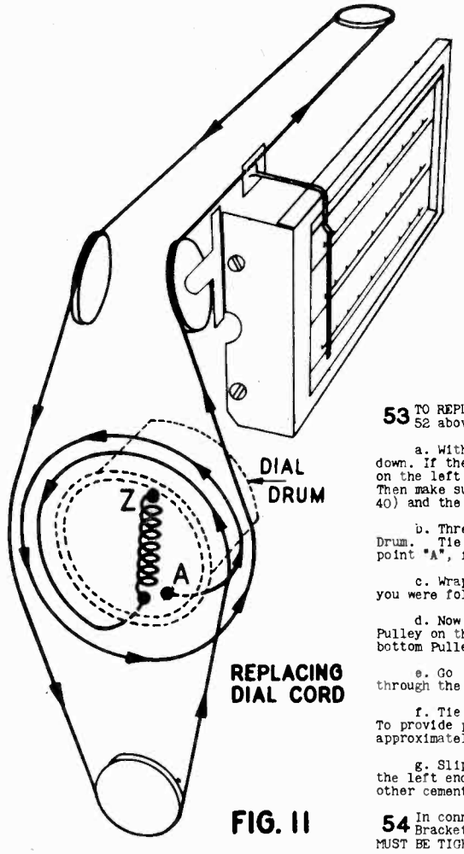


FIG. 11

51 The Cam Assembly Stop Pin, located on the left end of the Cam Assembly (Figure 14), allows approximately 180° of rotation of the Assembly and provides a strong, positive stop for the mechanism during locking and unlocking. It also protects the less rugged stops on the Gang Condenser. This Pin should strike the Stop just before the Gang Condenser is in full mesh or fully open. If it does not, to establish the correct relation between these two sets of stops: Loosen the set screw in the Knurled Condenser Drive Gear (Figures 10 and 15) on the Cam Shaft. Turn the Cam Assembly until the Stop Pin on it points to the back and is resting against the Stop on the Left End Bracket (Figure 14). Close the Gang Condenser to full mesh, then open it up just the least bit to relieve the Condenser Stop and tighten the set screw in the Knurled Gear. This allows the heavy Cam Assembly Stop Pin to reach its Stop first in each direction, since its working arc is slightly less than that of the Gang Condenser. See chassis service manual for complete calibration instructions.

52 The Knurled Gear (Figure 10) driving the Gang Condenser should be set on the Cam Shaft so that the center of its face engages the Crown Gear on the Extension Shaft. The dial Drive Gear, located on the left end of the Cam Shaft, (Figure 15) should engage the center of the face of the gear on the Dial Cord Drum. Check the end play in the Cam Shaft to see that these two sets of gears will not become unmeshed. If there is excessive end play in the Cam Shaft, move the collar (Figure 14) in closer to the Left End Bracket. There should be approximately .010 of an inch play between the Collar and Bracket.

53 TO REPLACE THE DIAL CORD: First check the points outlined in sections 51 and 52 above, then refer to figure 11 and proceed as follows:

a. With the Gang Condenser closed, the holes in the Dial Cord Drum should be down. If they are not, loosen the set screw in the Pointer Drive Gear (Figure 15) on the left end of the Cam Shaft, and rotate the Dial Cord Drum so that they are. Then make sure that the anti-backlash springs are compressed one tooth (section 40) and the gears are meshing properly before tightening the set screw.

b. Thread one end of the Dial Cord through the front hole of the two on the Drum. Tie a knot near the end of the inside of the Drum. This is the starting point "A", figure 11.

c. Wrap one and one quarter turns around the Drum counter-clockwise as though you were following the threads of a left hand screw.

d. Now go up over the front Pulley on the left end of the Dial; around the Pulley on the right end; over the back Pulley on the left end; down around the bottom Pulley and up to the front of the Drum.

e. Go around the Drum three quarters of a turn counter-clockwise and up through the back hole.

f. Tie the Tension Spring on and hook it over the hook on the Drum at "Z". To provide proper tension in the Dial Cord the extended spring should measure approximately 1 1/4 inch in length over all, when the Cord system is equalized.

g. Slip the Pointer clip under the Cord, set the Pointer at the last mark on the left end of the Dial Scale, close the clip and put on a drop of household or other cement on the Cord and clip junction.

54 In connection with Calibration, notice that movement of the Left End Bearing Bracket (Figure 15) changes the Pointer setting. BOTH SCREWS IN THIS BRACKET MUST BE TIGHT.

MAGIC KEYBOARD
A.F.C.and Mechanism Notes
Manual Tuning,Parts

STEWART-WARNER CORP.

CHECKING A.F.C.

55 In order to determine if the Automatic Frequency Control System is working, either of the following methods may be employed without removing the chassis from the cabinet.

a. Select a local station whose signal is fairly strong and which operates on a frequency below 1000 KC. Tune manually to a frequency slightly above that of the selected station, but close enough to the signal that it can be heard somewhat distorted.

b. Open the A.F.C. (two upper) contacts on the Side Switch, by reaching into the back of the set with a pointed stick and forcing the contacts apart.

c. A.F.C. should then pull the signal in clearly and hold it, while the contacts remain open.

d. Now tune below the station frequency a few KC. and open the A.F.C. contacts again. Again A.F.C. should pull the signal in clearly.

56 The same check on Automatic Frequency Control action can be made from the front of the set by proceeding as follows:

a. Pull off the Tuning Knob. Pull out the Set-up Knob. Unlock the mechanism by turning the Set-up Knob clockwise until a slight click is heard.

b. Push a button in. After the pointer stops, tune in a fairly strong station below 1000 KC. Then detune until the signal is somewhat distorted.

c. Now, push the Set-up Knob in and leave it in. This also releases the depressed button. Push the same button in again. This should open the A.F.C. contacts on the Side Switch, and allow A.F.C. to bring the signal in clearly.

d. Pull the Set-up Knob out. Push the same button in again. Detune the other side of the station and repeat paragraph c.

57 If Automatic Frequency Control does not appear to be working: First make sure that the A.F.C. contacts on the Back and Side Switches (Figure 1 to 7) are open when a station is tuned in automatically and that the A.F.C. contacts on the Side Switch are closed when tuning manually or setting up the mechanism. Then check the Discriminator, Control,R.F., Mixer, and I.F. tubes. Re-align the I.F., Broadcast and discriminator trimmers as explained in the chassis service manuals before attempting to locate a fault in the chassis.

MANUAL TUNING

58 There should be sufficient traction between the Friction Roller and the Friction Wheel (Figure 13) to provide positive movement of the mechanism when the Tuning Knob is turned, providing there is no mechanical overload in the system. If the Dial Pointer fails to move when tuning manually, first, try washing the Rubber Ring on the Friction Wheel with carbon tetrachloride to remove any oil or grease. The traction between the Friction Roller and Friction Wheel may be increased slightly by sliding the Friction Wheel out farther on the Motor Shaft. The contact pressure between the Friction Wheel and Roller can be increased by shortening the Return Spring on the Bar and Arm Assembly (Figure 13). However, shortening this spring makes the buttons harder to push in.

59 Because of the exceptionally high tuning ratio used in this unit, the compounding effect on any slight lost motion is such that every precaution must be taken to keep backlash within satisfactory limits. Backlash will be at a minimum with proper adjustment of the various gears, as outlined in sections 40 and 41. Considerable lost motion will result if the Gang Condenser sways because of too loose mounting or because it turns too stiffly. Assuming the Clutch is in good working condition, it will only slip if mechanically overloaded.

60 In case of excessive Pointer backlash, check the following points; BOTH screws in the Left End Bearing Bracket must be tight. See that the Pointer Drive Gear(Figure 15) is not slipping on the Cam Shaft, that the anti-backlash springs in the gear are compressed at least one tooth, and that it does not slip out of mesh with the gear on the drum. The Dial Cord should be tight enough to extend the Tension Spring in the Drum so it measures about 1 1/4 inches long. See that the Pointer does not slip on the Cord and slides freely on the Guide Rail.

61 If the Tuning Shaft turns only a part of a revolution then catches, with a button depressed, it is probably due to burrs or rough edges on the Star Wheel or Adjustable Tip of the Kickout Arm (Figure 13). Or it may be that the buttons are too hard to release, because of improper adjustment of the Kickout Arm tip. See sections 35 and 37.

CHANGING MECHANISM

62 The early production sets have the Mystic Mechanism wired directly to the chassis. Later sets are equipped with a socket and plug to facilitate removal of the mechanism. The socket on the later mechanism is mounted about four inches from the right end, and facing the rear, on the horizontal reinforcing member on the back of the Dial Assembly. It is connected in as shown in figures 1A or 1B, depending upon the type of Side Switch (See Section 14.)

63 To change the Mystic Mechanism and Dial Assembly, part number 112727, it is only necessary to unsolder the green and the green-black wires to the volume control, take the volume control off the bracket, slip the Visual Tuning Indicator Light socket off, pull the above mentioned plug, loosen the set screw in the Flexible Coupling (Figure 10) and take out the four screws holding the assembly to the chassis. If the assembly has no plug on it see section 65.

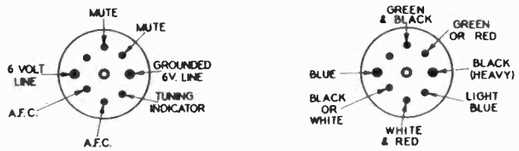
When installing the new Mystic Mechanism and Dial Assembly see section 51 for dial calibration instructions, and section 42 for information on adjusting the tension in the spring in the flexible coupling.

64 To change the Mystic Mechanism, part number 111350, only, it is necessary to remove the Dial Cord from the Drum (Figure 11), take out the four screws holding the two End Bearing Brackets to the frame, pull out the plug and take out the four screws holding the unit to the frame. The two front screws holding the unit to the frame can be reached by removing the second or third and the sixth or seventh button shells in the bottom row. If the unit has no plug on it see section 65.

When installing the new Mystic Mechanism, see section 22g for alignment of the End Bearings, sections 51 to 53 for restringing the dial cord and dial calibration, and section 42 for information on adjusting the tension in the spring in the flexible coupling.

65 If it is necessary to put one of the later mechanism, having the socket, on an early chassis, the Plug (Figure 12), part number 112736, must be wired to the chassis. The plug is provided with seven color coded wires of sufficient length to connect to the proper points on the under side of the chassis. Disconnect an old wire and connect the corresponding new wire, following the colors for identification, before disconnecting the next old wire. However, some of the cable wires may have a different color than the original chassis wires. Briefly the cable wires are:

Black (Heavy)	To grounded side of 6 volt winding of power transformer.
Blue (Heavy)	To other terminal of 6 volt winding of power transformer.
Light Blue	To one leg of the Reactance Dimmer Coil (The Visual Tuning Indicator Light is connected to the other leg.)
White - Red	On models R-184 and R-185 to A.V.C. cathode (the one with the white-green wire attached to it) of the 6H6 tube. On model R-186 to the ungrounded cathode of the discriminator (6H6) tube.
Small Black or White	On models R-184 and R-185 to other cathode of the 6H6 tube - the one with the brown wire attached to it. On model R-186 to ground.
Green - Black	On model R-184 to ground. On models R-185 and R-186 to the one end of the audio input choke - the end connected to the control grid of one of the 6V6 output tubes with a green-black wire.
Green or Red	On model R-184 to the control grid of the 6L6 output tube. On models R-185 and R-186 to the other end of the audio input choke - the end connected to the control grid of the other 6V6 output tube with a green wire.



TOP VIEW OF PLUG

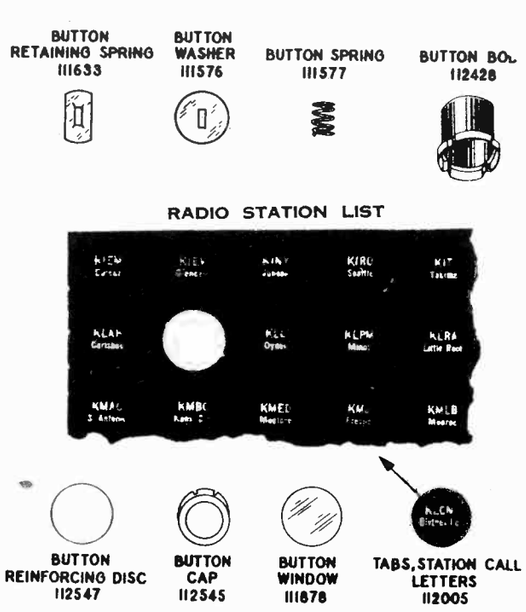
FIG. 12

SPECIAL TOOLS

66 A special spring adjuster tool, part number T117468, list price $0.75 may be obtained from the factory for adjusting the Back and Side switch blades, although a pair of duck-bill pliers or a screw driver can be used.

67 Wrenches can also be supplied by the factory for the fluted (Bristol) set screws used in various parts of the Mystic Mechanism. For the #6 (small) set screws, the wrench is part number 112483, and for the #8 (large) set screw, the wrench is part number 112484. These wrenches have a list price of 7 cents each.

PARTS LIST FOR MYSTIC MECHANISM



Wherever the word "right" or "left" appears in the following list, it is understood that you are standing in front of the mechanism.

The Identification Numbers are to assist you in identifying parts shown on figures 13, 14 and 15 or to indicate in which figure the part can be seen. The identification is NOT TO BE USED in place of the part number, when ordering parts.

PART NUMBER	IDENTIFICATION NO.	DESCRIPTION	LIST PRICE
111591	1	Arm (long) - side switch operating	.05
111627	2	Bar & Arm Assembly	.60
111526	3	Bearing - on tuning shaft	.50
111176	4	Bracket - left end of mechanism	.20
111547	5	Bracket - with studs (right end of mechanism)	.90
111589	6	Bracket - push button escutcheon support	.08

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

PART NUMBER	IDENTIFICATION NO.	DESCRIPTION	LIST PRICE
111162	7	Bushing - left end of cam shaft	.18
112428		Button Body - for tuner	.10
112545		Button Cap - for push button	.06
111878		Button Window - celluloid for push button	.01
112547		Button Reinforcing Disc - for push button	.01
111633		Button retaining spring - inside push button	.02
111577		Button Spring - in push button	.005
111576		Button Washer - in push button	.005
111617 / 112563	8	Cam - bakelite for back switch operation (with arm) / Cam - bakelite - less operating arm	.62 / .10
111625	9	Cam Shaft - with cams & right end brkt.	11.50
111168	10	Cams - Station selector	.50
111148	11	Clutch - collar, spring and gear	.55
111160	12	Collar - retaining (less set screw) left end of cam shaft	.15
111161		Collar - retainer for pawls	.10
111616	13	Collar & Spring - for star wheel	.36
111882		Collar - inside of locking cam	.08
111137		Drive Ring - rubber (on friction wheel)	.05
111693	14	Escutcheon - metal, for push button	1.15
111310	15	Flywheel - with set screws	1.25
111549	16	Friction Roller - on rear end of tuning shaft	.30
111169	17	Friction Spacer - between cams	.11
111402 / 111137	18	Friction Wheel - (on motor shaft) with rubber ring / Drive Ring rubber (on friction wheel)	.66 / .05
111145	19	Gear - and pinion (reduction)	.45
111157	20	Gear - crown and pinion, for "Setting-up"	.75
111523	21	Gear - set up (on tuning shaft)	.50
112726		Housing - with keys	3.25
112522	22	Key stop bar - kickout assembly	.50
111632	23	Knob - for setting up	.31
111408		Lock - saw tooth adjacent to cam (left half)-Fig. 14	.40
111548	24	Lock - saw tooth with gear (right half)	.70
112727	25	Mystic Mechanism - complete with all dials - ready to mount on chassis	60.00
111350	26	Mystic Mechanism only, less dial frame assembly	35.00
111380	27	Motor - 6 volt 60 cycles	4.40
112354		Motor - 6 volt 25 to 80 cycles	5.50
111491 / 111634	28	Pawl & Bushing - single unit / Pawls & Shaft - (assembly)	.20 / 4.00
111148	29	Pin - cam shaft, left end	.05
111409		Pin - for friction roller- Fig. 13	.04
111410		Pin - in star wheel- Fig. 13	.04
111411	30	Pin - cam shaft - right end	.04
111883		Pin - inside of lock	.03
111557		Retainer - over left end of pawl shaft (brass)	.03
111152		Retaining Ring - for reduction gears	.02
111153		Retaining Ring - for crown gear	.02
75032		Screw - #4 for kickout tip - Per C	.50
85040		Screw - #6 Hex. Hd. for mtg. frame Per C	.35
88707		Screw - Binder Hd. for mtg. push button escutcheon - Per dz.	.06
111673		Screws - (through back switch)	.01
111968		Screw - side switch mounting- Fig. 6	.01
85827		Set Screw - on clutch collar- Fig. 8	.02
111554		Set Screw - #4 headless (for pawl collar)	.01
111403		Set Screw - #8 for set up knob- Fig. 13	.12
111588		Set Screw - for collar and star spring mtg. (6/32)	.11
112138		Set Screw - 8/32 round head	.03
111166		Shaft - for pawls	.20
111405		Shaft - for key stop bar	.18
111406		Shaft - for bar and arm assembly	.18
111590	31	Shaft - tuning	.30
85815		Spring - between reduction gear sections (next to motor)	.01
89086		Spring - coil between sections of clutch gear- Fig. 8	.01
112465		Spring - between reduction gear sections (next to clutch)	.01
111138		Spring - horseshoe shaped on clutch	.02
111151		Spring - key stop bar shaft retainer	.01
111528		Spring - coil (inside of lock)	.01
111552		Spring - flat, with tongue, on lock (latch spring)- Fig. 9	.04
111555		Spring - for key and pawls	.06
111609	32	Spring - kickout	.05
111935	33	Spring - coil, key stop bar return	.03
112568	34	Spring - bakelite cam return	.05
111440	35	Star Wheel - on tuning shaft	.25
111674	36	Switch - side (above tuning shaft)	.95
112564	37	Switch - back, later type	1.25
112521	38	Tip - adjustable on kickout arm	.06
76999		Washer - lock, for kickout tip - Per C	.50
77113		Washer - flat for kickout tip - Per C	.50
111169	17	Washer - friction spacer (between cams)	.11
111553		Washer - spring retainer on lock mech.- Figure 9	.02
112483		Wrench - for #6 fluted set screw	.07
112484		Wrench - for #8 fluted set screw	.07

PARTS LIST CONTINUED ON PAGE 37

STEWART-WARNER CORP.

MAGIC KEYBOARD
Dial Mechanism and
Miscellaneous Parts

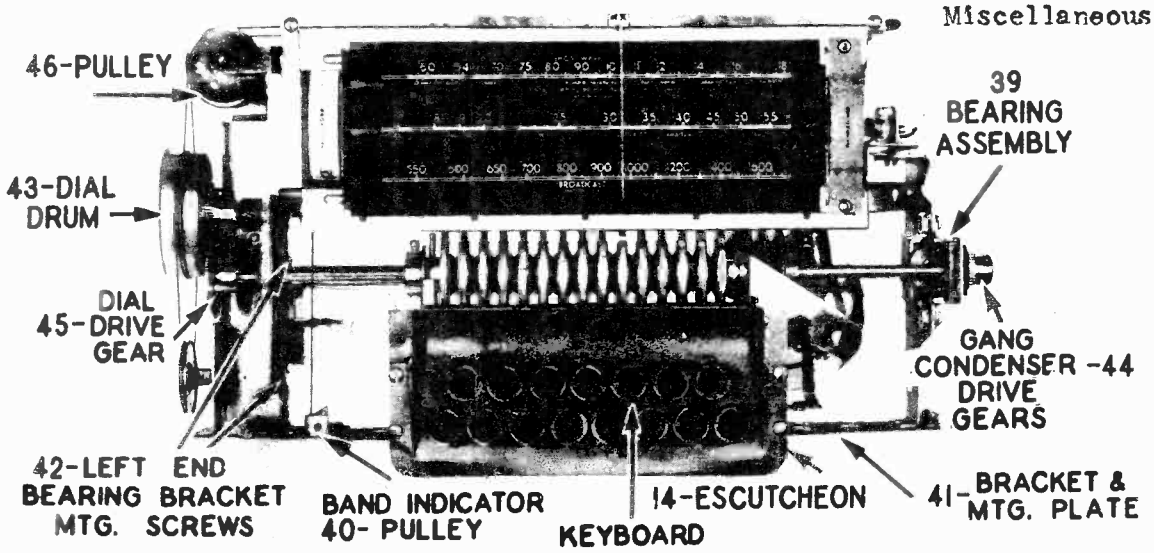


FIG. 15

25 FRONT VIEW OF MYSTIC MECHANISM AND DIAL ASSEMBLY

PART NUMBER	IDENTIFICATION NO.	DESCRIPTION	LIST PRICE
111930		Band Indicator - and frame assembly--	.40
111894	39	Bearing Assembly - self aligning, on right end of cam shaft and supports gang extension Shaft	.40
111601		Bearing - self aligning	.12
111692		Bearing Retainer - plate, copper	.06
112658		Belt - for range switch drive	.06
111261		Bolt - chassis mtg. (#14 X 1-1/4)	.03
88831		Bracket - for range switch support (under chassis)	.02
111630	40	Bracket & Pulley - for band indicator cord	.10
111893	41	Bracket & Mounting Plate - for mystic mechanism	3.10
111894	39	Bracket & Bearing - right side of shaft	.40
111899	42	Bracket & Bearing - left side of shaft	.70
111260		Bushing - rubber (for chassis mtg.)	.06
111892		Bushing - rubber, mystic mechanism mtg. to chassis	.02
111658		Clip - for pulley retaining	.01
110782		Cord - for band indicator (2 ft. required) Per ft.	.04
111302		Cord - dial drive (6 ft. lengths)	.30
111864	43	Dial Drum - with gear	.50
111226		Escutcheon - for dial (with glass)	3.00
111227		Escutcheon - around push button opening	1.20
111690		Felt - oil wick for bearing	.05
112450		Flexible Coupling - with set screws	.80
111865		Frame - dial, with scale	2.50
111608	34	Gear - right end of cam shaft drives gang condenser	.20
111629	45	Gear - dial drive (left end of cam shaft)	.52
111631	44	Gear - crown, on extension gang shaft	.38
111496		Knob - tuning or volume	.20
111497		Knob - range or tone	.20
111197		Lever - for band indicator(on shaft)	.12
111370		Link & Lever - for range switch drive (used in early production)	.20
112633		Plug - for mechanism connecting (8 prong)	.20
112736		Plug and cable - for mechanism connecting	.75
111859		Pointer - for dial, with slider	.18
111622	46	Pulley - dial cord drive	.35
111630		Pulley & Bracket - for band indicator	.10
112626		Pulley - on range switch shaft under chassis	.20
84214		Retaining Ring - for dial drum	.02
89837		Retaining Spring - for holding escutcheon to cabinet	.01
111222		Scale - dial	1.20
110716		Screw - band indicator pivot (shaft)	.03
111116		Screw - #5 X 5/8, mystic mechanism mtg.	.02
85827		Set Screw - 8/32 square head	.02
111403		Set Screw - 8/32 fluted head	.12
112138		Set Screw - 8/32 slotted head	.03
110716		Shaft, band indicator	.03
112488		Shaft - extension (between gang condenser & unit)- Figure 10	.20
111373		Shaft - for range switch	.08
85427		Socket - octal base	.15
110501		Socket - 4 prong (for speaker)	.16
110627		Socket - dial lamp & automatic lamp	.12
111008		Socket - reactance dimmer lamp	.12
112630		Socket & Bracket - for electrical connections to mech.	.75
111090		Spacer - steel. mystic mechanism mtg. to chassis	.02
111570		Spacer - rubber, for mystic mechanism mtg. to chassis	.02
T117468		Spring Bender - (switch adjusting tool)	.75
89086		Spring - between sections of dial drive gear left-side of mechanism	.01
111232		Spring - torsion for band indicator	.05
111862		Spring - drive cord tension- Fig. 11	.03
112490		Spring - in flexible coupling	.02
111676		Stud - lower left idler pulley	.10
112667		Stud - for pulley mtg.(for top pulleys)	.10
112005		Tabs - station call letters(6 sheets)	.60
84412		Terminal Strip - phono (model 186-P only)	.03
85066		Terminal Strip - G.D.A.	.20
89709		Terminal Strip - phono (for model 186-W only)	.15
112483		Wrench - for #6 fluted set screw	.07
112484		Wrench - for #8 fluted set screw	.07

DIAL MECHANISM AND MISCELLANEOUS PARTS LIST

Wherever the word "right" or "left" appears in the following list, it is understood that you are standing in front of the mechanism. The Identification Numbers are to assist you in identifying parts shown in figures 13, 14 and 15 or to indicate in which figure the part can be seen. The identification is NOT TO BE USED in place of the part number, when ordering parts.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Form 8529 PRINTED IN THE UNITED STATES OF AMERICA

MAGIC KEYBOARD
Mechanism Drawings

STEWART-WARNER CORP.

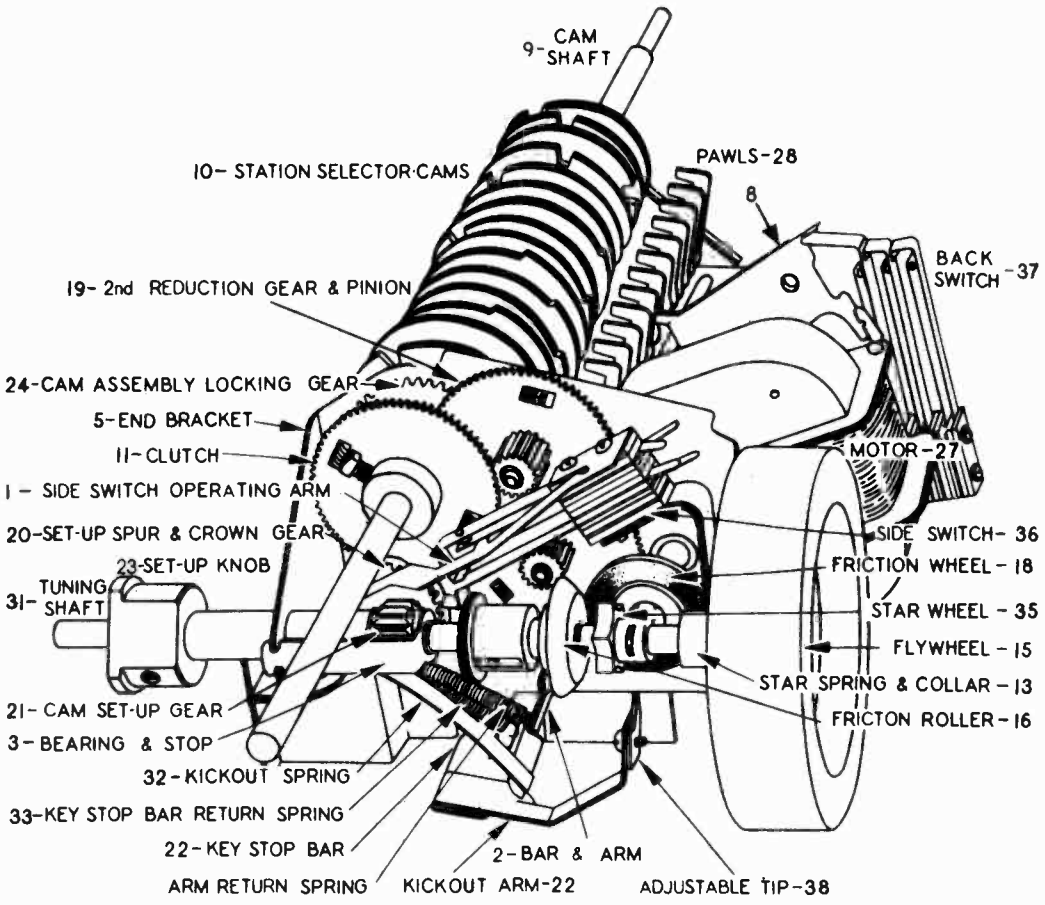


FIG. 13 LEFT END VIEW OF MECHANISM

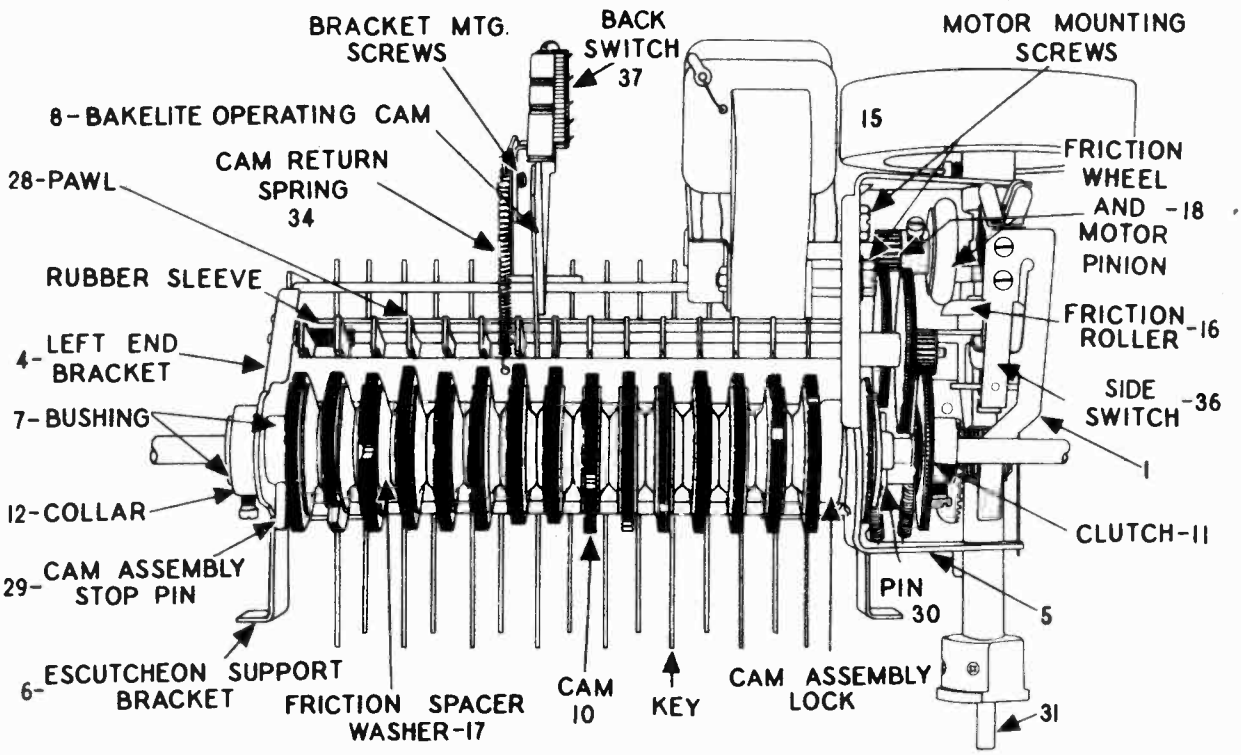
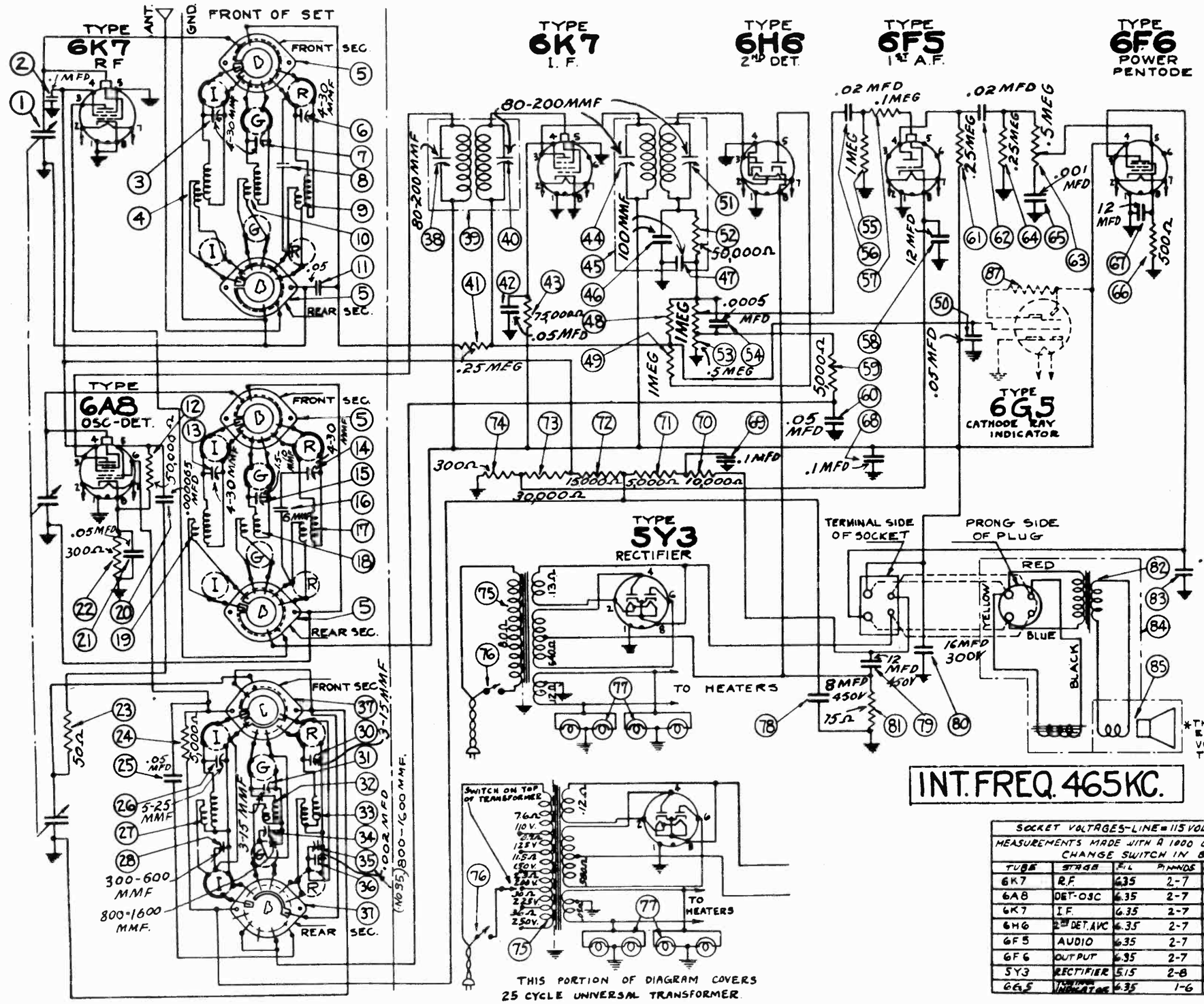


FIG. 14 26 TOP VIEW OF MECHANISM

MODELS WR-212, WR-212X,
WR-312, WR-312X
Schematic, Voltage
Resistances

WESTINGHOUSE ELEC. INTERNATIONAL CO.



D.C. RESISTANCE MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	BLANK	PRIM	SEC.
I-ANT	4	10.5Ω	3.8Ω
I-RF	.9	0.8	10.7
I-OSC	27	1.4	3.3
G-ANT	10	2.1	1.0
G-RF	18	1.8	1.0
G-OSC	32	0.8	0.9
R-ANT	9	0.7	0.03
R-RF	17	2.0	0.03
R-OSC	33	0.5	0.03
1ST IF	39	8.6	8.6
2ND IF	45	8.6	8.6
OUTPUT TRANS	82	480	0.5
SPKR FIELD		1900	
VOICE COIL	85	3	

*THE CONTROL GRID BIAS ON THE 6K7 & 6G5 TUBES EQUAL TO APPROXIMATE SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

INT. FREQ. 465 KC.

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	F.L.	PINNOS	PLATE	PINNOS	SCREEN	PINNOS	BIAS	PINNOS
6K7	R.F.	6.35	2-7	263	3-1	94	4-1	* SEE NOTE	
6A8	DET-OSC	6.35	2-7	263 / 167	DET. / OSC. 3-1 / 4-1	94	4-1	3.7	8-1
6K7	I.F.	6.35	2-7	263	3-1	103	4-1	* SEE NOTE	
6H6	2ND DET. AVC	6.35	2-7					-5.5	8-1
6F5	AUDIO	6.35	2-7	111	4-1			1.1	8-1
6F6	OUTPUT	6.95	2-7	247	3-1	263	4-1	17.5	8-1
5Y3	RECTIFIER	5.15	2-8	380	8-1				
6G5	TUNING INDICATOR	6.35	1-6	263	2-5			* SEE NOTE	

MODELS WR-212,WR-212X
WR-312,WR-312X
Socket,Trimmers
Chassis Layout

WESTINGHOUSE ELEC. INTERNATIONAL CO.

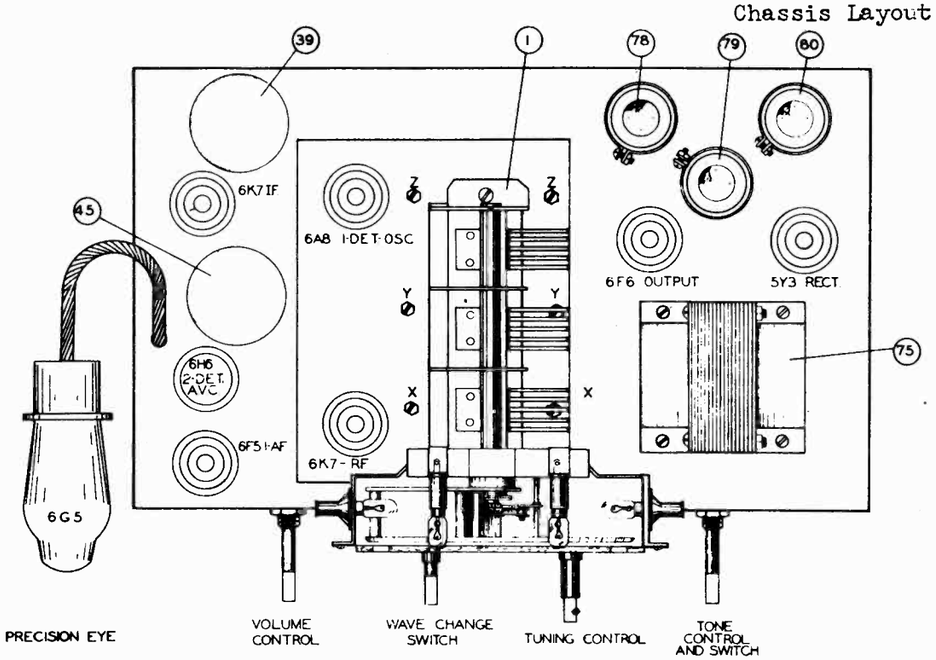


Figure No. 1

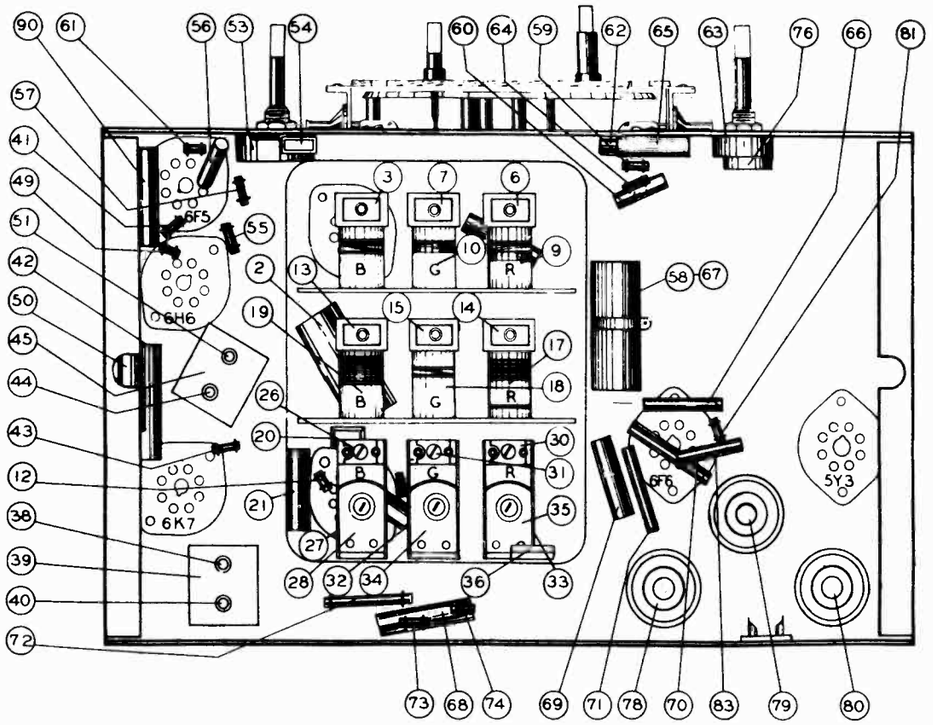


Figure No. 2

MODELS WR-212,WR-212X
WR-312,WR312X
Alignment,Specs.,Parts

WESTINGHOUSE ELEC. INTERNATIONAL CO.

Dia. #	Part #	Description of Parts	List Price
	RC 95214	R.F. coil assembly - green	1.00
	RC 95210	R.F. coil assembly (broadcast)	1.00
	CM 9511	.0000065 mfd. mica condenser	.15
	CW 2-05	.005 mfd., 200 V. condenser	.15
	RB 9529	300 ohm, 1/4 W. resistor	.10
	RB 9537	50 ohm, 1/4 W. resistor	.10
	RW 9526	5,000 ohm, 1 W. resistor (1/2 W. size)	.20
	CM 9513	.05 mfd., 200 V. condenser	.25
		5-25 mmf. trimmer condenser - part of CS 9540	.60
	RC 95211	Oscillator coil (broadcast) - part of CS 9540	1.65
		300-600 mmf. oscillator series cond. - part of CS 9540	.60
		3-15 mmf. trimmer condenser - part of CS 9520	.75
		3-15 mmf. trimmer condenser - part of CS 9520	.75
	RC 96213	Oscillator coil - green	1.75
	RC 96208	Oscillator coil - red	2.25
		800-1600 mmf. oscillator series cond. - part of CS 9520	.75
		800-1600 mmf. oscillator series cond. - part of CS 9520	.75
	CM 959	.002 mfd. mica condenser - part of IC 9576	.25
	SW 9554	Switch and bracket assembly - oscillator section	1.50
	IC 9576	60-200 mmf. trimmer condenser - part of IC 9576 First I.F. coil assembly - 465 KC.	1.50
	RE 9573	60-200 mmf. trimmer condenser - part of IC 9576	.10
	CW 2-05	.25 meg., 2/8 W. resistor	.20
	SA 105277	.005 mfd., 200 V. condenser	.15
		75,000 ohm, 1/4 W. resistor	.15
	IC 9577	80-200 mmf. trimmer condenser - part of IC 9577 Second I.F. coil assembly - 465 KC.	1.85
		100 mmf. mica condenser - part of IC 9577	
		100 mmf. mica condenser - part of IC 9577	
	SA 106281	1 meg., 1/4 W. resistor	.15
	SA 105281	1 meg., 1/4 W. resistor	.15
	CW 2-05	.05 mfd., 200 V. condenser	.15
		80-200 mmf. trimmer condenser - part of IC 9577	
		50,000 ohm, 1/4 W. resistor - part of IC 9577	
	VR 9536	Volume control - .5 meg.	.85
	CM 9519	.0005 mfd. mica condenser	.20
	SA 105281	1 meg., 1/4 W. resistor	.15
	CW 2-02	.02 mfd., 200 V. condenser	.15
	RE 9584	.1 meg., 1/4 W. resistor - part of CE 9526	.15
		12 mfd., 25 V. condenser - part of CE 9526	.90
	SA 105249	5,000 ohm, 1/4 W. resistor	.15
	CW 2-05	.05 mfd., 200 V. condenser	.15
	RE 9575	.25 meg., 1/8 W. resistor	.10
	CW 4-02	.02 meg., 400 V. condenser	.15
	VR 9512	Tone control - .5 meg.	1.10
	RE 9585	.25 meg., 1/4 W. resistor	.15
	CW 2-001	.001 mfd., 200 V. condenser	.15
	SA 107391	500 ohm, 1 W. resistor	.20
		12 mfd., 25 V. condenser - part of CE 9526	.90
	CW 4-10	.1 mfd., 400 V. condenser	.15
	CW 4-10	.1 mfd., 400 V. condenser	.15
	SA 103835	10,000 ohm, 2 W. resistor	.25
	SA 107572	5,000 ohm, 1 W. resistor	.20
	SA 101404	15,000 ohm, 1 W. resistor	.20
	SA 104966	30,000 ohm, 1/2 W. resistor	.20
	SA 105260	300 ohm, 1/4 W. resistor	.15
	TR 9557	Power transformer - 105-125 V., 50-60 cycle	4.00
		Switch (On & Off) - part of VR 9512	
	LP 9515	Dial lamp - 3.5 V., .35 amp	.20
	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
	RE 98101	37 ohm, 1/4 W. resistor	.15
	CR 9558	Output transformer	1.25
	CW 95105	.005 mfd., 400 V. condenser	.15
	SK 9511	Speaker	7.75
	SA 107282	Diaphragm/4 W. resistor - part of CB 9598	7.50
		Line cable assembly	1.15
	CB 9512	"Precision eye" cable assembly	.50
	CB 9598	.05 mfd., 200 V. condenser	.70
	CW 2-05		.15

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ... 2 #6K7,1 #6A8,1 #6H6,1 #6F5,1 #6F6,1 #6G5,1 #5Y3 - Total 8
Power Supply ..... 106 to 125 volts, 50 to 60 cycles A.C.
Power Consumption ..... 60 Watts
Maximum Output ..... 3.3 Watts
Maximum Undistorted Output ..... 2.5 Watts

Tuning Ranges ..... (White Band - 525 to 1800 KC.
(Green Band - 1750 to 6000 KC.
(Red Band - 5800 to 18500 KC.

Line-Up Frequencies .. I.F.465KC.,1600KC.,570 KC.,5500 KC.,1900 KC.,17000 KC.,6000 KC.

LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full; turn tone control to the base position, the wave change switch on broadcast and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC. and adjust its output to produce a measureable reading on output meter when test signal is applied to the grid of the 6K7 tube through a .1 mfd. blocking condenser.
4. Adjust trimmers #44 and #51 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 detector-oscillator and adjust #38 and #40 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to the White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 KC.
3. Apply test signal to antenna terminal on chassis through a 200 mfd. series condenser and adjust #26, #15 and #5 to maximum output.
4. Set test oscillator and dial indicator to 570 KC. and adjust #28 to maximum output, at the same time rocking the variable tuning condenser.
5. Return to 1600 KC. setting with both test oscillator and dial indicator and readjust #26, #15 and #5 for accuracy.

ADJUSTMENT OF GREEN BAND

NOTE: In adjusting the two short-wave bands (Green and Red) a .0002 mfd. condenser set and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This 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 KC. and adjust #31, #15 and #7 to maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #34 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 5500 KC. setting and make readjustment of #31, #15 and #7.

ADJUSTMENT OF RED BAND

1. Set wave change switch to the Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #30, #14 and #6 to maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #35 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #30, #14 and #6.

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 through the aluminum casing making the condenser appear to be defective. If left in this position too long the condenser may be injured.

Dia. #	Part #	Description of Parts WITHOUT NOTICE	PRICES SUBJECT TO CHANGE
1	CB 9550	Variable condenser	$ 4.50
2	CW 2-05	.05 mfd., 200 V. condenser	.26
3	CW 4-50	4.5 mmf. mica condenser	.15
4	RC 96209	Antenna coil (Broadcast)	1.40
5	SW 9553	Switch and bracket assembly - Antenna & R.F. Sections	1.40
6	CS 9554	4-30 mmf. trimmer condenser	.15
7	CS 9554	4-30 mmf. trimmer condenser	.15
8		Twisted wire - part of RC 96206	
9	RC 96206	Antenna coil - red band	.95
10	RC 96212	Antenna coil - green band	.80
11	CW 9513	.05 mfd., 200 V. condenser	.25
12	RE 9563	50,000 ohm, 1/4 W. resistor	.10
13	CS 9554	4-30 mmf. trimmer condenser	.15
14	CS 9554	4-30 mmf. trimmer condenser	.15
15	CS 9553	1.5-10 mmf. trimmer condenser	.15
16	CM 9512	6 mmf. mica condenser	.15
17	RC 95207	R.F. coil assembly - red	1.25

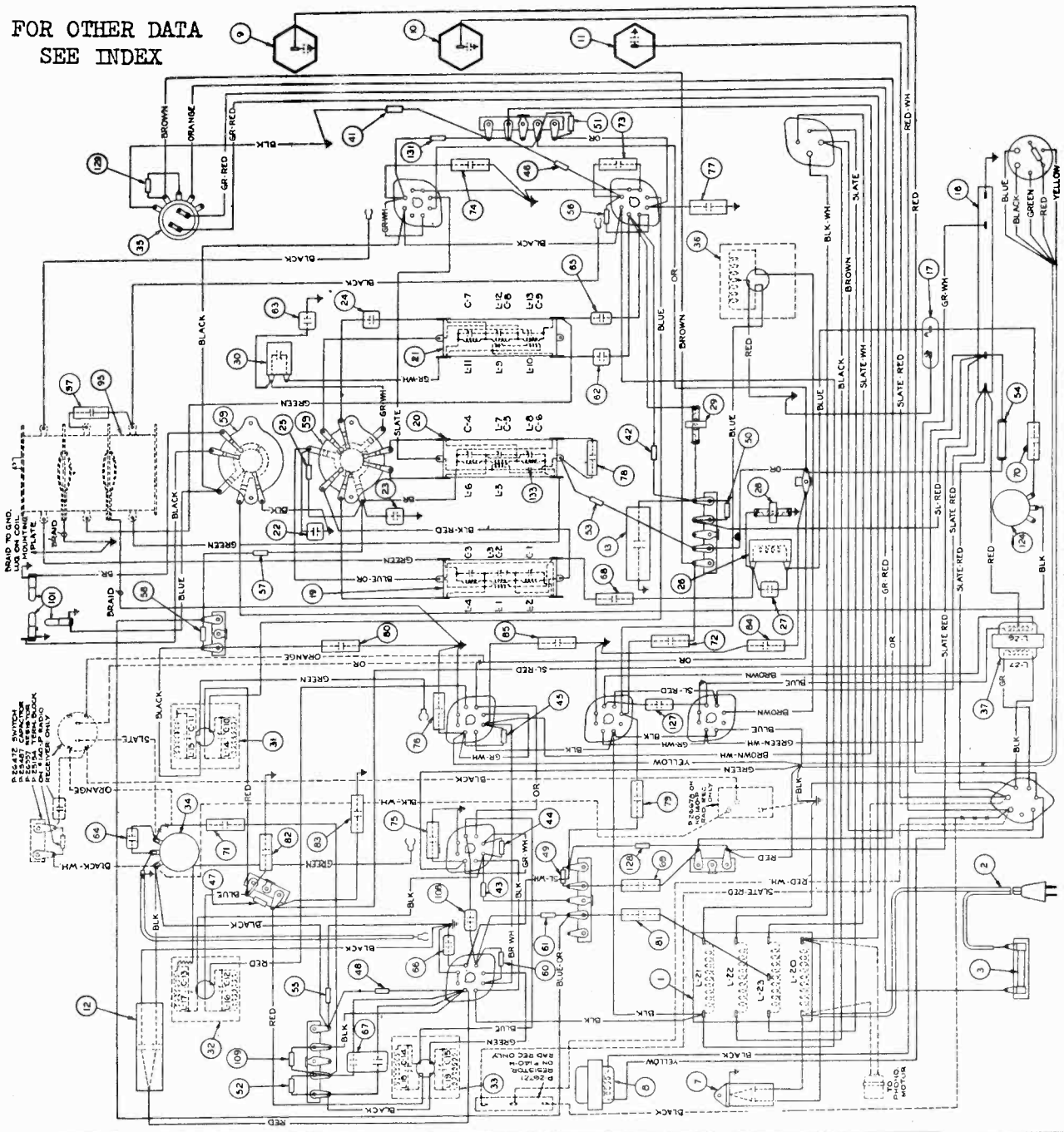
STROMBERG-CARLSON TEL. MFG. CO.

MODEL 140 Series
Chassis Wiring

Tuning Ranges	A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc
Number and Types of Tubes	3 No. 6K7, 1 No. 6A8, 1 No. 6Q7, 2 No. 6F6, 1 No. 6E5, 1 No. 5Z3
Power Supply Voltage	105 to 125 Volts
Power Supply Frequency	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating:	
(Nos. 140-H, 140-K, 140-L)	115 Watts
(No. 140-P)	155 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

APPARATUS SPECIFICATIONS

No. 140-H	50 to 60 Cycles; P-26190 Chassis; P-26171 Loud Speaker
No. 140-HB	25 to 60 Cycles; P-26191 Chassis; P-26171 Loud Speaker
Nos. 140-K, 140-L	50 to 60 Cycles; P-26190 Chassis; P-26170 Loud Speaker
Nos. 140-KB, 140-LB	25 to 60 Cycles; P-26191 Chassis; P-26170 Loud Speaker
No. 140-P	60 Cycles Only; P-26664 Chassis; P-26170 Loud Speaker; P-26632 Phonograph Unit
No. 140-PB	25 Cycles Only; P-26665 Chassis; P-26170 Loud Speaker; P-26633 Phonograph Unit



MODEL 150 Series
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

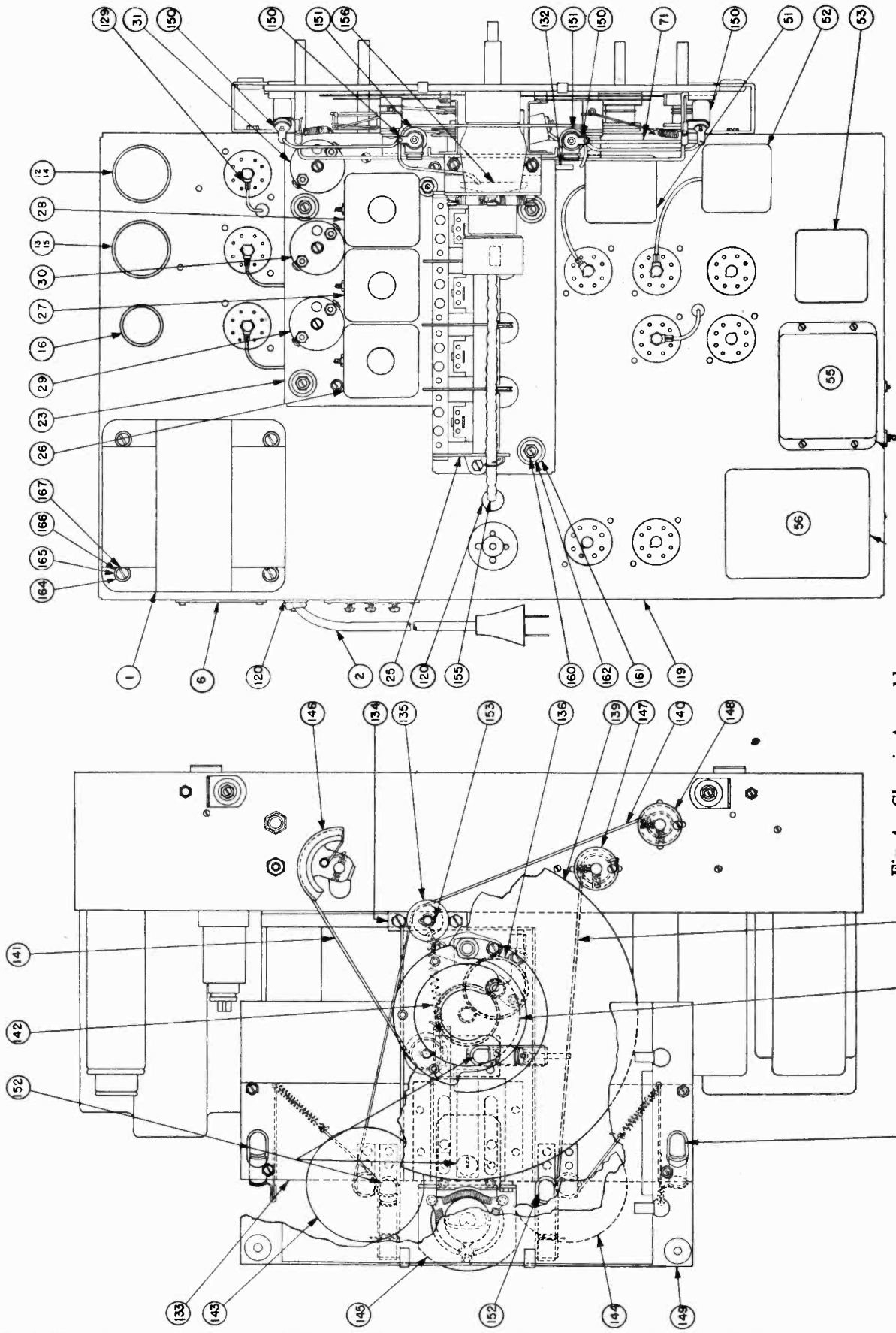


Fig. 4. Chassis Assembly

STROMBERG-CARLSON TEL. MFG. CO.

Tuning Ranges—
X—145 to 370 Kc.; A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.; D—18,000 to 60,000 Kc.
Number and Types of Tubes—4 No. 6K7, 1 No. 6A8, 1 No. 6J7, 2 No. 6H6, 2 No. 6L6, 1 No. 6E5, 1 No. 5Z3
Power Supply Voltage—105 to 125 Volts
Power Supply Frequency—25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating—167 Watts
Frequency of Intermediate Amplifier—465 Kilocycles

APPARATUS SPECIFICATIONS

No. 150-L—50 to 60 Cycles; P-26454 Chassis Assembly; P-26170 Loud Speaker
No. 150-LB—25 to 60 Cycles; P-26455 Chassis Assembly; P-26170 Loud Speaker

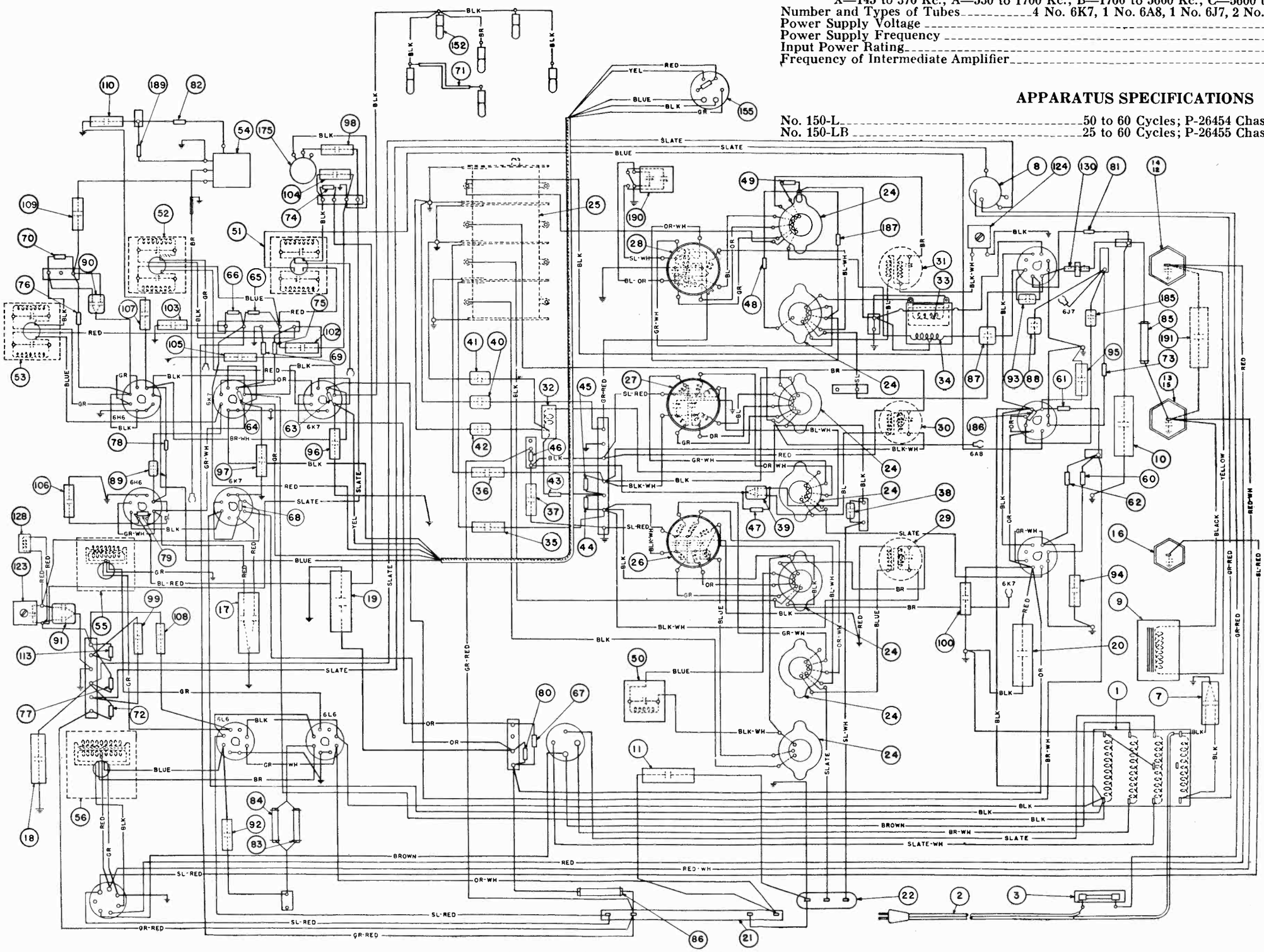


Fig. 3. Wiring Diagram of Chassis.

CIRCUIT DESCRIPTION

The No. 150 Receiver is a twelve tube, "Adjustable High Fidelity" receiver employing metal tubes, including the new "Beam" power tubes. There are five tuning ranges in this receiver, one of which is the Ultra-Short Wave range. This range is also referred to as the Ultra-High Frequency (U. H. F.) range and also as the "D" band. This receiver uses a Carpinchoe high fidelity dynamic speaker, and has incorporated in it the exclusive "Patent Applied For", Stromberg-Carlson "Tri-Focal" tuning system and 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. Audio reproduction is further improved in this receiver 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.

Maximum selectivity between adjacent stations located in the standard broadcast band is obtained by the use of an additional tuned radio frequency ("Bi-resonator") circuit. When either the "X", "B", "C", or "D" ranges are in operation, this additional tuned radio frequency circuit is automatically cut out of the receiver circuit. Adjustable high fidelity is obtained from this receiver by means of the variable band width, intermediate frequency transformers which are used in the two intermediate amplifier stages.

MODEL 160 Series
Circuit Data
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	X—145 to 370 Kc.; A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.; D—18,000 to 60,000 Kc.
Number and Types of Tubes	4 No. 6K7, 1 No. 6A8, 2 No. 6J7, 2 No. 6H6, 1 No. 6F6, 2 No. 6L6, 1 No. 6E5, 1 No. 5Z3
Power Supply Voltage	105 to 125 Volts
Power Supply Frequency	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating—	
No. 160-L	170 Watts
No. 160-P	214 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

FOR OTHER DATA
SEE INDEX

The No. 160 Radio Receiver is a fourteen tube, "Adjustable High Fidelity" receiver employing metal tubes, including the new "Beam" power tubes. There are five tuning ranges in this receiver, one of which is the Ultra-Short Wave range. This range is also referred to as the Ultra-High Frequency (U. H. F.) range and also as the "D" band. This receiver uses a Carpinchoe high fidelity dynamic speaker, and has incorporated in it the exclusive "Patent Applied for", Stromberg-Carlson "Tri-Focal" tuning system and 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. Audio reproduction is further improved in this receiver 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.

This receiver is also equipped with an "automatic tone control" circuit, which operates automatically to reduce the high frequency noise which is present when the receiver is tuned to weak signals. The tube which operates in this automatic tone control circuit is indicated on the schematic wiring diagram.

In addition to the above features, the No. 160-P Receiver is furnished with a highly efficient "Automatic Record Changer" Phonograph Unit, which is equipped with an entirely new type of pick-up suspension device. Maximum selectivity between adjacent stations located in the standard broadcast band is obtained by the use of an additional tuned radio frequency ("Bi-resonator") circuit. When either the "X", "B", "C", or "D" ranges are in operation, this additional tuned radio frequency circuit is automatically cut out of the receiver circuit. Adjustable high fidelity is obtained from this receiver by means of the variable band width, intermediate frequency transformers which are used in the two intermediate amplifier stages.

Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 180 Series
Chassis Wiring

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	X—145 to 370 Kc.; A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.; D—18,000 to 60,000 Kc.
Number and Types of Tubes	5 No. 6K7, 1 No. 6A8, 3 No. 6J7, 2 No. 6H6, 2 No. 6F6, 2 No. 6L6, 1 No. 6E5, 1 No. 5Z3
Power Supply Voltage	105 to 125 Volts
Power Supply Frequency	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	170 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

APPARATUS SPECIFICATIONS

No. 180-L	50 to 60 Cycles; P-26641 Chassis Assembly; P-26170 Loud Speaker
No. 180-LB	25 to 60 Cycles; P-26642 Chassis Assembly; P-26170 Loud Speaker

FOR OTHER DATA
SEE INDEX

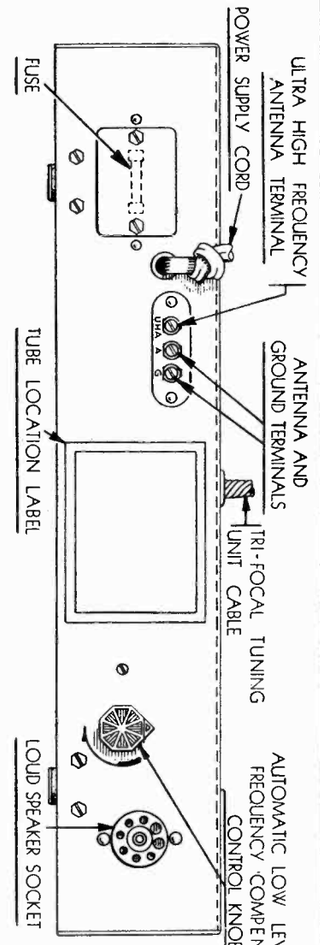
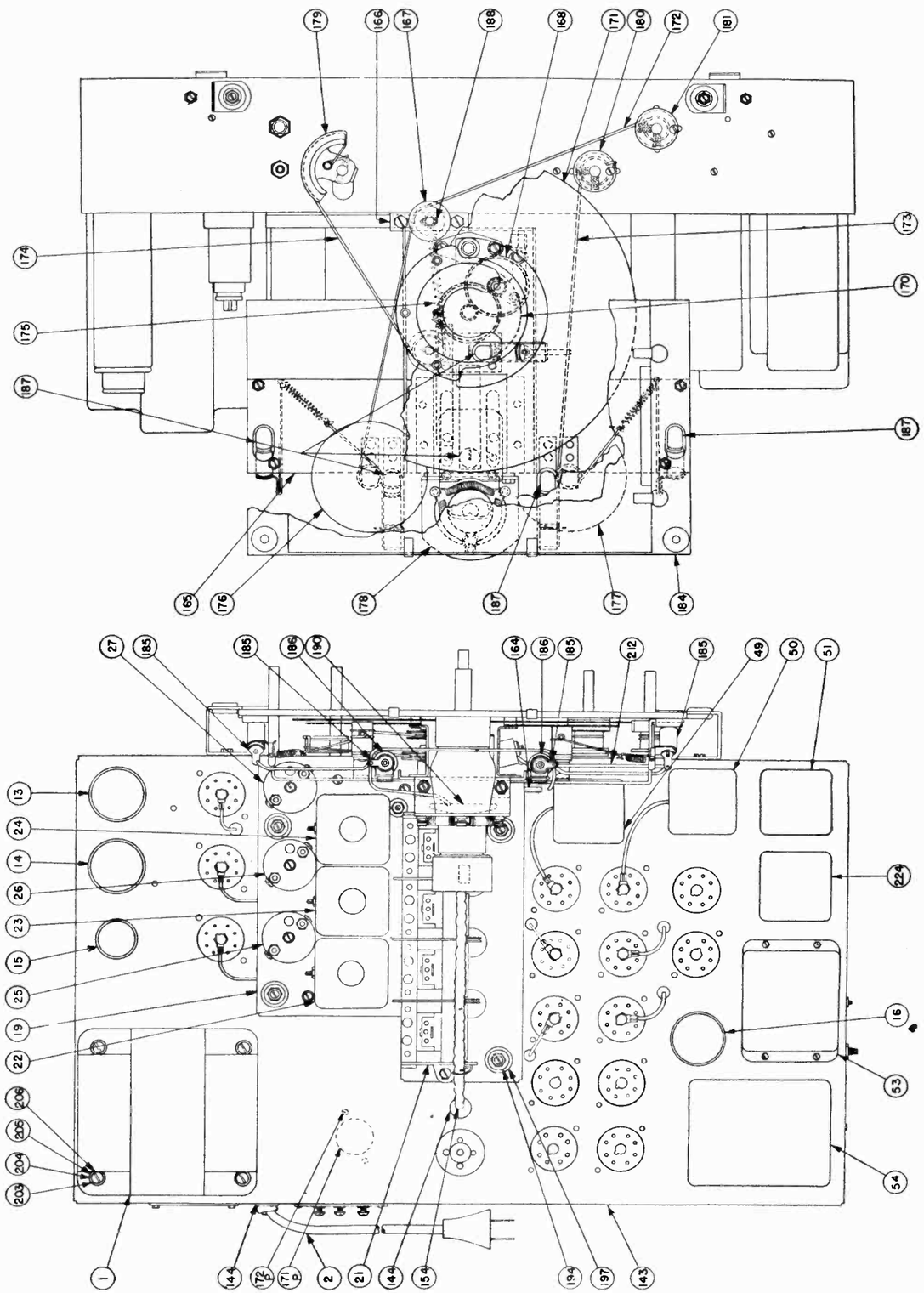


Fig. 1. Location and Operation of Control for Low Level Bass Compensating Circuit.

MODEL 180 Series
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.



MODEL 225 AC-DC
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

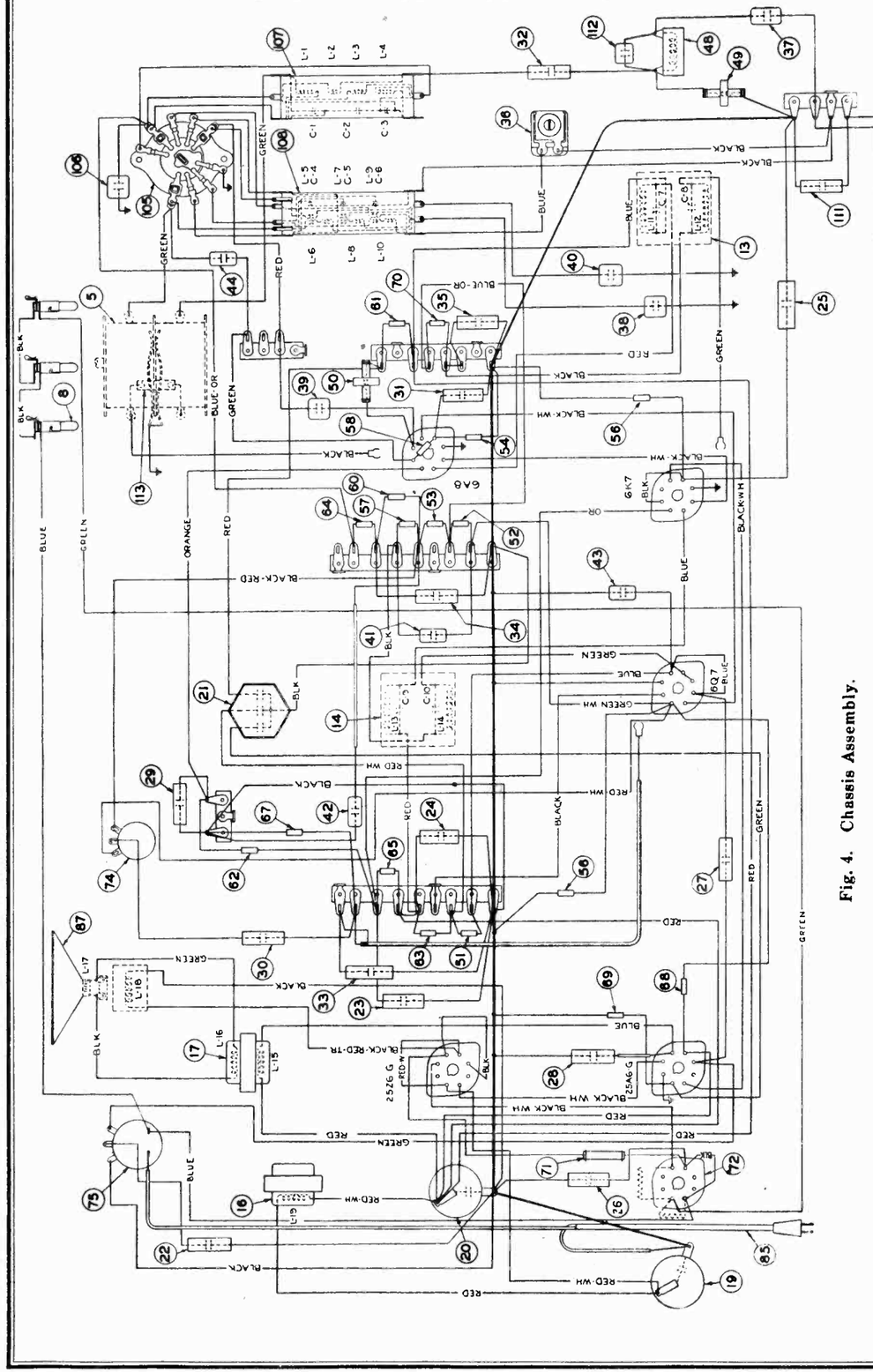


Fig. 4. Chassis Assembly.

Type of Circuit	Superheterodyne
Tuning Ranges	A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc.
Number and Types of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6Q7, 1 No. 25A6-G, 1 No. 25Z6-G
Voltage Rating	105 to 125 Volts
Power Frequency (For AC Operation)	50-60 Cycles
Input Power Rating	50 Watts
Intermediate Frequency	465 Kilocycles

MODEL 228 Series
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

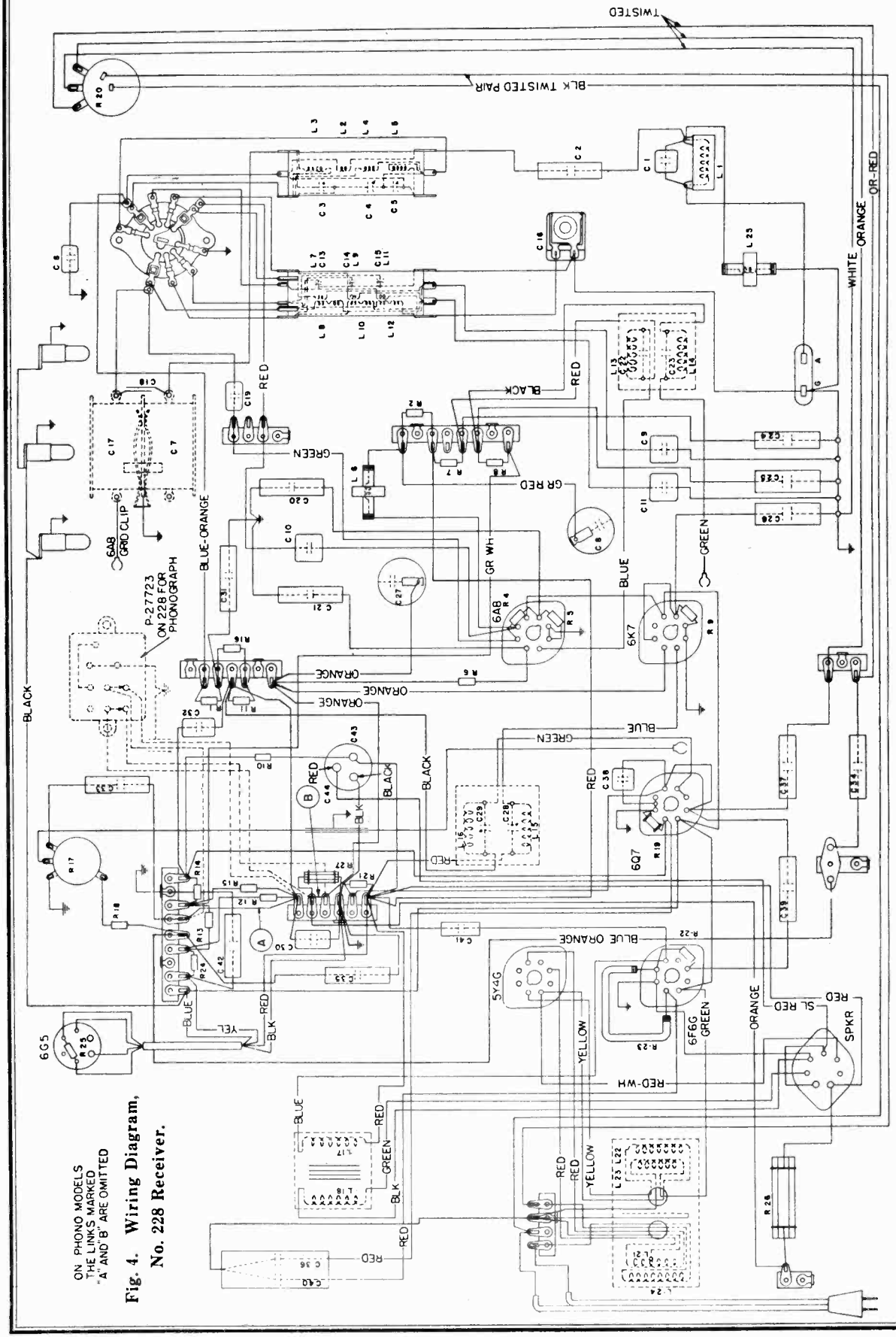


Fig. 4. Wiring Diagram, No. 228 Receiver.

FOR OTHER DATA
SEE INDEX

No. 228-H Receiver ---50 to 60 Cycles; P-27543 Chassis; P-27557 Loud Speaker
No. 228-HB Receiver ..25 to 60 Cycles; P-27544 Chassis; P-27557 Loud Speaker
No. 228-L Receiver ---50 to 60 Cycles; P-27543 Chassis; P-27605 Loud Speaker
No. 228-LB Receiver ..25 to 60 Cycles; P-27544 Chassis; P-27605 Loud Speaker

MODEL 228 Series
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

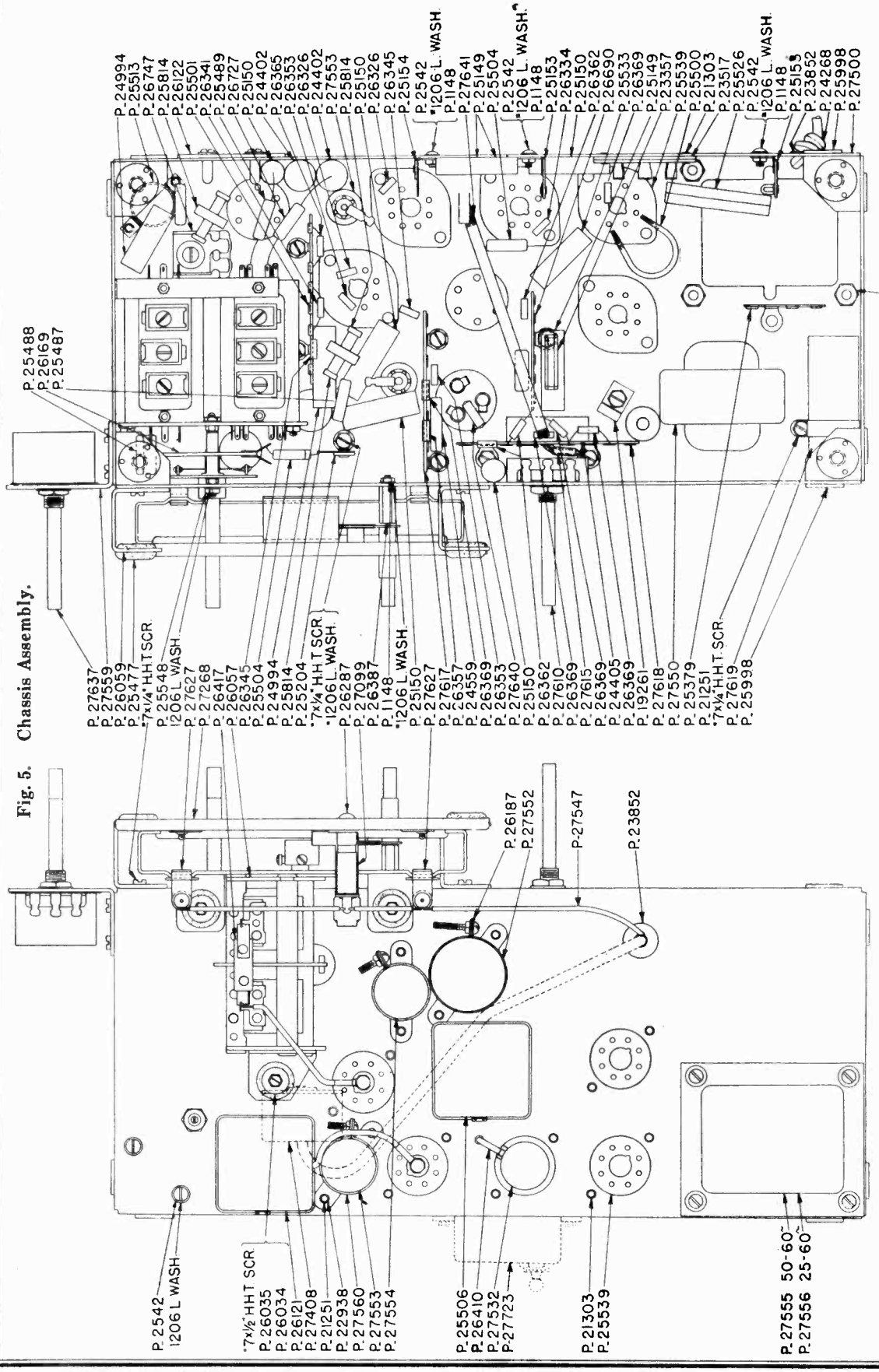


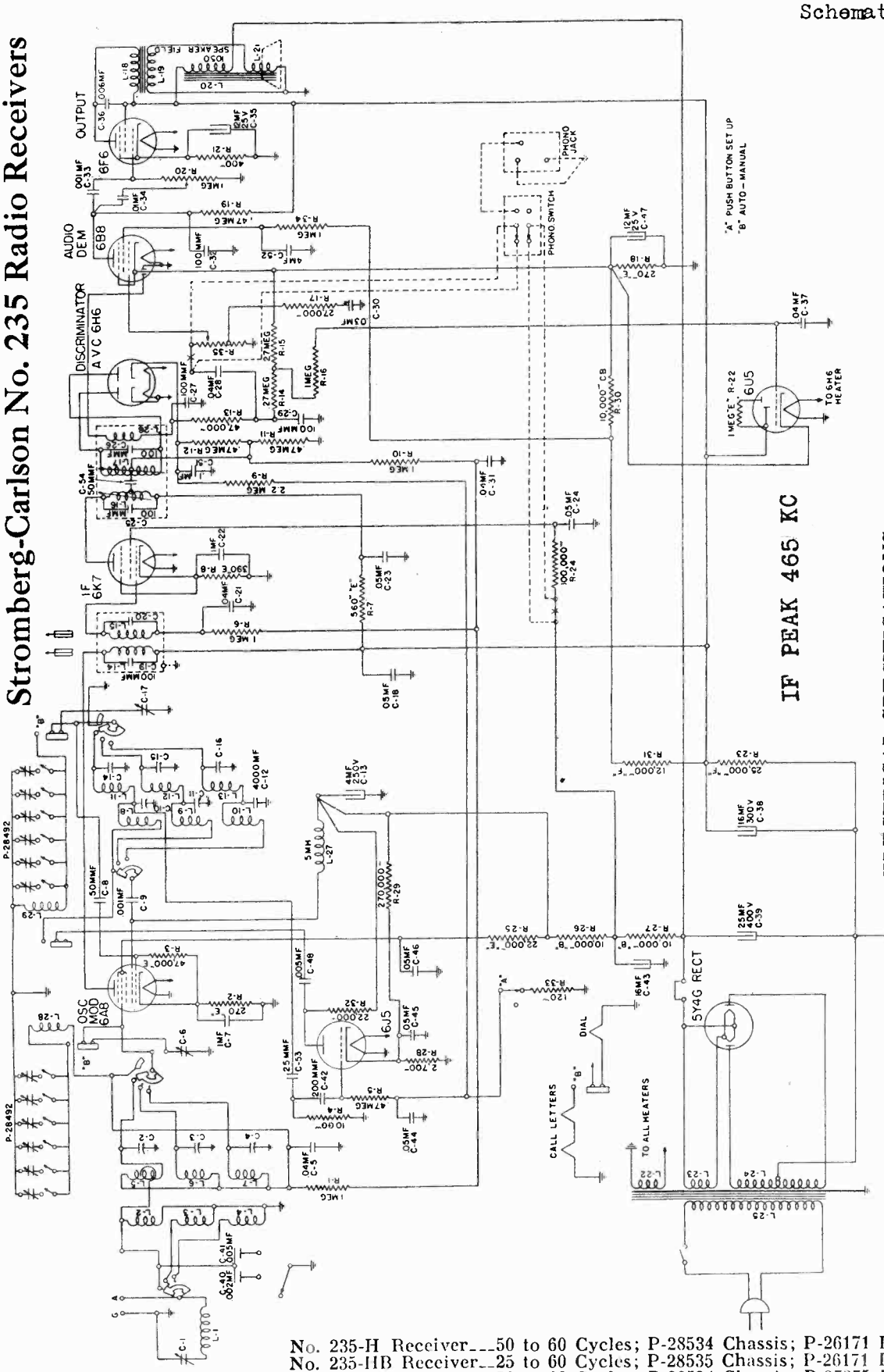
Fig. 5. Chassis Assembly.

Tuning Ranges	A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5900 to 18,000 Kc.
Number and Types of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6Q7, 1 No. 6F6G, 1 No. 6G5, 1 No. 5Y4G
Voltage Rating	105 to 125 Volts, A. C.
Input Power Frequency	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	56 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

MODELS 235H, 235HB
235L, 235LB
Schematic, Specs.

STROMBERG-CARLSON TEL. MFG. CO.

Stromberg-Carlson No. 235 Radio Receivers



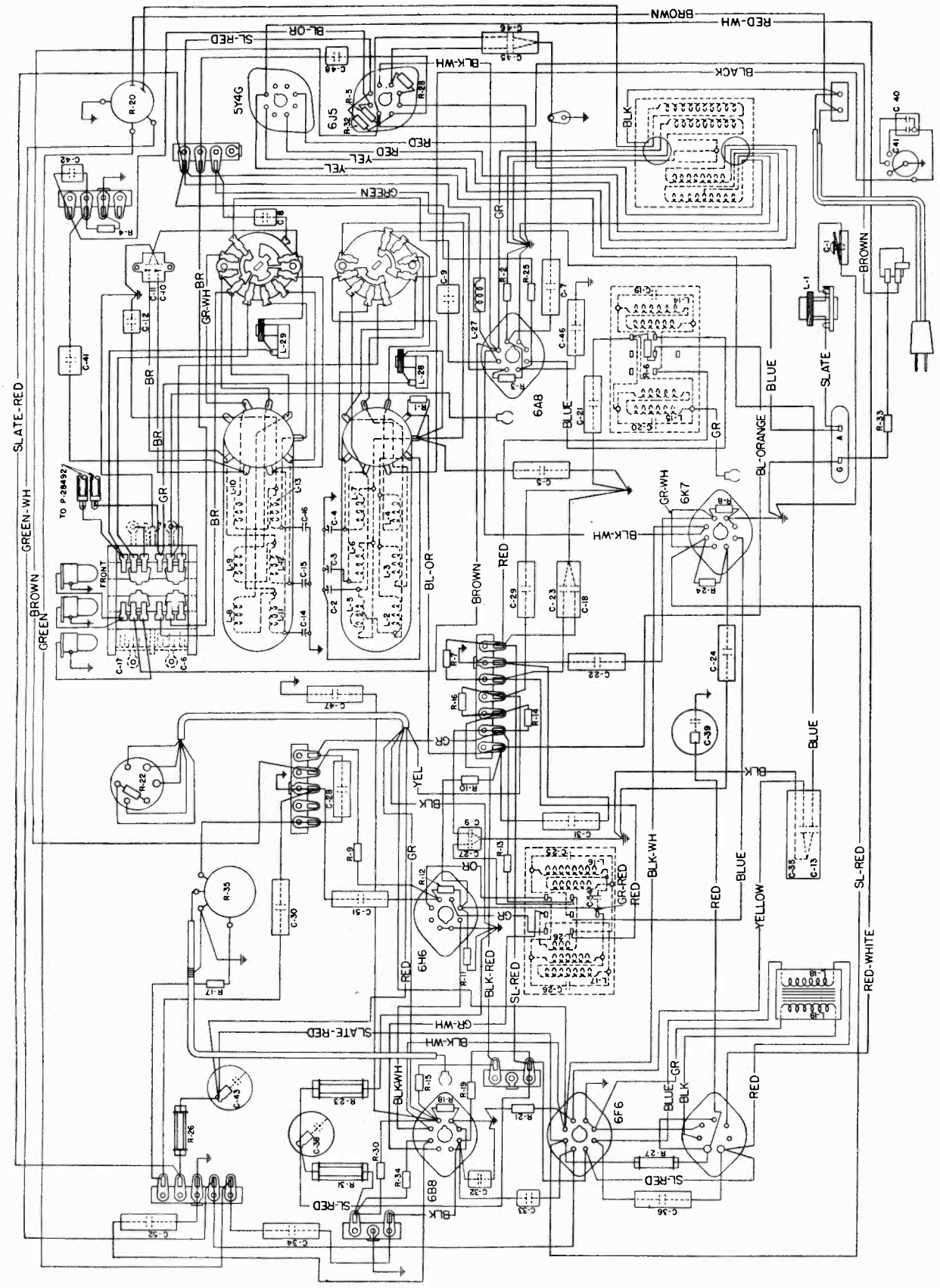
ELECTRICAL SPECIFICATIONS

Type of Circuit ..... Superheterodyne with A. F. C. Electric Tuning
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. 6J5, 1 No. 6K7, 1 No. 6H6, 1 No. 6B8, 1 No. 6F6, 1 No. 6U5, 1 No. 5Y4G
Voltage Rating ..... 105 to 125 Volts
Frequency Rating ..... 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating ..... 70 Watts

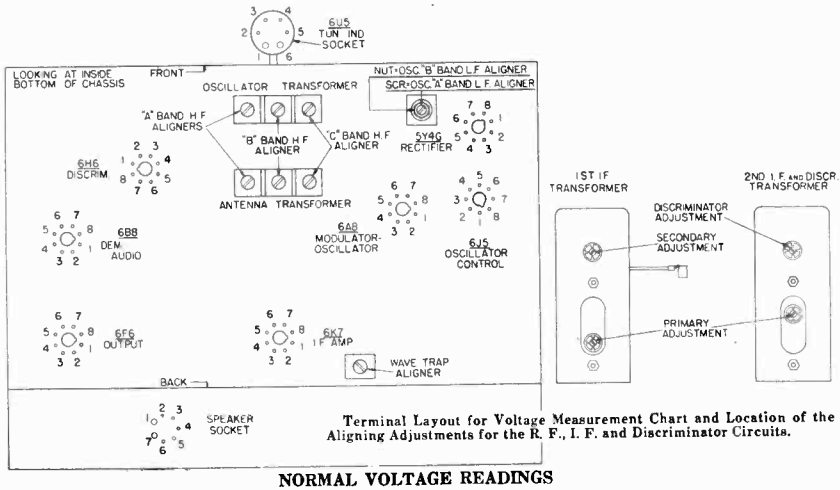
No. 235-H Receiver---50 to 60 Cycles; P-28534 Chassis; P-26171 Loud Speaker
No. 235-HB Receiver--25 to 60 Cycles; P-28535 Chassis; P-26171 Loud Speaker
No. 235-L Receiver----50 to 60 Cycles; P-28534 Chassis; P-27375 Loud Speaker
No. 235-LB Receiver--25 to 60 Cycles; P-28535 Chassis; P-27375 Loud Speaker

MODELS 235H,235HB
235L,235LB STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring



Wiring Diagram, No. 235 Receiver.



Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments for the R. F., I. F. and Discriminator Circuits.

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 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	Osc.—Mod.	0	0	0	+255	+76	—18	+160	*6.1*	+2	2-7	*6.1*
6J5	Osc. Control	—	0	0	+120	0	0	+160	*6.1*	+5.4	2-7	*6.1*
6K7	I. F. Amp.	0	0	0	+255	+76	+2.4	+240	*6.1*	+2.4	2-7	*6.1*
6H6	Discriminator—A. V. C.	—	0	0	0	0	0	0	*6.1*	0	2-7	*6.1*
6B8	Demodulator—Audio Amp.	0	0	0	+48*	0	0	+20*	*6.1*	+3.4	2-7	*6.1*
6F6	Audio Output	—	0	0	+245	+255	0	+210	*6.1*	+18	2-7	*6.1*
6U5	Tuning Indicator	—	*6.1*	+8*	0	+255	+3.4	0	—	—	1-6	*6.1*
5Y4-G	Rectifier	—	0	0	*338*	0	*338*	0	+340	+340	7-8	*4.8*
Speaker Socket		—	+340	0	0	+340	+340	0	+300	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 Kc., no signal

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, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a milliammeter having a range of 0 to 10 milliamperes connected in series with the cathode of the 6J5 oscillator control tube by means of an adaptor plug inserted between the tube and its socket. The leads to the meter should not be longer than 15", and should be shunted at the socket connections by a capacitor of not less than 0.25 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

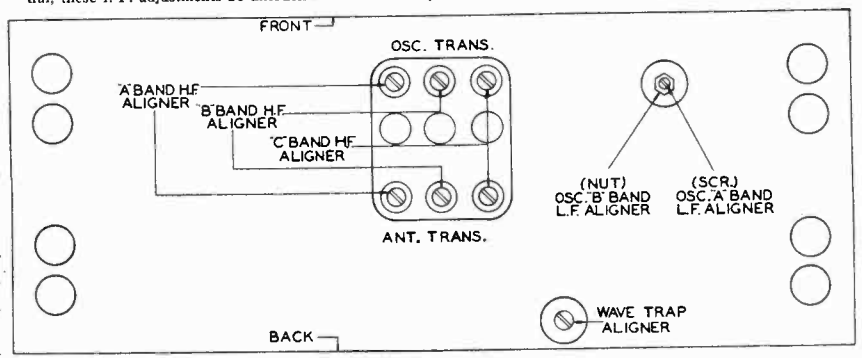
Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the "Signal Admission Control" is set for the maximum sensitivity position, and that the "Manual-Electric" control knob is set to the "Off" position. The "Off-On-Tone" control should also be set for the "Normal" position. 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, except when specifically directed in these instructions. Figures Nos. 1 and 2, show the location of all the aligning capacitors or adjustments for this receiver. It will not be necessary to remove the chassis in this receiver from its cabinet in order to make any alignment adjustments. 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 apertures located in the bottom metal base plate of the chassis. These apertures are easily accessible through the bottom of the cabinet shelf. **Never align any of these receivers without having the metal base plate fastened to the chassis base.**

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. Because of the necessity of obtaining the proper shape of resonance curve of these stages, 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



View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

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 Standard Broadcast range position and set the tuning dial to its extreme low frequency position. Set the "Manual-Electric" control knob to the "Manual" position, and the "Off-On-Tone" control knob to its normal position.

   CAUTION: **Never attempt to align the R. F. or I. F. circuits of this receiver with the "Manual-Electric" control knob set at the "Electric" position unless specifically directed in the following paragraphs. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with the A. F. C. switch (which is located on rear of the chassis base) set at the "set-up" position.**

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 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.

3. Now, noting from Fig. 1, the alignment adjustments for the First and Second I. F. transformers, align the I. F. circuits in the following order:

Adjust the Second I. F. transformer primary circuit for maximum output.

Adjust the First I. F. transformer primary circuit for maximum output.

Adjust the First I. F. transformer secondary circuit for maximum output.

Carefully make all of the above adjustments, watching carefully the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

4. To adjust the Discriminator circuit proceed as follows:

   Check the position of the "Manual-Electric" control knob which should be set to the "Manual" position.

   CAUTION: **Before adjusting this circuit 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-oscillator tube. Now, observe the reading of the milliammeter which is connected in series with the cathode of the No. 6J5 oscillator control tube, and rotate the "Manual-Electric" control knob to the "Electric" position, observing 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 "Manual-Electric" control knob is rotated from the "Manual" to the "Electric" position. If there is any difference in the milliammeter reading while rotating this control knob from the "Manual" to the "Electric" position, and vice versa, adjust the "Discriminator" circuit by means of the screw adjustment located on the 2nd I. F.—Discriminator transformer until the meter reading has the same value regardless of whether the "Manual-Electric" control knob is rotated to the "Manual" or "Electric" position. When this condition is obtained, the Discriminator circuit 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 "Manual-Electric" control knob should be rotated to the "Manual" position, and the "Off-On-Tone" control knob should also be set for "Normal" operation.

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 Medium Wave 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 5 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 carbone 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, the tuning dial to 1000 kilocycles, and the "Manual-Electric" control knob to the "Manual" position. 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.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

In order to obtain reproduction of phonograph records in conjunction with the No. 235 Receiver, the following instructions should be followed.

To equip these receivers for phonograph operation, it will be necessary to purchase and install in the receiver a Stromberg-Carlson, P 28120 Switch Assembly. The rear of the chassis base of these receivers is already drilled for mounting this switch assembly. Complete instructions on how to install and operate this switch are furnished with each P-28120 Switch Assembly.

To obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with 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.

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 socket mounted in the P-28120 Switch Assembly and the pick-up. This shielded cable should be of the low capacity type, in order to prevent 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 socket mounted in the P-28120 Switch Assembly, 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.

INSTRUCTIONS FOR SETTING UP ELECTRIC TUNING ARRANGEMENT

1. Before proceeding to set-up the stations for electric tuning, the radio receiver should be turned "on" for approximately twenty to thirty minutes.
2. Set the Range switch control knob to the proper position for the "Broadcast" range (arrow pointing in direction of "Cream" dot).
3. Remove the list of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
4. Remove the two screws which hold the escutcheon plate to the front panel.
5. Remove from the escutcheon frame the strip of transparent material and the strip of paper on which the six stars are printed.
6. Remove the tuning indicator unit from its normal operating position.

   IMPORTANT: Always use the tuning indicator unit when setting up stations for electric tuning, in order to determine when resonance with the desired station is obtained.

7. From the lists of stations, remove the call letters of the six stations which it is desired to set up for electric tuning. These six stations should preferably be selected and set-up in the daytime so that the best service will be obtained at all times.

   CAUTION: Each button adjustment for electric tuning has assigned frequency limits. **These limits are designated for each adjustment on the rear plate which covers the tuning adjustments and are visible when looking at the rear of the receiver.** See Figure 5. The six stations should be selected so that the frequency of each station will be within the frequency limits assigned to one of the buttons.

   It will be noted that the station letters are printed on partly cut squares to facilitate ease in removing the desired station letters. In setting up these six favorite stations, the following order should be followed: Looking at the front of the receiver, the call letters of the station having the highest frequency should appear in the farthest left-hand square of the escutcheon frame, and then in successive order according to frequency the call letters of the remaining stations should be inserted into the other frames; the call letters of the station having the lowest frequency being inserted in the farthest right-hand square of the escutcheon frame. After the six station call letters have been inserted into the escutcheon frame, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into position by means of the two screws. The tuning adjustments for the six favorite stations can now be made starting with the station having the highest frequency and proceeding as follows:

8. IMPORTANT. By the aid of a screwdriver, rotate the slotted shaft of the "A. F. C." switch, which is located on the rear of the chassis base, so that the slotted shaft points in the direction of the word, "Set-up" (maximum clockwise rotation). See Figure 5.

9. Rotate the knob marked "Manual-Electric" (located on the front panel of the receiver) so that the arrow points in the direction of the word "Manual" and tune the receiver in the conventional manner by means of the station selector knobs to the station having the highest frequency (of the six selected stations) and note carefully the program which it is broadcasting. Then rotate the knob marked "Manual-Electric" so that the arrow points in the direction of the word "Electric".

10. Push the farthest left-hand button (looking at the front of the receiver) which should be the button for the station having the highest frequency provided the frequency of the station is within the designated frequency limits of the tuning adjustments for this button. See Figure 5. Then, looking at the rear of the receiver, rotate the screw of the oscillator tuning adjustment which is designated 1560 to 1000 kilocycles to the position where the desired station is received. In order to check whether the program being received is from the desired station, simply rotate the "Manual-Electric" control to the "Manual" position, and with the receiver tuned in "Manually" to the desired station a quick check can be made; then, rotate the "Manual-Electric" control knob back to the "Electric" position. **Exact resonance with the desired station should be obtained by observing the tuning indicator.** When this adjustment has properly been made, the screw of the antenna tuning adjustment designated 1560 to 1000 kilocycles should be rotated to the position where maximum indication is again obtained on the tuning indicator tube. When these adjustments have been properly made the station having the highest frequency is correctly set-up for Electric Tuning by means of the push button.

11. Now proceed to set-up the remaining five stations in the same manner as mentioned in Pargraphs, 9 and 10 above, proceeding according to the frequency of the remaining stations.

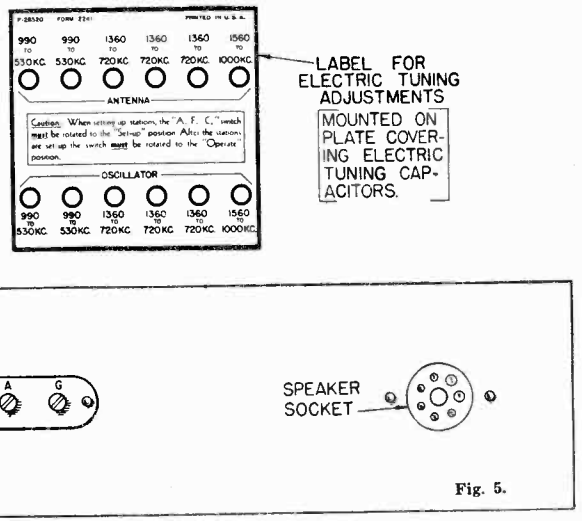


Fig. 5.

12. IMPORTANT: When all of the adjustments have properly heen made for the six desired stations, the slotted shaft of the "A. F. C." switch, located on the rear of the chassis base, should be rotated so that the slotted shaft points in the direction of the word, "Operate" (maximum counter-clockwise rotation). With the electric tuning system in operation, the receiver will be automatically kept in tune with any one of the six favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the electric tuning unit, it will be found that the automatic frequency control circut will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

13. The tuning indicator unit should now be replaced in its proper operating position. Before placing this unit in its proper location, make sure that the tuning indicator tube is fully inserted into its accompanying socket.

REPLACEMENT PARTS

Piece Number	Schematic Circuit Designation	Part
18096	R36, R37	Resistor, Type "B", 10,000 Ohms
23517		Socket, 7 Prong
24166	C53	Capacitor, Type "O", 25 Mmfd.
24268		Cord (Power Supply)
24402	C7, C22, C51	Capacitor, .1 Mfd.
24405	C5, C21, C23, C31, C37, C44	Capacitor, .04 Mfd.
24559	C27, C29, C32	Capacitor, Type "O", 100 Mmfd.
24560	C6, C54	Capacitor, Type "O", 50 Mmfd.
24994	C24	Capacitor, .05 Mfd.
25149	C34	Capacitor, .01 Mfd.
25459	C35	Electrolytic Capacitor, 4 Mfd., 250 Volts
25487	C9, C33	Capacitor, Type "W", .001 Mfd.
25500	R31	Resistor, Flexible, 400 Ohms
25533	C36	Capacitor, .01 Mfd.
25539		Socket, 8 Prong
25814	L27	R. F. Choke Coil
26227		Pilot Lamp
26322	R33	Resistor, Type "E", 120 Ohms
26326	R2, R18	Resistor, Type "E", 270 Ohms
26328	R8	Resistor, Type "E", 390 Ohms
26330	R7	Resistor, Type "E", 560 Ohms
26333	R4	Resistor, Type "E", 1000 Ohms
26338	R28	Resistor, Type "E", 2700 Ohms
26349	R25, R32	Resistor, Type "E", 22,000 Ohms
26353	R3, R13	Resistor, Type "E", 47,000 Ohms
26357	R1, R24	Resistor, Type "E", .1 Megohm
26362	R14, R15, R29	Resistor, Type "E", .27 Megohm
26365	R5, R11, R12, R19	Resistor, Type "E", .47 Megohm
26369	R6, R10, R16, R22, R34	Resistor, Type "E", 1 Megohm
26373	R9	Resistor, Type "E", 2.2 Megohms
26497		Tuning Indicator Cable Assembly
26564	C10, C11	Capacitor Assembly, L. F. Aligners ("A" and "B" Ranges)
26776	R21	Resistor, Type "P", 12,000 Ohms
26944	C12	Capacitor, Type "W", .004 Mfd.
27067	L22, L23, L24, L25	Power Transformer (50 to 60 Cycles Chassis)
27068	L22, L23, L24, L25	Power Transformer (25 to 60 Cycles Chassis)
27069	L14, L15	1st I. F. Transformer
27073	C19, C20, C25, C26	Capacitor, Fixed Tuning, 100 Mmfd.
27081	C1	Tuning Capacitor, Wave Trap
27098	C40, C41	Capacitor Assembly, 1—.002 Mfd. ;1—.005 Mfd. (Signal Admission Control)
27101	C42	Capacitor, Type "O", 200 Mmfd.
27102		Pulley Assembly, Gang Tuning Capacitor
27107		Dial (Tuning)
27108	C18, C33, C45, C48	Capacitor Assembly (2—.05 Mfd.)
27112		Dial Indicator Frame
27122	C39	Electrolytic Capacitor, 25 Mfd., 400 Volts
27123	C38	Electrolytic Capacitor, 16 Mfd., 300 Volts
27124	C13, C35	Electrolytic Capacitor Assembly, 4 Mfd., 250 Volts; 12 Mfd., 20 Volts
27125	R23	Resistor, Type "P", 25,000 Ohms
27132	L18, L19	Transformer Assembly, Audio Output
27137		Range Switch
27143	C2, C3, C4, C14, C15, C16	H. F. Aligners for Antenna and Oscillator Transformers
27144	L2, L3, L4, L5, L6, L7	Coil Assembly, Antenna Transformers
27145	L8, L9, L10, L11, L12, L13	Coil Assembly, Oscillator Transformers
27149	L1	Wave Trap Coil
27159		Belt (Tuning Drive)
27311	R20	"Off-On" Switch and Tone Control
27396		Thumb Screw
27416		Switch (Signal Admission Control)
27558	C46	Capacitor, Type "W", .005 Mfd.
27595	C43	Electrolytic Capacitor, 16 Mfd., 250 Volts
27610	R35	Volume Control
27612	L16, L17, L26	2nd I. F.—Discriminator Transformer
27615	R17	Resistor, Type "EI", 27,000 Ohms
27655	C47	Dry Electrolytic Capacitor, 12 Mfd., 25 Volts
27782	C30	Capacitor, .05 Mfd.
28170	R30	Resistor, Type "FB", 10,000 Ohms
28492		Adjustable Capacitors and Switches Assembly for Electric Tuning
28521		Electric Tuning Cable Assembly
28523		Electric Tuning Cable Assembly
28550	L29	Oscillator Coil for Electric Tuning
28551	L28	Antenna Coil for Electric Tuning
28572		Drive Assembly
28616		A. F. C. Switch
28653		Shuttle Switch for Manual Electric Tuning Capacitors
28654	C6, C17	Gang Tuning Capacitors
28699		Pilot Lamp Socket Assembly for Tuning Dial
28700		Pilot Lamp Socket Assembly for Station Call Letters
28702		Lever Assembly for Manual-Electric Control Switch
28704		Drive Rod for Manual-Electric Control Switch
28705		Button for Manual-Electric Control Switch
28711		Cam and Bracket Assembly for Manual-Electric Control Switch
28720		Spring for Manual-Electric Control Switch

MISCELLANEOUS PARTS

27800	Knob Assembly (Used on both "Volume" and "Off-On-Tone" Controls)
27802	Knob Assembly (For "Rapid Stations Selector" Shaft)
27803	Knob Assembly (For "Vernier Stations Selector" Shaft)
27804	Knob Assembly (For "Range" Switch Shaft)
27628	Felt Washer (Used on both "Volume" and "Off-On-Tone" Controls Shafts)
27629	Felt Washer (For Range Switch Shaft)
27630	Felt Washer (For "Rapid Stations Selector" Shaft)
28504	Knobs (For Stations' Selectors of Electric Tuning)
28603	Knob (For "Manual-Electric" Control)

MODEL 229P Series
Chassis Wiring
Specifications

STROMBERG-CARLSON TEL. MFG. CO.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
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. 6H6, 1 No. 6F5, 1 No. 6F6, 1 No. 80, 1 No. 6G5
Power Supply Voltage	105 to 125 Volts
Power Supply Frequency	See Receivers Listed under "Apparatus Specifications"
Input Power Rating	90 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

APPARATUS SPECIFICATIONS

No. 229-P	60 Cycles Only; P-27936 Chassis; P-27834 Loud Speaker; P-27835 Phonograph Unit
No. 229-PB	25 Cycles Only; P-27937 Chassis; P-27834 Loud Speaker; P-27836 Phonograph Unit
No. 229-PD	50 Cycles Only; P-27936 Chassis; P-27834 Loud Speaker; P-27837 Phonograph Unit
No. 229-PE	40 Cycles Only; P-27937 Chassis; P-27834 Loud Speaker; P-27838 Phonograph Unit

FOR OTHER DATA SEE INDEX

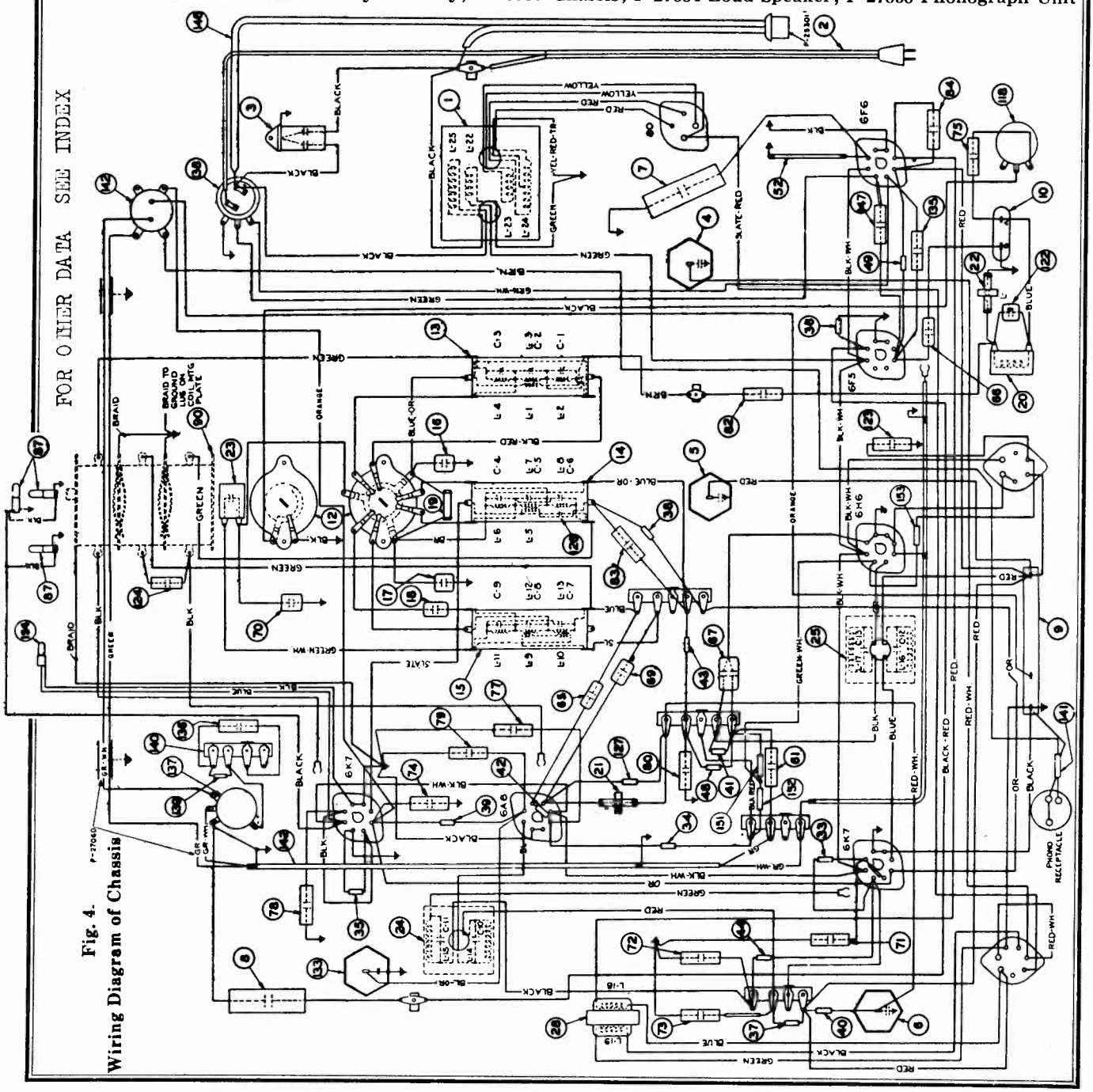


Fig. 4. Wiring Diagram of Chassis P-27040

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 240H,-HB,-L,
-LB,-M,-MB,-R,-RB,
S,-SB,-W,-WB,-P,-PB
Schematic,Specs.
Circuit Data

Fig. 3. Schematic Circuit of Receiver.

Tuning Ranges ---------- A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.
No. and Type of Tubes ---------- 2 No. 6K7, 1 No. 6A8, 2 No. 6C5, 1 No. 6H6, 1 No. 6F5, 2 No. 6F6, 1 No. 6G5, 1 No. 5U4G
Voltage Rating ---------- 105 to 125 Volts, A.C.
Power Frequency Rating ---------- 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating:
Radio Models Only ---------- 132 Watts
Radio-Phono. Models ---------- 165 Watts
Frequency of Intermediate Amplifier ---------- 465 Kilocycles

The No. 240 Receivers are eleven tube "Adjustable High Fidelity" receivers employing metal tubes. These receivers have three tuning ranges, the frequency limits of each range being listed under the "Electrical Specifications." 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 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.

MODEL 240 Series
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

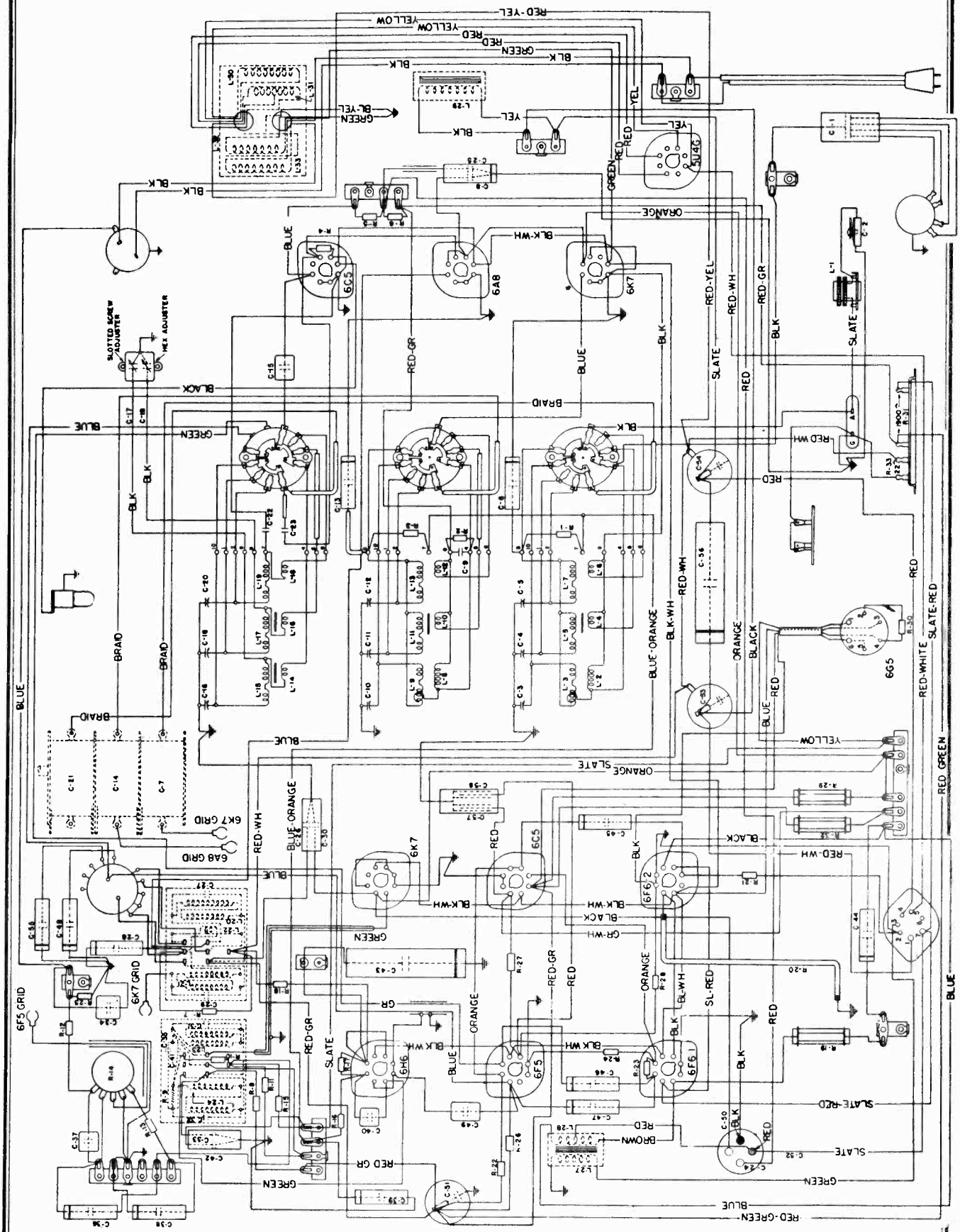


Fig. 4. Wiring Diagram, No. 240 Receiver

MODEL 240 Series

STROMBERG-CARLSON TEL. MFG. CO. Chassis Views, Specs

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 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*
6K7	R. F. Amp.	0	0	0	+230	+95	0	—	*6.1*	0	2–7	*6.1*
6A8	Modulator	0	0	0	+235	+95	—17	+95	*6.1*	0	2–7	*6.1*
6C5	Oscillator	—	0	0	+130	—	—17	0	*6.1*	0	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+225	+95	0	—	*6.1*	0	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	—	+125	+115	+125	*6.1*	+1.2	2–7	*6.1*
6C5	Audio Amp.	—	0	0	+115	+115	0	+230	*6.1*	+5.2	2–7	*6.1*
1st 6F6	Audio Output	—	0	0	+295	+300	0	0	*6.1*	+20	2–7	*6.1*
2nd 6F6	Audio Output	—	0	0	+290	+300	0	0	*6.1*	+20	2–7	*6.1*
6G5	Tuning Ind.	—	*6.1*	+2*	0	+225	0	0			1–6	*6.1*
5U4G	Rectifier	—	—	+420	—	*380*	—	*380*	—	+417	2–8	*4.8*
Speaker Socket		—	+410	0	0	+420	+420	—	+300			

A. C. voltages are indicated by italics. Receiver tuned to 1000 Kc., no signal.

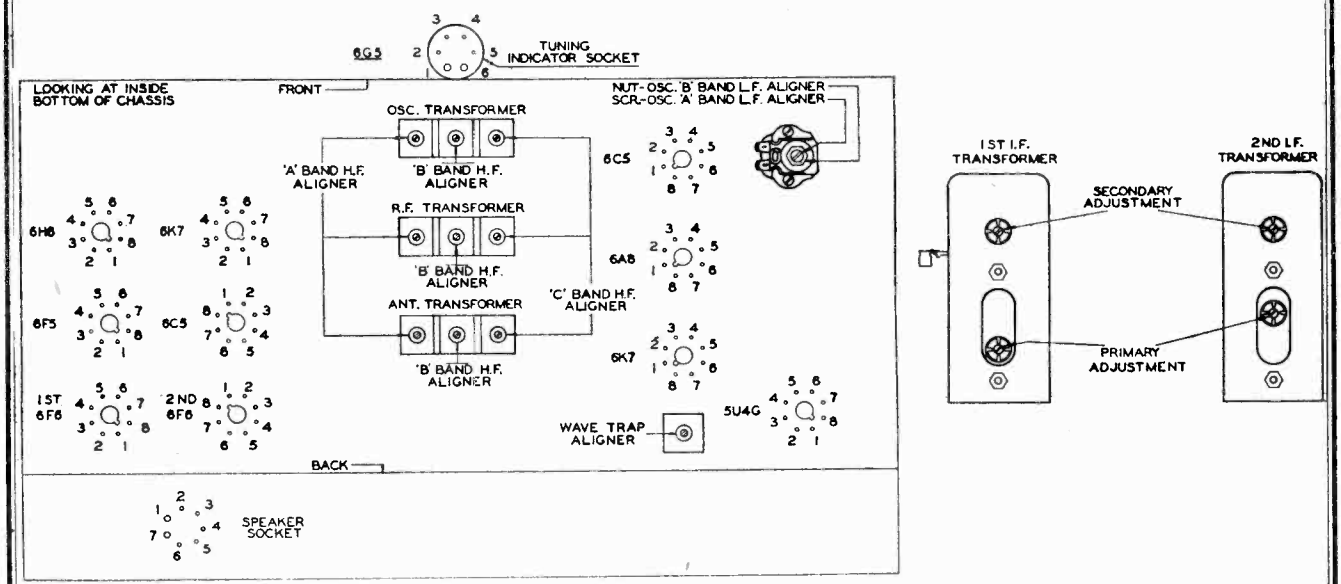


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODEL 240 Series
Alignment, Trimmers

STROMBERG-CARLSON TEL. MFG. CO.

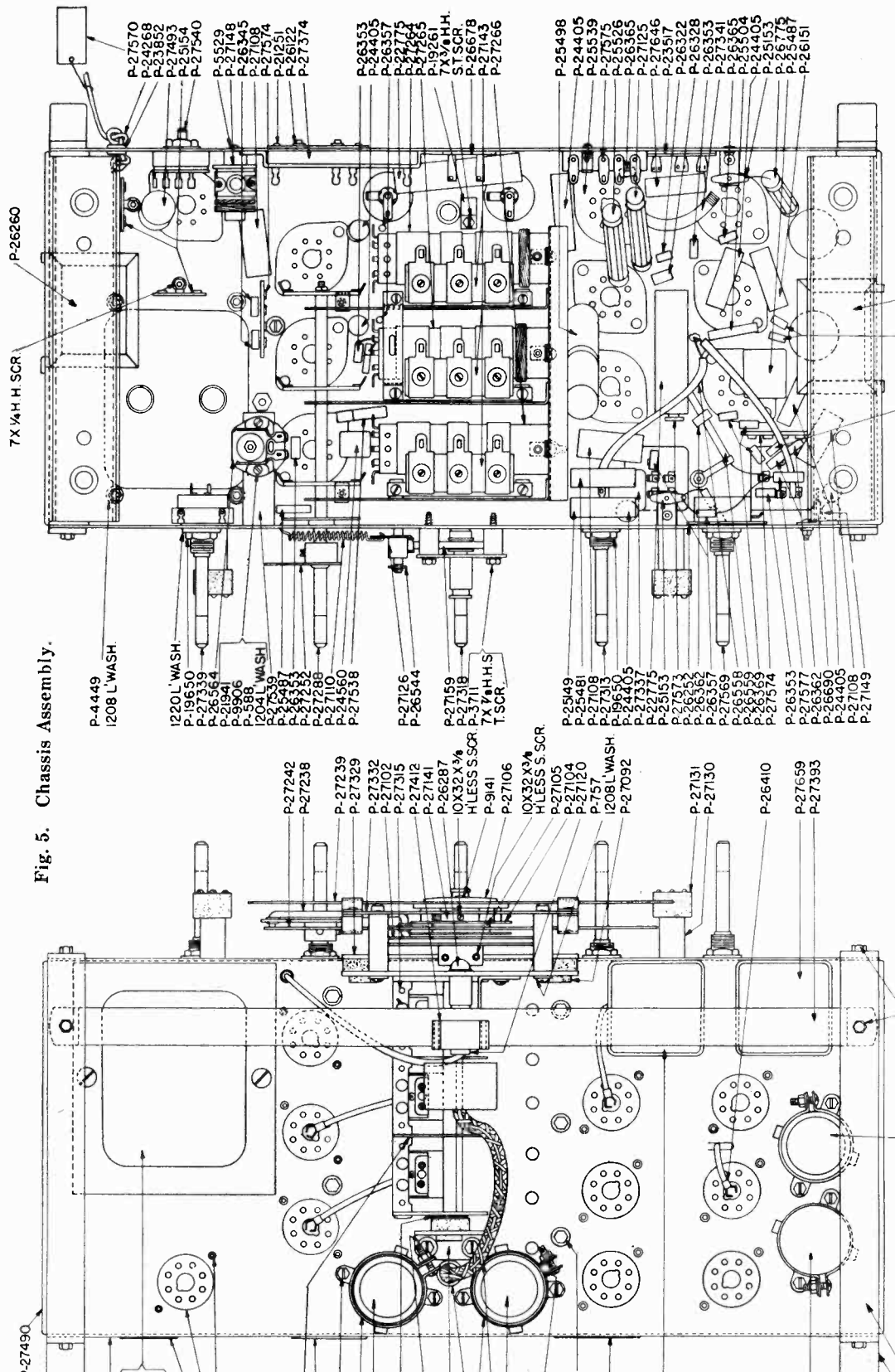


Fig. 5. Chassis Assembly.

APPARATUS SPECIFICATIONS

No. 240-H	.50 to 60 Cycles;	P-27244 Chassis;	P-27503 Loud Speaker
No. 240-HB	.25 to 60 Cycles;	P-27245 Chassis;	P-27503 Loud Speaker
No. 240-L	.50 to 60 Cycles;	P-27244 Chassis;	P-27385 Loud Speaker
No. 240-LB	.25 to 60 Cycles;	P-27245 Chassis;	P-27385 Loud Speaker
No. 240-M	.50 to 60 Cycles;	P-27244 Chassis;	P-27504 Loud Speaker
No. 240-MB	.25 to 60 Cycles;	P-27245 Chassis;	P-27504 Loud Speaker
No. 240-R	.50 to 60 Cycles;	P-27244 Chassis;	P-27385 Loud Speaker
No. 240-RB	.25 to 60 Cycles;	P-27245 Chassis;	P-27385 Loud Speaker
No. 240-S	.50 to 60 Cycles;	P-27244 Chassis;	P-27504 Loud Speaker
No. 240-SB	.25 to 60 Cycles;	P-27245 Chassis;	P-27504 Loud Speaker
No. 240-W	.50 to 60 Cycles;	P-27244 Chassis;	P-27504 Loud Speaker
No. 240-WB	.25 to 60 Cycles;	P-27245 Chassis;	P-27504 Loud Speaker
No. 240-P	.60 Cycles Only;	P-27505 Chassis;	P-27504 Loud Speaker
No. 240-PB	.25 Cycles Only;	P-27506 Chassis;	P-27504 Loud Speaker

When reception conditions warrant, the fidelity of this receiver can be increased by rotating the "Tone-Fidelity" switch control knob in a clockwise rotation from the normal position of this control. High Fidelity reproduction is obtained in two steps from the normal position of this control. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit, so that balanced reproduction is obtained for any setting of the volume control.

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.

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, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

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 "Fidelity" control knob is set for the "normal" position. The "Off-On-Bass" control knob should also be set for the normal position. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

It will not be necessary to remove the chassis in these receivers from their cabinets in order to make any alignment adjustments. 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. See Figure 2. Never align any of these receivers without having the metal base plate fastened to the chassis base.

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.

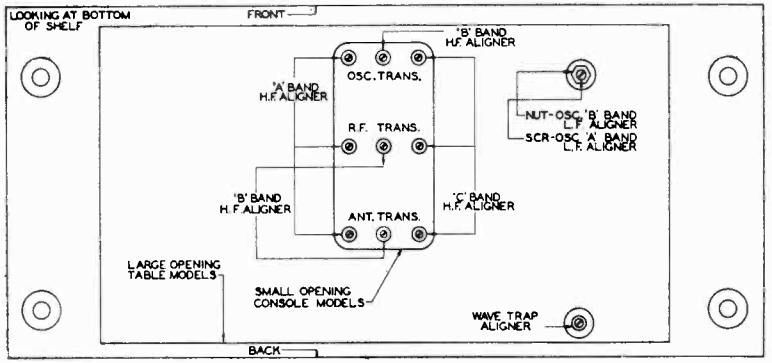


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

Intermediate Frequency Adjustments

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 knob to its "Normal" position, and the "Off-On-Bass" control knob to its normal position. Never attempt to align the I. F. circuits of this receiver with the "Fidelity" control set at any position other than the "Normal" fidelity 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 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 cillator 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 16 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "C" 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. 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 5 megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "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. 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.
5. Set the test oscillator's frequency and the receiver's tuning dial to 1.8 megacycles.
6. 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.
7. Reset both the test oscillator's frequency and the receiver's tuning dial to 5 megacycles and repeat operations Nos. 2, 3 and 4.

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 1.5 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" band high frequency aligner for maximum output.
4. Adjust the antenna's "A" band high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. 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.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

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.

MODEL 240 Series
Voltage, Socket
Trimmers

STROMBERG-CARLSON TEL. MFG. CO.

REPLACEMENT PARTS

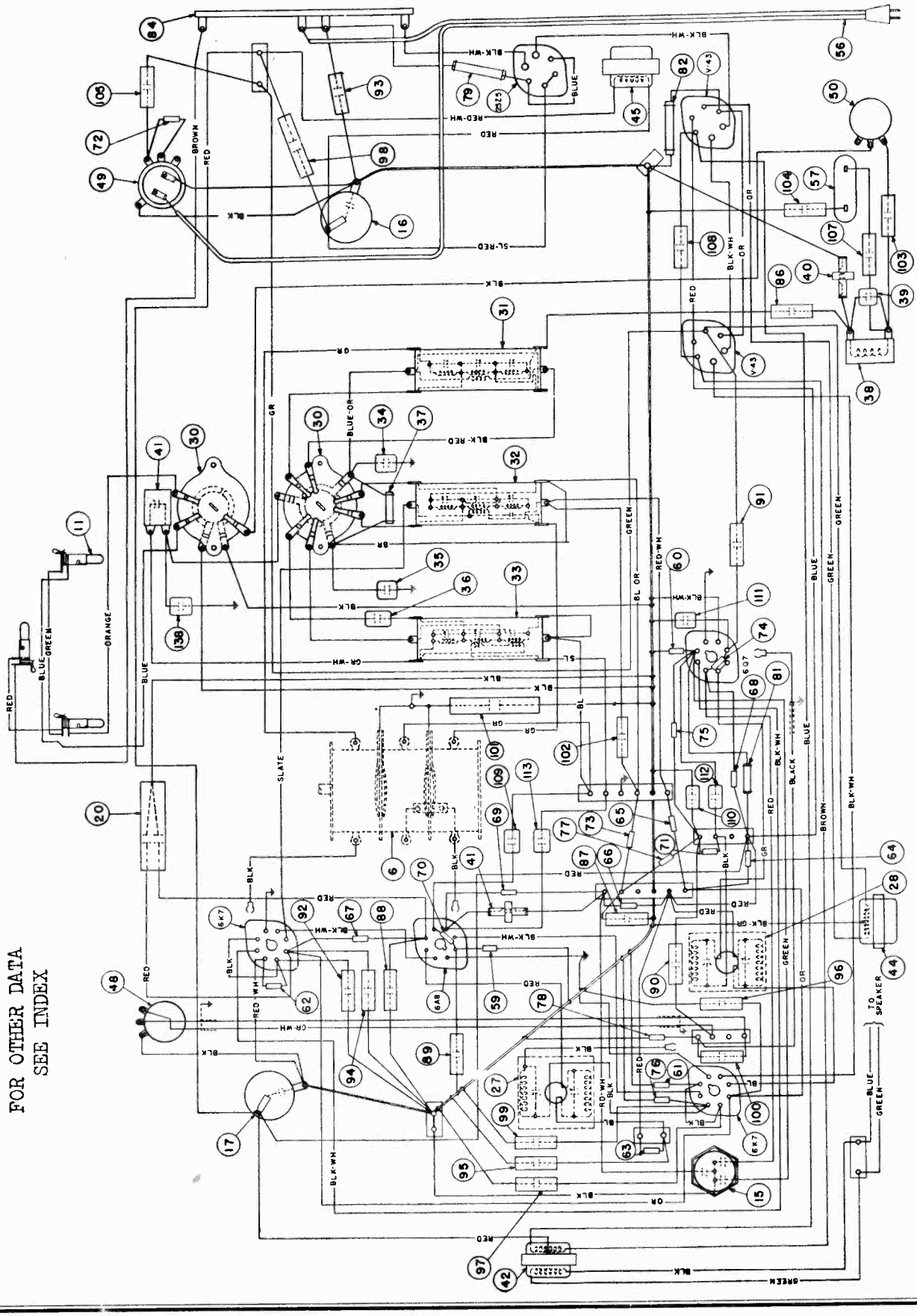
Piece Number	Schematic Circuit Designation	Part
22775	C43, C56	Capacitor, .4 Mfd.
23517		Tube Socket, 7 Prong
24268		Cord, Power Supply
24405	C6, C13, C28, C36, C39, C45, C46	Capacitor, .04 Mfd.
24560	C23	Capacitor, Type "O", 50 Mmfd.
25149	C38, C48	Capacitor, .01 Mfd.
24559	C35, C41	Capacitor, Type "O", 100 Mmfd.
25481	C55	Capacitor, .002 Mfd.
25487	C15, C40	Capacitor, Type "W", .001 Mfd.
25498	C57, C58	Electrolytic Capacitor, 10 Mfd., 25 Volts, and 10 Mfd., 25 Volts
25504	C49, C59	Capacitor, Type "2", 100 Mmfd.
25526	R29	Resistor, Type "F", 15,000 Ohms
25539		Tube Socket, 8 Prong
26151	C47	Capacitor, .005 Mfd.
26260	L29	Choke Assembly
26287		Pilot Lamp
26322	R28	Resistor, Type "E", 120 Ohms
26328	R27	Resistor, Type "E", 390 Ohms
26333	R8	Resistor, Type "E", 1000 Ohms
26345	R5, R6	Resistor, Type "E", 10,000 Ohms
26353	R2, R4, R9, R13, R24	Resistor, Type "E", 47,000 Ohms
26357	R1, R3, R7, R12, R22, R26	Resistor, Type "E", .1 Megohm
26362	R10, R11, R18, R25	Resistor, Type "E", .27 Megohm
26365	R21, R23	Resistor, Type "E", .47 Megohm
26369	R15, R16, R17, R30	Resistor, Type "E", 1 Megohm
26564	C17, C19	Capacitor, Oscillator Low Frequency Aligners
26678		Socket, Phono-Jack
26775	R19	Resistor, Type "F", 20,000 Ohms
27081	C2	Capacitor, Aligning
27101	C9	Capacitor, Type "O", 200 Mmfd.
27102		Pulley Assembly
27108	C8, C25, C26, C30, C33, C42	Capacitor, Two, .05 Mfd., 400 Volts
27110		Spring
27120		Pilot Lamp Socket Assembly
27123	C51	Electrolytic Capacitor, 16 Mfd., 300 Volts
27125	R32	Resistor, Type "F", 25,000 Ohms
27126		Strap Assembly
27134	L27, L28	Output Transformer
27141		Dial Hub Plate
27143	C3, C4, C5, C10, C11, C12, C16, C18, C20	H. F. Aligners for Antenna, R. F. and Oscillator Transformers
27148	L1	Coil Assembly, Wave Trap
27159		Belt
27189	L30, L31, L32, L33	Power Transformer (50 to 60 Cycles Chassis)
27190	L30, L31, L32, L33	Power Transformer (25 to 60 Cycles Chassis)
27196		Range Switch Assembly
27232	C7, C14, C21	Gang Tuning Capacitors
27236		Mask Assembly (Selectorlite Dial)
27237		Arm Assembly (Mask Actuator)
27238		Rod, Mask (Actuator)
27239		Dial (Tuning)
27264	L2, L3, L4, L5, L6, L7	Coil Assembly, Antenna Transformer
27265	L8, L9, L10, L11, L12, L13	Coil, Assembly, R. F. Transformer
27266	L14, L15, L16, L17, L18, L19	Coil Assembly, Oscillator Transformer
27313		Switch for Fidelity Control
27314	L20, L21, L22	First I. F. Transformer
27318		Drive Assembly
27332		Indicator Frame Assembly
27336	C53	Electrolytic Capacitor, 16 Mfd., 500 Volts
27337	C34	Capacitor, Type "W", .004 Mfd.
27339		Switch, "Off-On-Bass" (Used on Radio Models only)
27341	R20	Resistor, Flexible, 200 Ohms
27374	R31, R33	Resistor, "B" Voltage Divider
27408		Cable Assembly
27411		Clamp Assembly, Tuning Indicator
27493	C1	Capacitor Assembly; Four, .002 Mfd.
27537	C24, C50, C52	Electrolytic Capacitor, 4 Mfd., 400 Volts; 4 Mfd., 250 Volts; 4 Mfd., 250 Volts
27540		Switch, Signal Admission Control
27569	R14	Volume Control
27577	C37	Capacitor, Type "O", 15 Mmfd.
27622	C54	Electrolytic Capacitor, 16 Mfd., 500 Volts
27646	C44	Capacitor, .002 Mfd.
27659	L23, L24	Second I. F. Transformer
26751		Switch, "Off-On-Bass-Phono" (Used only on "Radio-Phono" Models)
27947		Cord Assembly (Used only on "Radio-Phono" Models)

MISCELLANEOUS PARTS

Piece Number	Part
27800	Knob Assembly (Used on "Volume", "Range Switch" and "Off-On-Bass" Controls' Shafts)
27801	Knob Assembly (For "Fidelity" Shaft)
27802	Knob Assembly (For "Rapid Station Selector" Control Shaft)
27803	Knob Assembly (For "Vernier Station Selector" Control Shaft)
27628	Felt Washer (Used on "Volume", "Fidelity", "Range Switch" and "Off-On-Bass" Controls' Shafts)
27630	Felt Washer (For "Rapid Station Selector" Control Shaft)

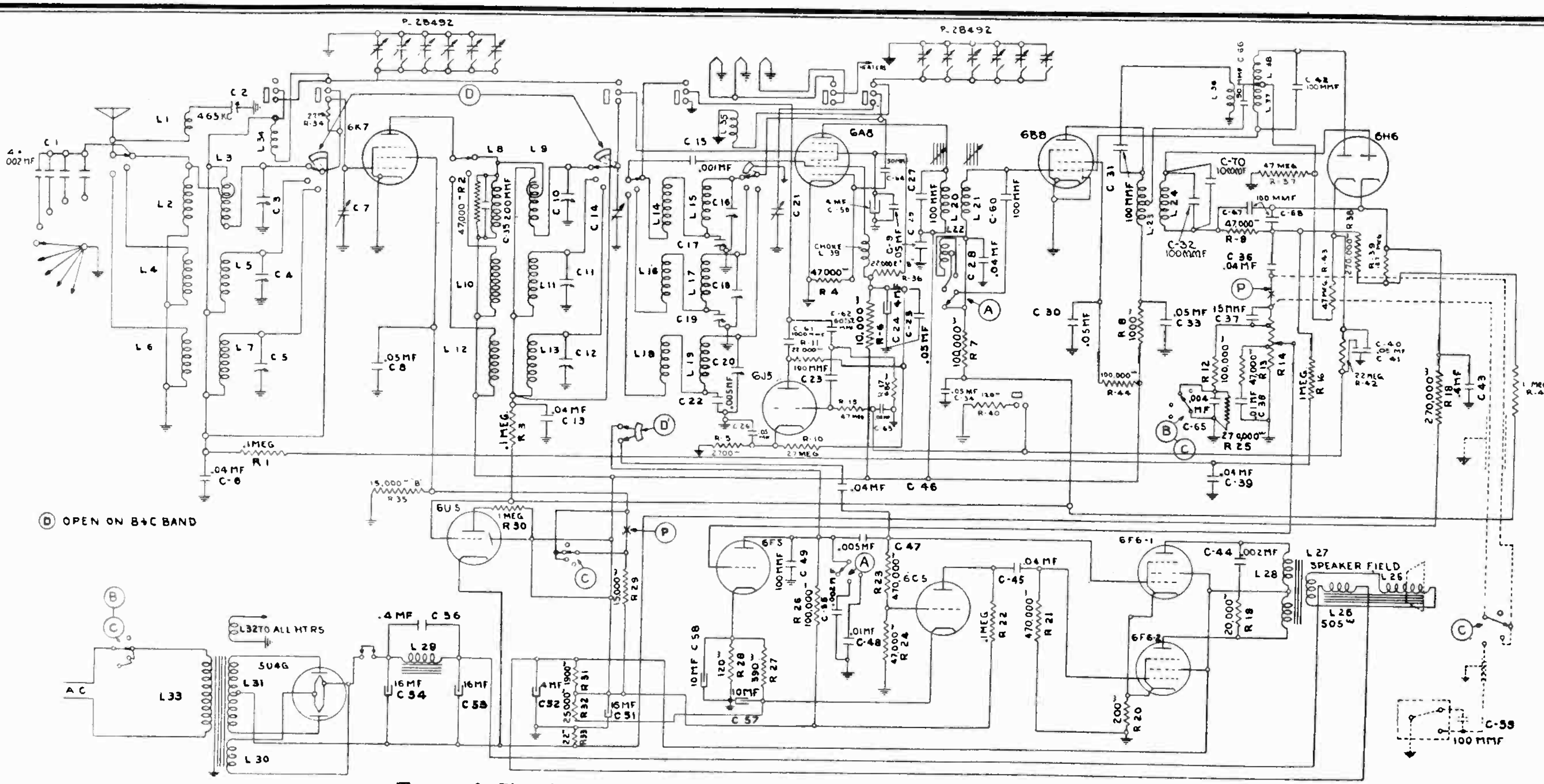
MODELS 126H,126I

STROMBERG-CARLSON TEL. MFG. CO. Chassis Wiring



MODELS 245L,-LB,
-M,-MB,-R,-RB,
-P,-PB
Schematic,Specs.

STROMBERG-CARLSON TEL. MFG. CO.



IF PEAK 465 KC

Stromberg-Carlson

No. 245

Radio Receivers

Type of Circuit	Superheterodyne with A. F. C. Electric Tuning
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. 6K7, 1 No. 6A8, 1 No. 6J5, 1 No. 6B8, 1 No. 6H6, 1 No. 6F5, 1 No. 6C5, 2 No. 6F6, 1 No. 6U5, 1 No. 5U4G
Voltage Rating	105 to 125 Volts, A. C.
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating:	
Radio Models Only	130 Watts
Radio-Phono. Models	165 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

APPARATUS SPECIFICATIONS

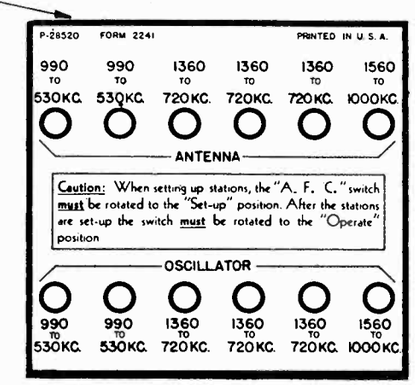
No. 245-L	50 to 60 Cycles; P-28481 Chassis; P-27385 Loud Speaker
No. 245-LB	25 to 60 Cycles; P-28482 Chassis; P-27385 Loud Speaker
No. 245-M	50 to 60 Cycles; P-28481 Chassis; P-27504 Loud Speaker
No. 245-MB	25 to 60 Cycles; P-28482 Chassis; P-27504 Loud Speaker
No. 245-R	50 to 60 Cycles; P-28481 Chassis; P-27385 Loud Speaker
No. 245-RB	25 to 60 Cycles; P-28482 Chassis; P-27385 Loud Speaker
No. 245-P	60 Cycles Only; P-28590 Chassis; P-27504 Loud Speaker; P-27839 Phono. Motor Unit
No. 245-PB	25 Cycles Only; P-28591 Chassis; P-27504 Loud Speaker; P-27840 Phono. Motor Unit

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 245 Series
Chassis Wiring
Tuner

LABEL FOR ELECTRIC TUNING ADJUSTMENTS

MOUNTED ON PLATE COVERING ELECTRIC TUNING CAPACITORS.



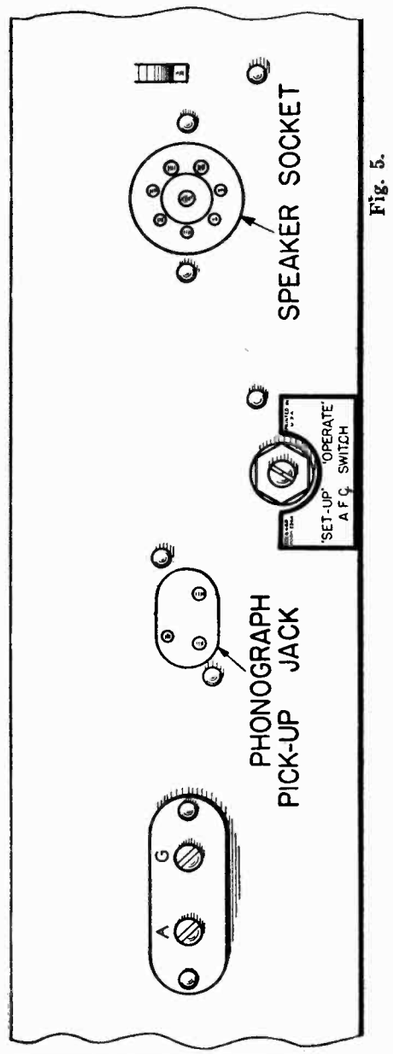


Fig. 5.

Fig. 4. Wiring Diagram, No. 245 Receiver.

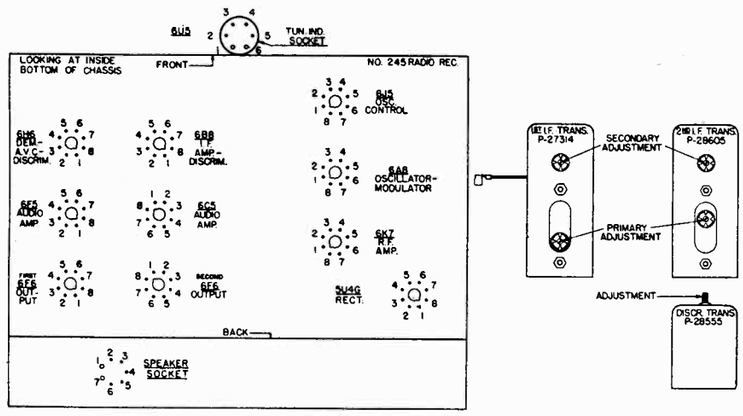


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments for the I. F. and Discriminator Circuits.

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 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*
6K7	R. F. Amp.	0	0	0	+225	+107	0	0	*6.1*	0	2–7	*6.1*
6A8	Osc.—Mod.	0	0	0	+225	+107	—10	+130	*6.1*	0	2–7	*6.1*
6J5	Osc. Control	—	0	0	+170	+3.8	0	+225	*6.1*	+3.8	2–7	*6.1*
6B8	I. F. Amp.—Discriminator	0	0	0	+220	0	0	+107	*6.1*	0	2–7	*6.1*
6H6	Discriminator—Dem.—A. V. C.	—	0	0	0	0	0	0	*6.1*	0	2–7	*6.1*
6F5	Audio Amp.	0	0	0	0	+135	+110	+135	*6.1*	+1.3	2–7	*6.1*
6C5	Audio Amp. (Inv.)	—	0	0	+110	+110	0	+220	*6.1*	+5.2	2–7	*6.1*
1st 6F6	Audio Output	—	0	0	+300	+310	0	0	*6.1*	+22	2–7	*6.1*
2nd 6F6	Audio Output	—	0	0	+300	+310	0	0	*6.1*	+22	2–7	*6.1*
6U5	Tuning Indicator	—	*6.1*	+15*	0	+225	0	0	—	—	1–6	*6.1*
5U4G	Rectifier	—	0	+425	0	*390*	0	*390*	0	+425	2–8	*4.8*
Speaker Socket		—	+400	0	0	+425	+425	0	+310	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 Kc., no signal.

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, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a milliammeter having a range of 0 to 10 milliamperes connected in series with the cathode of the No. 6J5 oscillator control tube by means of an adaptor plug inserted between the tube and its socket. The leads to the meter should not be longer than 15", and should be shunted at the socket connections by a capacitor of not less than 0.25 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the "Signal Admission Control" is set for the maximum sensitivity position, that the Fidelity Control knob is set for the "Normal" position and that the "Manual-Electric" control knob is set to the "Off" position. The "Off-On-Bass" control should also be set for the "Normal" position. 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, except when specifically directed in these instructions. Figures Nos. 1 and 2, show the location of all the aligning capacitors or adjustments for this receiver. It will not be necessary to remove the chassis in this receiver from its cabinet in order to make any alignment adjustments. 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 through the bottom of the cabinet shelf. Never align any of these receivers without having the metal base plate fastened to the chassis base.

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. 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

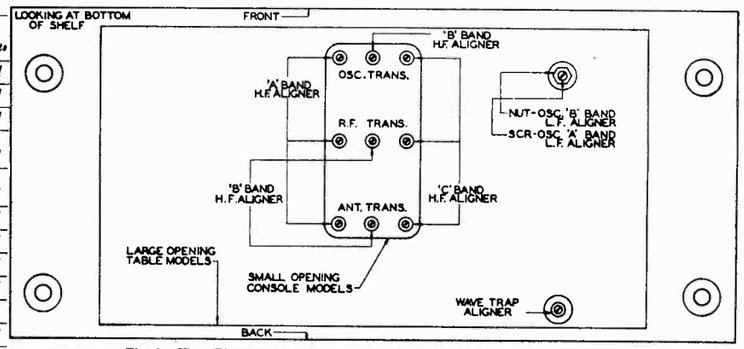


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

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 Standard Broadcast range position and set the tuning dial to its extreme low frequency position. Set the Fidelity control knob to its "Normal" position, the "Manual-Electric" control knob to the "Manual" position, and the "Off-On-Bass" control knob to its normal position.

   CAUTION: 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" position and the "Manual-Electric" control knob set at the "Electric" position unless specifically directed in the following paragraphs. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with the A. F. C. switch (which is located on rear of the chassis base) set at the "set-up" position. See Fig. 5.

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 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.

3. Now, noting from Fig. 1, the alignment adjustments for the First and Second I. F. transformers, align the I. F. circuits in the following order:

   Adjust the Second I. F. transformer primary circuit for maximum output.

   Adjust the Second I. F. transformer secondary circuit for maximum output.

   Adjust the First I. F. transformer primary circuit for maximum output.

   Adjust the First I. F. transformer secondary circuit for maximum output.

   Carefully make all of the above adjustments, watching carefully the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

4. To adjust the Discriminator circuit proceed as follows:

   Check the position of the "Manual-Electric" control knob which should be set to the "Manual" position. CAUTION: Before adjusting this circuit 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-oscillator tube. Now, observe the reading of the milliammeter which is connected in series with the cathode of the No. 6J5 oscillator control tube, and rotate the "Manual-Electric" control knob to the "Electric" position, observing 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 "Manual-Electric" control knob is rotated from the "Manual" to the "Electric" position. If there is any difference in the milliammeter reading while rotating this control knob from the "Manual" to the "Electric" position and vice versa, adjust the "Discriminator" circuit by means of the screw adjustment located on the top of the Discriminator transformer until the meter reading has the same value regardless of whether the "Manual-Electric" control knob is rotated to the "Manual" or "Electric" position. When this condition is obtained, the Discriminator circuit 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 "Manual-Electric" control knob should be rotated to the "Manual" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass" control knob should also be set for "Normal" operation.

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 16 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "C" 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. 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 Medium Wave 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 5 megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. **Adjust** the R. F. interstage "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. 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.
5. Set the test oscillator's frequency and the receiver's tuning dial to 1.8 megacycles.
6. 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.
7. Reset both the test oscillator's frequency and the receiver's tuning dial to 5 megacycles and repeat operations Nos. 2, 3 and 4.

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 1.5 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" band high frequency aligner for maximum output.
4. Adjust the antenna's "A" band high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. 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.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

FOR PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS, INSTRUCTIONS FOR SETTING UP ELECTRIC TUNING ARRANGEMENT, Wave Trap Adjustment, – SEE MODELS 235

Used only on No. 245-P Receivers

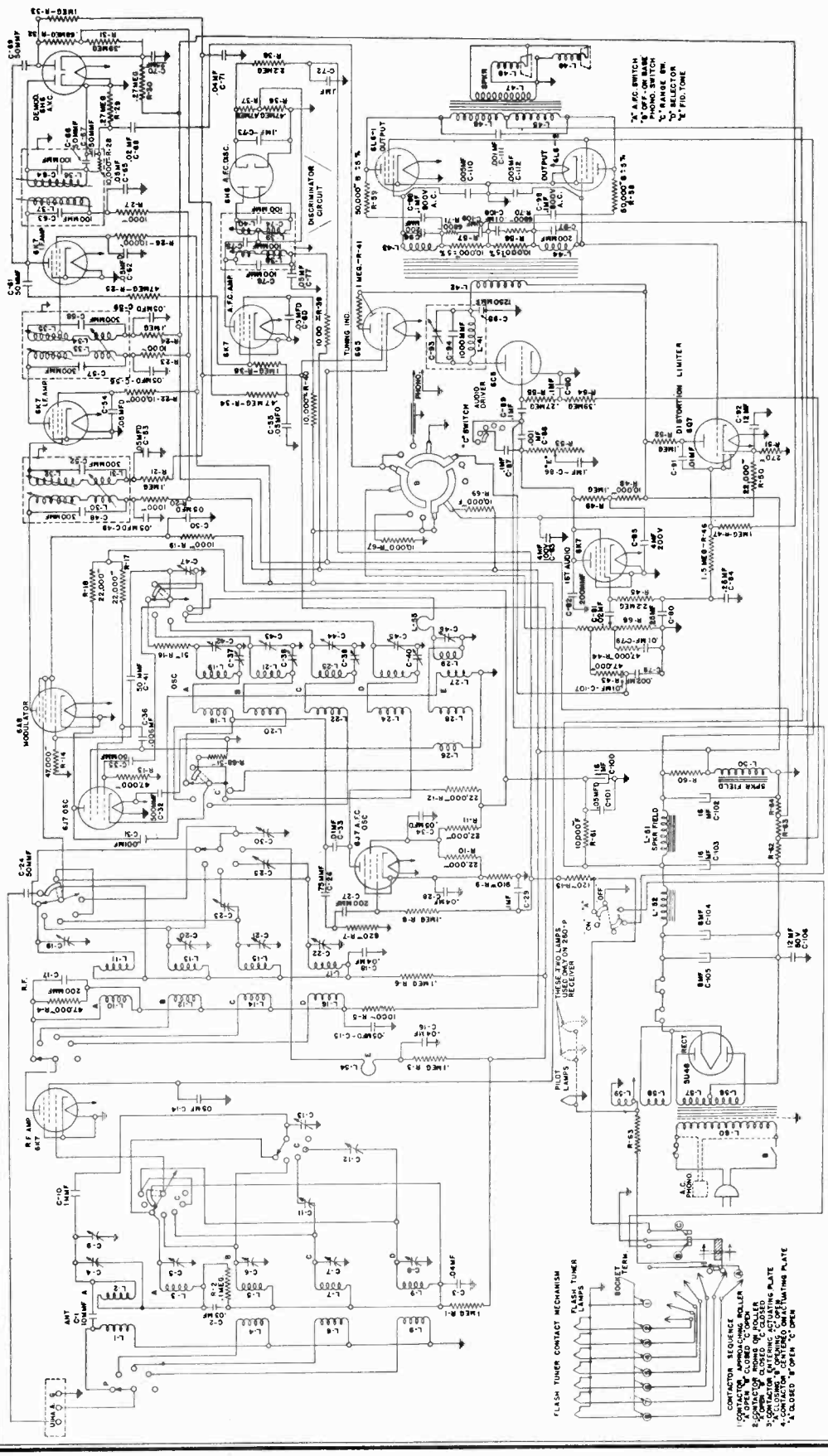
Piece Number	Schematic Circuit Designation	Part
18408	C67, C68	Electrolytic Capacitor, 16 Mfd., 25 Volts, cond.10
18604	C48, C69	Capacitor, Type "S", 100 Mmfd. Mfd., 25 Volts
56528	R39	Resistor, Type "F", 15,000 Ohms
56529		Tube Socket, 8 Prong
58514	L36	R. F. Choke Coil
58131	C47	Capacitor, .008 Mfd.
58509	L39	Choke Assembly
58507		Pilot Lamp
56523	R35, R40	Resistor, Type "E", 125 Ohms
56525	R37	Resistor, Type "F", 250 Ohms
56522	R8	Resistor, Type "E", 1000 Ohms
56545	R6	Resistor, Type "E", 10,000 Ohms
56546	R11	Resistor, Type "E", 25,000 Ohms
56533	R3, R4, R9, R13, R34	Resistor, Type "E", 50,000 Ohms
56527	R1, R2, R7, R12, R32, R36, R44	Resistor, Type "E", .1 Megohm
56507	R10, R18, R33, R35, R39	Resistor, Type "E", .27 Megohm
56505	R15, R21, R23, R37, R45	Resistor, Type "E", .47 Megohm
56509	R16, R30, R41	Resistor, Type "E", 1 Megohm
56571	R38, R43	Resistor, Type "E", 2.2 Megohms
56491		Tuning Indicator Cable Assembly
58604	C17, C19	Capacitor, Oscillator Low Frequency Aligners
56078		Socket, Phone-Jack
56715	R19	Resistor, Type "F", 50,000 Ohms
57012	C37, C51, C52, C49, C60	Capacitor, Fixed Tuning, 100 Mmfd.
57001	C6	Capacitor Aligning
57101	C55	Capacitor, Type "O", 300 Mmfd.
57170		Pulley Assembly
57108	C8, C9, C53, C50, C20, C30, C54, C40, C41	Capacitor, Two .05 Mfd., 400 Volts
57110		Spring
57183	C61	Electrolytic Capacitor, 16 Mfd., 300 Volts
57155	R35	Resistor, Type "F", 35,000 Ohms
57154	L37, L38	Output Transformer
57141		Dial Hub Plate
57142	C5, C4, C3, C16, C11, C13, C14, C15, C90	M. F. Aligners for Antenna, R. F. and Oscillator
57143	L1	Coil Assembly, Wave Trap
57150		Belt
57159	L20, L21, L22, L23	Power Transformer (25 to 60 Cycles Chassis)
57160	L24, L25, L26, L28	Power Transformer (25 to 60 Cycles Chassis)
57196		Range Switch Assembly
57826		Mask Assembly (Selectorlite Dial)
57827		Arm Assembly (Mask Actuator)
57828		Rod, Mask (Actuator)
57830		Dial (Tuning)
57864	L2, L3, L4, L5, L6, L7	Coil Assembly, Antenna Transformer
57865	L8, L9, L10, L11, L12, L13	Coil Assembly, R. F. Transformer
57866	L14, L15, L16, L17, L18, L19	Coil Assembly, Oscillator Transformer
57905	C46, C89	Capacitor, Type "O", 50 Mmfd.
57915		Switch for Fidelity Control
57814	L29, L31, L32	First I. F. Transformer
57838		Indicator, Frame Assembly
57839	C62	Electrolytic Capacitor, 16 Mfd., 200 Volts
57837	C63	Capacitor, Type "W", .004 Mfd.
57849		Switch, "Off-On-Bass" (Used on Radio Models only)
57541	R36	Resistor, Flexible 500 Ohms
57974	R31, R33	Resistor, "B" Voltage Divider
57607	R56	Resistor, Type "KB", 22,000 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
	Knob Assembly (Used on "Volume", "Range Switch" and "Off-On-Bass" Knob)
	Knob Assembly (For "Fidelity" Shaft)
	Knob Assembly (For "Rapid Station Selector" Control Shaft)
	Knob Assembly (For "Manual-Electric" Control Shaft)
	Pad Washer (For "Rapid Station Selector" Control Shaft)
	Pad Washer (Used on "Volume", "Fidelity", "Range Switch" and "Off-On-Bass" Knob)
	Pad Washer (For "Manual-Electric" Control Shaft)
	Bushing Strip for "Rapid Station Selector" Control Shaft
	Bushing Strip for "Manual-Electric" Control Shaft
	Pilot Lamp Bracket Assembly
	Pilot Lamp Socket Assembly for Tuning Dial
	Drive Rod for "Rapid Station Selector" Control Switch
	Drive Rod for "Manual-Electric" Control Switch
	Cable and Bracket Assembly for "Manual-Electric" Control
	Rod Assembly for "Manual-Electric" Control Switch
	Coil Assembly for "Manual-Electric" Control Switch
	Cord, Power Supply for Phono Motor
	Shielded Cord Assembly
	Pilot Lamp Bracket Assembly

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 260L,-LB
260P,-PB
Schematic,Specs.



IF PEAK 465 KC

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne with Automatic Frequency Control
Tuning Ranges	A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc. D—11,000 to 22,000 Kc.; E—22,000 to 60,000 Kc.
Number and Types of Tubes	5 No. 6K7; 1 No. 6A8; 2 No. 6J7; 2 No. 6H6; 1 No. 6C5; 1 No. 6Q7; 2 No. 6L6; 1 No. 6G5; 1 No. 5U4G
Input Voltage Rating	105 to 125 Volts, A. C.
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating:	
No. 260-L	185 Watts
No. 260-P	260 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

Stromberg-Carlson

No. 260 Radio Receivers

MODEL 260 Series
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

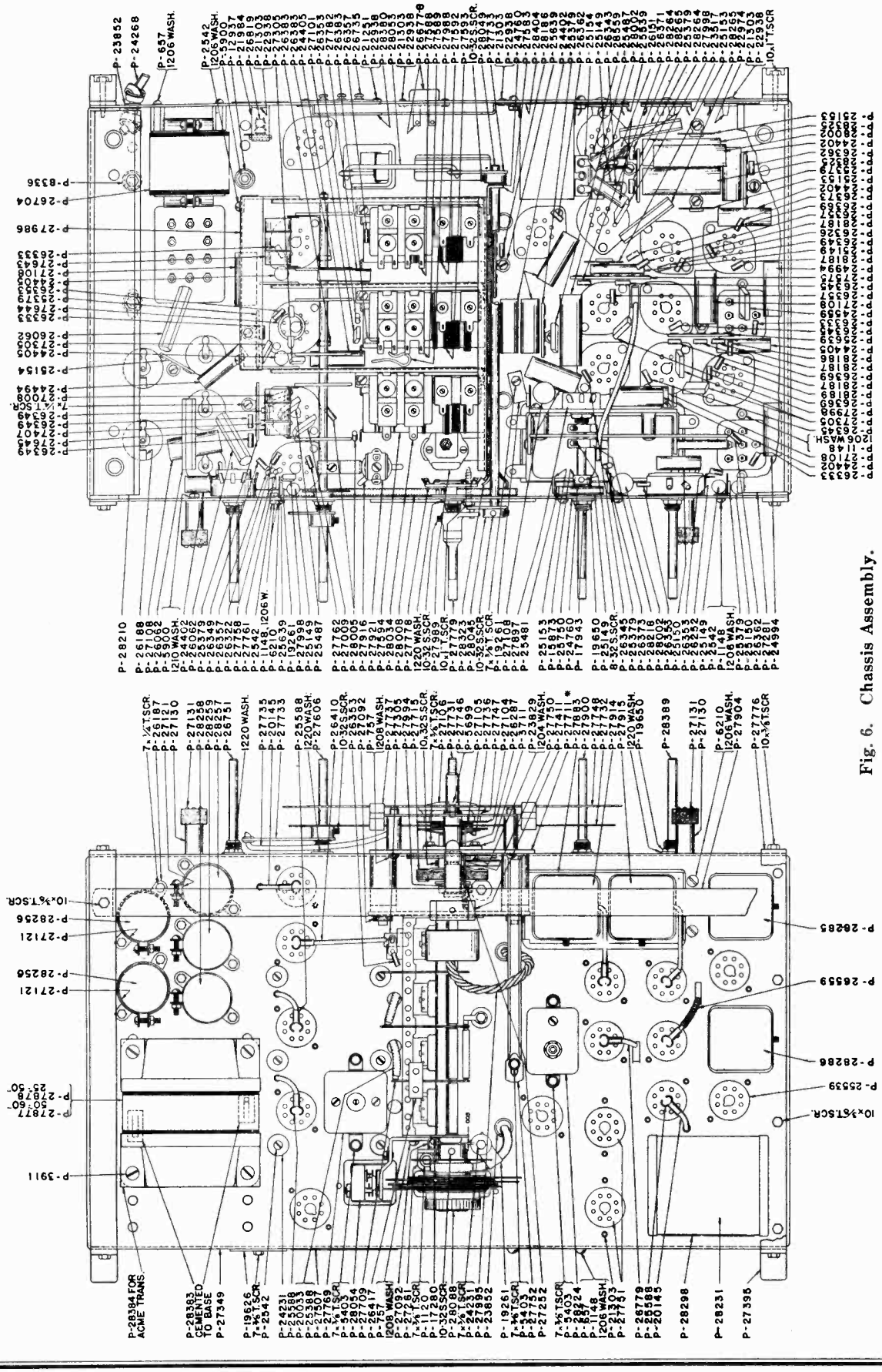
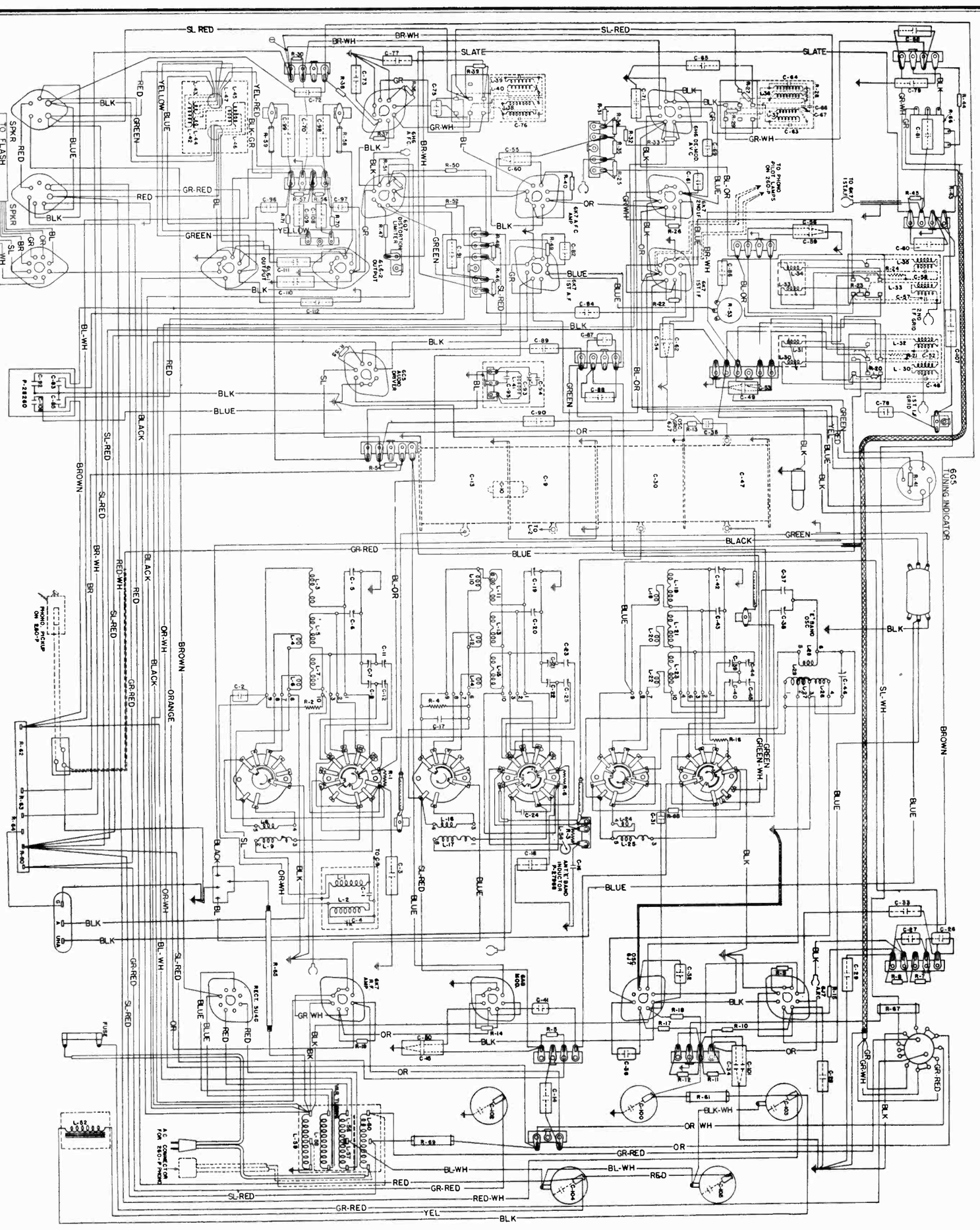


Fig. 6. Chassis Assembly.



PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base of the No. 260-L Receiver, 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 when using an electric pick-up and phonograph unit with 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. 260-L 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 plug 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.

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.

			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	+235	+90	0	+85	*6.3*	0	2-7	*6.3*
6A8	Modulator	0	0	0	+235	+85	—1.8	+85	*6.3*	0	2-7	*6.3*
6J7	Oscillator	0	0	*6.3*	+80	+185	0	0	0	0	2-7	*6.3*
6J7	Oscillator Control	0	0	0	+195	+115	+5.8	0	*6.3*	+5.8	2-7	*6.3*
6K7	1st I. F. Amp.	0	0	0	+235	+75	0	+92	*6.3*	0	2-7	*6.3*
6K7	2nd I. F. Amp.	0	0	0	+235	+75	0	+92	*6.3*	0	2-7	*6.3*
6H6	Demodulator —A. V. C.	—	0	0	—0.2	0	0	—1.4	*6.3*	0	2-7	*6.3*
6K7	A. F. C. Amplifier	0	0	0	+235	+75	0	+92	*6.3*	0	2-7	*6.3*
6H6	A. F. C. Discriminator	—	0	0	—0.2	0	—0.2	—0.2	*6.3*	0	2-7	*6.3*
6K7	1st Audio Amp.	0	0	0	+48	+48	0	—1.4	*6.3*	0	2-7	*6.3*
6C5	Audio Amp. Driver	—	0	0	+220	—0.1	—0.1	—	*6.3*	0	2-7	*6.3*
6Q7	Full Power Quality Control	0	0	0	+165	0	0	—20	*6.3*	+1.0	2-7	*6.3*
6L6 (No. 1)	Audio Output	—	0	0	+400	+275	—22	—	*6.3*	0	2-7	*6.3*
6L6 (No. 2)	Audio Output	—	0	0	+400	+275	—22	—	*6.3*	0	2-7	*6.3*
6G5	Tuning Indicator	—	*6.3*	+15*	—1.4	+240	—2.5	0	—	—	1-6	*6.3*
5U4G	Rectifier	—	0	+410	—	*420*	—	*420*	—	+410	2-8	*5.1*
Speaker Socket (6 Prong)		—	+245	—	+410	+410	0	0	—	—		
Speaker Socket (7 Prong)		—	+505	0	0	+415	+415	—	+270	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

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.

ALIGNMENT DATA

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 these receivers has a complex circuit arrangement. 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-Phonograph" control knob to its "Normal" position. **Never attempt to align the R. F. or I. F. circuits of these receivers 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. 6K7 tube used in the second I. F. amplifier, a modulated signal of 465 kilocycles 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. 6K7 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 ground binding post terminal.
3. Now, noting from Figure 1, the alignment adjustments for the I. F. circuits proceed in the following order:

   Adjust the third I. F. transformer primary circuit for maximum output.

   Adjust the third I. F. transformer secondary circuit for maximum output.
4. Remove the lead connecting the signal generator (through the 0.1 mfd. capacitor) to the grid of the No. 6K7 tube of the second I. F. amplifier and connect this lead to the grid of the No. 6K7 tube of the first I. F. amplifier; then align in the following order:

   Adjust the second I. F. transformer secondary circuit for maximum output.

   Adjust the second I. F. transformer primary circuit for maximum output.
5. Remove the signal generator lead connecting to the grid of the No. 6K7 tube of the first I. F. amplifier and connect it to the grid of the No. 6A8 modulator tube; then align in the following order:

   Adjust the first I. F. transformer secondary circuit for maximum output.

   Adjust the first I. F. primary circuit for maximum output.
6. Check all the above adjustments again with the signal generator lead connected to the grid of the No. 6A8 modulator tube and in the order as given above.

Carefully make all the above adjustments, carefully watching the output meter and reduce the output of the test oscillator as required.

Adjustment of the Discriminator Tuned Circuits

To properly adjust the tuned circuits of the discriminator transformer, 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 and signal generator are exactly in resonance at 465 kilocycles.** Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the junction of the resistors R-37, R-38 and the chassis base. It is preferable to use the 500 volt scale of this meter in order that the load imposed on the discriminator circuit will not be too great. The D. C. milliammeter previously mentioned should be connected in series with the cathode of the No. 6J7 oscillator control tube exactly as described in the second paragraph of the Alignment Data. The signal generator should remain connected to the grid of the No. 6A8 modulator tube the same way as connected when making the aligning adjustments of the I. F. Amplifier circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Now, slightly detune the secondary circuit of the Discriminator transformer so that a fair voltage indication is obtained on the high resistance voltmeter connected across the junction of the resistors R-37, R-38, and the chassis base, and then adjust the primary circuit of the Discriminator transformer until a maximum reading is obtained on the voltmeter. Now, again adjust the secondary circuit of the Discriminator transformer so that zero reading is obtained on the voltmeter. Care should be taken that the meter does not read below zero.

CAUTION: In order to make sure that this adjustment of the secondary circuit of the Discriminator transformer has been correctly made, the adjusting screw should be turned gradually so that the indicator of the voltmeter will first return to zero, and then while continuing to turn this screw in the same direction, will go slightly below the zero mark, after which the screw should be turned in the opposite direction until the indicator is again brought back to the zero mark. If the above described condition cannot be obtained, this adjusting screw adjustment for the secondary circuit of the Discriminator transformer has been rotated in the wrong direction, and it will be necessary to carefully turn it in the opposite direction. After this adjustment has been made, it will not be necessary to use the voltmeter any more and it can be removed from the receiver circuit.

When the above adjustments have been carefully made, the milliammeter connected in the cathode circuit of the No. 6J7 oscillator control tube should be observed, and if the tuned circuits of the discriminator transformer are correctly adjusted there should be no difference in the reading of this milliammeter when the A. F. C. control knob is rotated from the "off" to the "on" position. If the above condition does not exist, the secondary circuit of the Discriminator transformer should be readjusted until the milliammeter has the same value regardless of whether the A. F. C. control knob is rotated to the "on" or "off" position.

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 terminals 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.

Instructions for Setting Up the A. F. C. Flash Tuning Unit

1. Remove the flash tuner lamp unit escutcheon plate by removing the four screws.
2. Remove the lists of station letters from the P-28420 package assembly which is tacked inside of the cabinet.
3. Remove the seven paper squares on which are printed the words "Tone", "Beauty", "Value", "Action", "Flash", "Tuning", and "Radio" from the square frames located on the rear side of the lamp unit escutcheon plate.
4. Remove the station letters of the seven stations which it is desired to set up in the flash tuning unit from the list of stations. It will be noted that the letters of the stations are printed on partly cut squares to facilitate ease in removing the desired letters. Insert one of these seven station letters into each frame of the flash tuner lamp unit. The recommended method of inserting these station letters into the frames of the escutcheon plate is to arrange them according to the frequency of the stations as follows:

   Looking at the front of the escutcheon plate the station having the highest frequency should appear in the top right-hand frame, and then in successive order according to frequency the remaining station letters should be inserted into the other frames; the top left-hand frame containing the station letters of the station having the lowest frequency. In inserting these letters into the frames be sure to have the letters located between two pieces of transparent material.
5. Fasten the escutcheon plate again to the lamp unit by means of the four screws. The receiver is now ready to be operated and the flash tuning unit contactors located on the rear of the chassis base adjusted for the seven favorite stations.
6. Rotate the "On-Off-Bass-Phonograph" Control knob from its complete counter-clockwise position, slightly clockwise from this position which turns the set "on" (indicated by illumination of the dial). Allow the receiver to reach operating temperature (about 15 minutes) before proceeding with setting up the flash tuning mechanism. Check the position of the Automatic Frequency Control knob which should be rotated to the "Off" position, and set the Fidelity Control knob to the "Normal" position. Now carefully tune in the desired station having the highest frequency, watching the tuning indicator so that the receiver will be exactly tuned to this station.
7. After carefully tuning in the desired station rotate the A. F. C. Control knob to the "On" position. Now, noting from Figure 3, the sketch which shows the contactor clamping frame and knurled nut, hold the clamping frame with one hand and loosen the knurled nut with the other hand. Then move the contactor, numbered 2, so that its point is engaged between the two small rollers of the switching mechanism as also shown in Figure 3. When the point is properly engaged between the rollers, the lamp of the lamp unit which is located behind the station letters of the station being tuned in will light. When this condition is obtained, retighten the large knurled nut and at the same time securely hold the gang tuning capacitor and the contactors from rotating by means of the extended portion of the contactor clamping frame. **It is extremely important to keep the gang tuning capacitor and the contactors from rotating when tightening the large knurled nut.**
8. Now rotate the A. F. C. Control knob to the "off" position and note whether the tuning has been shifted by watching the tuning indicator. If a change is noted it will be necessary to repeat operation No. 7.
9. When no change is noticed after performing the above operations Nos. 7 and 8, the remaining six favorite stations should be set up in the same manner.

   With the A. F. C. flash tuning unit in operation, the receiver will be automatically kept in tune with any one of the seven favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the flash tuning unit, it will be found that the Automatic Frequency Control will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

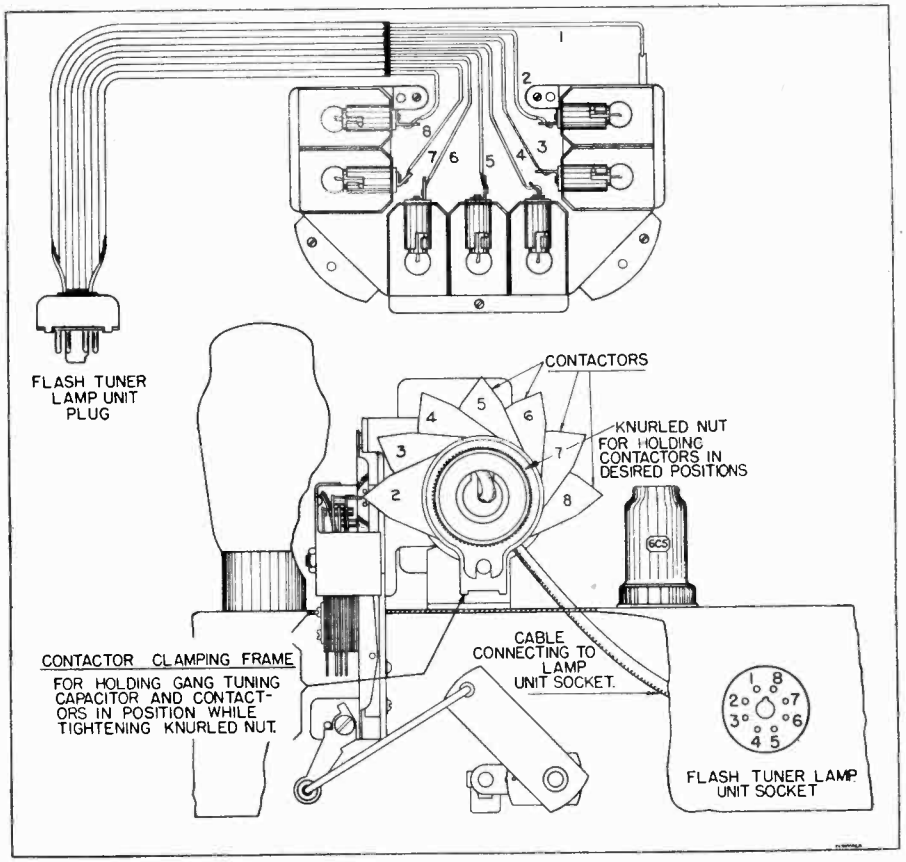


Fig. 3. Showing Flash Tuner Lamp Unit With Escutcheon Plate Removed (Top Figure) and Rear View of Receiver Showing Flash Tuner Mechanism (Bottom Figure).

A. F. C. FLASH TUNER PARTS

24760		Spring Washer
28045		Lever
28053		Rod for Actuating A. F. C. Switching Mechanism
28054		Lever and Spring Combination
28088		Contactors' Assembly
28097		Contact Disc for Contactor
28098		Contactor
28099		Insulation Disc between Contactors
28100		Clamping Plate
28102		Blue Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102		Orange Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102		Green Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102		Brown Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102		Slate Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102		White Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102		Red Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28296		Locking Ring Spring
28323		A. F. C. Switch Cable Assembly
29437	R50	Resistor, Flexible, 10 Ohms

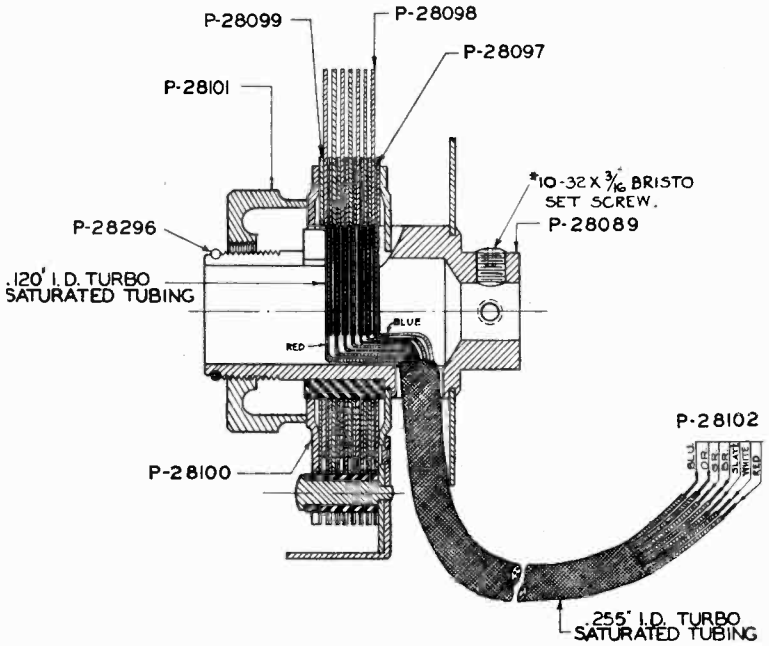


Fig. 5. Section View of Flash Tuner Contactors Assembly.

MISCELLANEOUS PARTS

27800		Knob Assembly (Used on Volume, Range Switch and Off-On-Bass-Phonograph Controls' Shafts)
27801		Knob Assembly (Used on Fidelity and A. F. C. Controls' Shafts)
27802		Knob Assembly (For Rapid Station Selector Control Shaft)
27803		Knob Assembly (For Vernier Station Selector Control Shaft)
27628		Felt Washer (Used on Volume, Fidelity, Range Switch, A. F. C., and Off-On-Bass-Phonograph Controls' Shafts)
27630		Felt Washer (Used on Rapid Station Selector Control Shaft)

APPARATUS SPECIFICATIONS

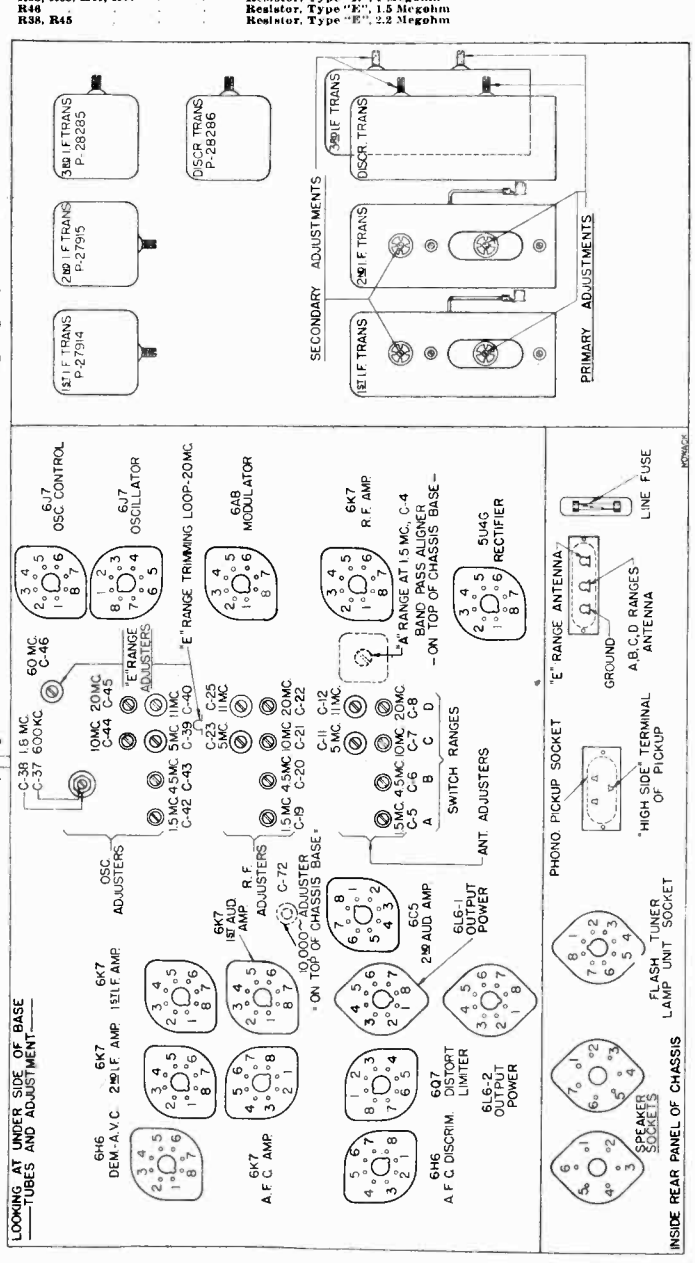
No. 260-L	50 to 60 Cycles; P-27992 Chassis; P-26170 and P-27827 Loud Speakers
No. 260-LB	25 to 60 Cycles; P-27993 Chassis; P-26170 and P-27827 Loud Speakers
No. 260-P	60 Cycles Only; P-27992 Chassis; P-26170 and P-27827 Loud Speakers; No. 7 Automatic Phonograph Unit
No. 260-PB	25 Cycles Only; P-27993 Chassis; P-26170 and P-27827 Loud Speakers; No. 7-B Automatic Phonograph Unit

MODEL 260 Series
Socket, Trimmers **STROMBERG-CARLSON TEL. MFG. CO.**
Parts List

REPLACEMENT PARTS

Piece Number	Schematic Circuit Designation	Part	28264	R56, R57	Resistor, Type "E", 10,000 Ohms
21984		Fuse Block Assembly	28265	R58, R59	Resistor, Type "B", 50,000 Ohms
22974		Tube Socket, 6 Prong	28285	L36, L37	Third I. F. Transformer
23517		Tube Socket, 7 Prong	28286	L38, L39, L40	Fourth I. F. (Discriminator) Transformer
24268		Cord, Power Supply	28301	C93	Adjustable Capacitor, High Frequency Cut-Off Filter
24314	C1	Capacitor, Type "O", 10 Mmfd.	28325	C98, C99	Capacitor, .1 Mfd., 800 Volts
24402	C29, C86, C87, C89, C90	Capacitor, .1 Mfd.	28380	R60, R62, R63, R61	Resistor, "B" Voltage Divider
24405	C8, C16, C18, C28, C55, C71	Capacitor, .04 Mfd.	28389	R66	Potentiometer, Volume Control
24560	C66, C67	Capacitor, Type "O", 50 Mmfd.	28405		Connector Assembly
24994	C15, C65, C77	Capacitor, .05 Mfd.	28410		Lever Assembly
25149	C33, C79, C91, C107, C108, C109	Capacitor, .01 Mfd.	28459	C111	Capacitor, .001 Mfd., 1600 Volts
25150	C68, C81	Capacitor, .02 Mfd.			
25481	C78	Capacitor, .002 Mfd., 400 Volts			
25483	C72, C73	Capacitor, .1 Mfd., 400 Volts			
25487	C31, C88, C94	Capacitor, Type "W", .001 Mfd.			
25489	C95	Capacitor, Type "W", .00125 Mfd.			
25539		Tube Socket, 8 Prong			
26062	R61, R67, R69	Resistor, Type "F", 10,000 Ohms			
26181	C110, C112	Capacitor, .005 Mfd., 400 Volts			
26178	L51	P-26170 Loud Speaker Field Coil (1050 Ohms)			
26250	L48	Voice Coil and Cone Assembly (P-26170 Loud Speaker)			
26250	L49	Voice Coil and Cone Assembly (P-27827 Loud Speaker)			
26287		Pilot Lamp			
26322	R15	Resistor, Type "E", 120 Ohms			
26326	R51	Resistor, Type "E", 270 Ohms			
26333	R5, R19, R20, R23, R27, R39	Resistor, Type "E", 1000 Ohms			
26343	R70, R71	Resistor, Type "E", 6800 Ohms			
26345	R22, R26, R28, R40, R48	Resistor, Type "E", 10,000 Ohms			
26349	R10, R11, R12, R17	Resistor, Type "E", 22,000 Ohms			
26353	R4, R13, R14, R25, R43, R44	Resistor, Type "E", 47,000 Ohms			
26357	R1, R8, R21, R24, R49, R52	Resistor, Type "E", .1 Megohm			
26362	R29, R30, R55	Resistor, Type "E", .27 Megohm			
26369	R33, R35, R41, R47	Resistor, Type "E", 1 Megohm			
26371	R46	Resistor, Type "E", 1.5 Megohm			
26373	R38, R45	Resistor, Type "E", 2.2 Megohm			

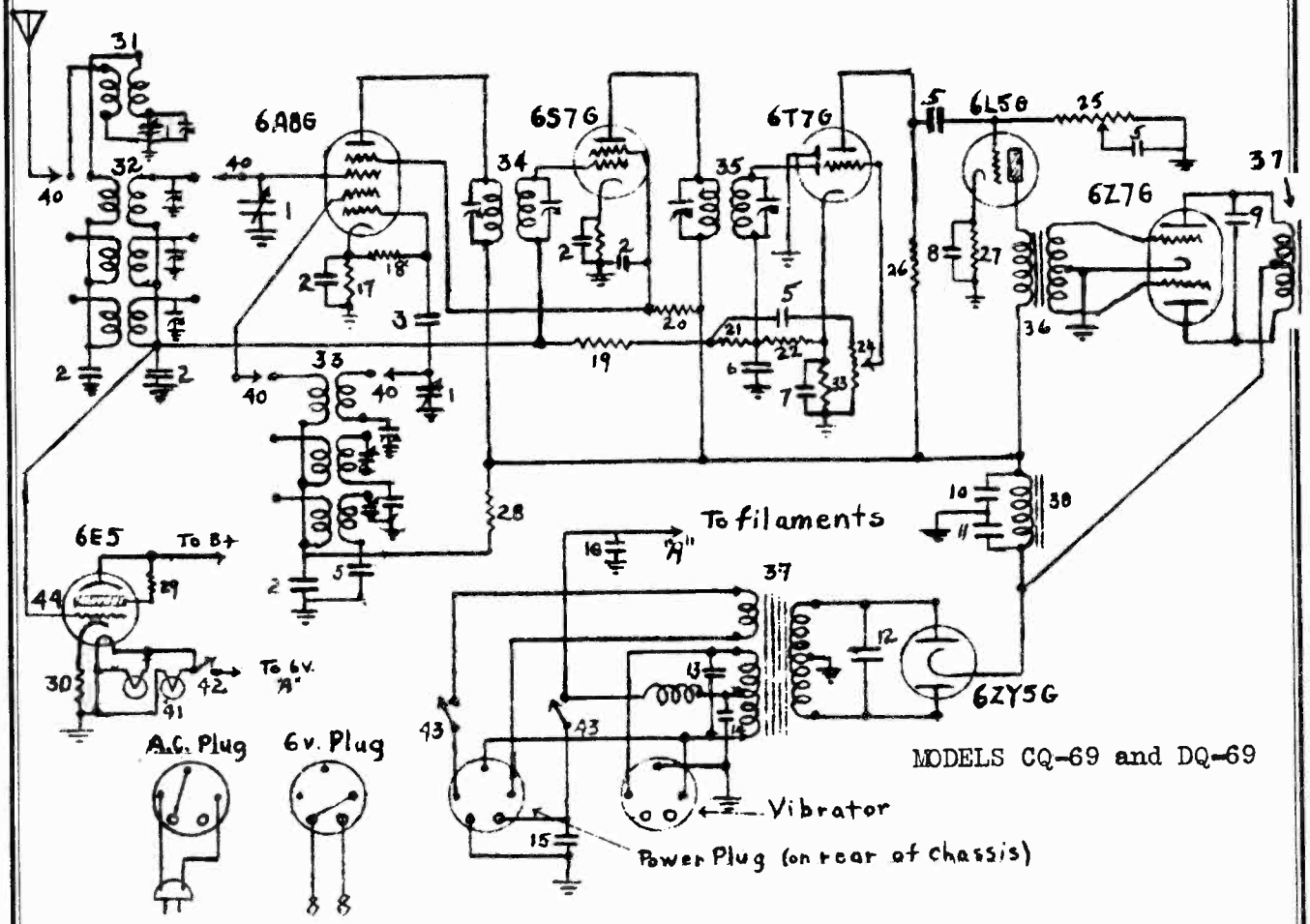
Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.



26383	R2, R3, R6	Resistor, Type "E", .1 Megohm	27758	C26	Capacitor, Type "O", 75 Mmfd.
26417	C10	Capacitor	27761	R7	Resistor, Type "E", 620 Ohms
26677		Plug for Phonograph Pickup	27762	R9	Resistor, Type "EB", 810 Ohms
26678		Socket for Phonograph Pickup	27778		Switch, A. F. C.
26734	L52	Choke Assembly	27779		Crank Arm
26735		Antenna Ground Binding Posts	27782	C2	Capacitor, .03 Mfd.
26751		Switch Assembly, "Off-On-Base-Phonograph" Control	27787	L56, L57, L58, L59, L60	Power Transformer (60 to 80 Cycles Chassis)
26819		Fuse, 5 Amperes	27788	L56, L57, L58, L59, L60	Power Transformer (25 to 60 Cycles Chassis)
27008	C36	Capacitor, Type "W", .006 Mfd.	27802	C4	Capacitor, R. F. Aligner for "A" Range Antenna Transformer
27009	C32	Capacitor, Type "E", 500 Mmfd.	27807	L30, L31, L33, L34	Coil and Bracket Assembly
27010	C24	Capacitor, Type "O", 100 Mmfd.	27807	R33	Potentiometer, Tone Fidelity Control
27101	C17	Capacitor, Type "O", 200 Mmfd.	27808	L50	Field Coil Speaker Field Coil (3425 Ohms)
27108	C14, C34, C49, C50, C54, C56, C59, C60, C62, C101	Capacitor, Two, .05 Mfd.	27814	L49	P-27827 Loud Speaker Field Coil
27305	C24, C35, C41, C61, C89	Capacitor, Type "O", 50 Mmfd.	27815	L35	First I. F. Transformer
27306	C25, C32, C91, C96, C75	Fixed Condenser, 300 Mmfd.	27915	L26, L27, L28, L29	Second I. F. Transformer
27407	R18, R56	Resistor, Type "EB", 22,000 Ohms	27921	C16	Oscillator Transformer, "E" Range
27588	C5, C6, C7, C8, C11, C12	Capacitors, Aligning	27938	C17	Antenna Transformer Tuning Loop, "E" Range
27589	C19, C20, C21, C22, C23, C25	Capacitors, Aligning	27989	C37, C38	Fixed Condenser, 1500 Mmfd., Range Oscillators
27592	L9, L14, L5, L6, L7	Hi-Resonator Coil "A" Range Antenna Transformer "B" and "C" Ranges	27994		Pilot Lamp Socket Assembly
27593	L13, L14, L15, L16, L17	Antenna Transformer "A", "B", and "C" Ranges	27995		Cable Assembly (Tuning Indicator Unit)
27594	L18, L19, L20, L21, L22, L23	Oscillator Transformer "A", "B", and "C" Ranges	27998	C27, C83, C98, C97	Capacitor, Type "O", 300 Mmfd.
27608		Range Switch Assembly	28003	C70, C80, C84	Capacitor, .25 Mfd., 150 Volts
27638	L1, L2	Antenna Transformer, "A" Range	28005	R16, R68	Resistor, Type "EB", 1 Ohm
27641	L10, L11	Antenna Transformer, "B" Range	28008		Cable Assembly, Phonograph Switch to Pickup Socket
27644	L12, L47	Antenna Transformer, "C" Range	28031	C39, C40, C42, C13, C44, C45	Capacitors, Aligning
27645	L24, L25	Oscillator Transformer, "D" Range	28186	R31, R54	Resistor, Type "EB", .39 Megohm
27710	C9, C13, C30, C47	Gang Tuning Capacitor	28187	R15, R36, R37	Resistor, Type "EB", .68 Megohm
27715		Coupling Assembly (Tuning Drive)	28189	R32	Resistor, Type "EB", .18 Megohm
27730		Gear and Bracket Assembly	28225		High Frequency Cut-Off Filter
27731		Dial Plate Assembly	28231	L41	Solenoid, High Frequency Cut-Off Filter
27732		Mask Assembly	28232	L42, L43, L44, L45, L46, L47	Audio Input and Output Transformer Assembly
27733		Lever Assembly, Mask Actuator	28236	C101, C105	Electrolytic Capacitor, 8 Mfd., 500 Volts
27735		Rod	28237	C103	Electrolytic Capacitor, 8 Mfd., 450 Volts
27737		Indicator Frame Assembly	28238	C102	Electrolytic Capacitor, 16 Mfd., 300 Volts
27745		Dial Plate	28239	C100	Electrolytic Capacitor, 16 Mfd., 300 Volts
27751		Tube Socket, 8 Prong	28240	C85, C86, C92, C106	Electrolytic Capacitor, 4 Mfd., 100 Volts; 4 Mfd., 200 Volts; 12 Mfd., 50 Volts; 12 Mfd., 50 Volts

MODELS CQ-69,DQ-69
Schematic,Data

L. TATRO PRODUCTS CORP.



1	Gang condenser	16	.25 mfd.	31	Preselector coil
2	.10 mfd.	17	400 ohms	32	Antenna coil
3	.00025 mfd	18	25M ohms	33	Oscillator coil
4	.002 mfd.	19	1 megohm	34	Iron core I.F.
5	.01 mfd.	20	50M ohm	35	I.F. coil
6	.00025 mfd.	21	25M ohm	36	Input trans.
7	10 mfd. electr.	22	½ megohm	37	Speaker
8	5 mfd. electr.	23	5M ohms	38	Filter choke
9	.0025 mfd.	24	½ meg. control	39	Power trans.
10	8 mfd. electr.	25	Tone control	40	Band switch
11	16 mfd. electr.	26	¼ megohm	41	Pilot lights
12	.005 mfd. 1600 v.	27	1500 ohms	42	Tuning eye and dialite switch
13	10 mfd. electr.	28	10M ohms		
14	.5 mfd.	29	½ megohm	43	Power switch
15	.10 mfd.	30	1500 ohms	44	Tuning eye

The DQ-69 is a console model; the CQ-69 is a table model. The antenna should be as high as possible and about 100 feet long. A good ground is essentaal for good reception. The blue wire from the set is the antenna lead. If the set is to be operated on 110 volts continuously, the vibrator should be removed.

MODELS CQ-69,DQ-69
Alignment,Socket
Voltage

L. TATRO PRODUCTS CORP.

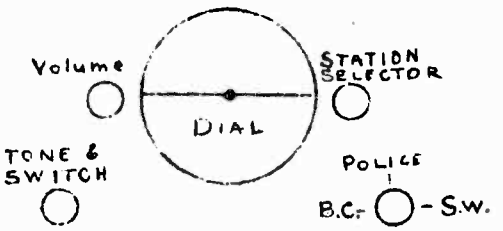
MODELS CQ-69 and DQ-69

-- VOLTAGES --

Plates 6A8G,6S7G,6L5G, 6Z7G and oscillator grid of 6A8G ...	140 v.
Plate 6T7G	12 v.
Screens 6A8G and 6S7G	40 v.
Cathodes: 6A8G and 6S7G	1.5 v.
6T7G	.5 v.
6L5G	5 v.

Voltages when set is on AC are higher.

Knob arrangement



MODELS CQ-69 and DQ-69

Model CQ-69 (table model) and DQ-69 (Console) may be operated on either 6 volts DC or 110 volts AC. A separate cord is provided for each voltage. A nonsynchronous vibrator in conjunction with a type 6ZY5G rectifier furnishes high voltage. The vibrator should be removed if the set is to be operated on 110 volts continuously.

--- ALIGNMENT PROCEDURE ---

Turn dial to closed gang position to make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust the I.F. coils to 456 KC.

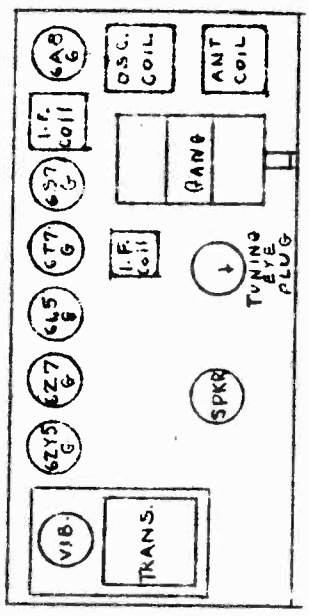
Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmers in antenna and oscillator coils to maximum output.

Switch to police band (middle band) set dial at 5 MC and adjust the second trimmers from the bottom to maximum output.

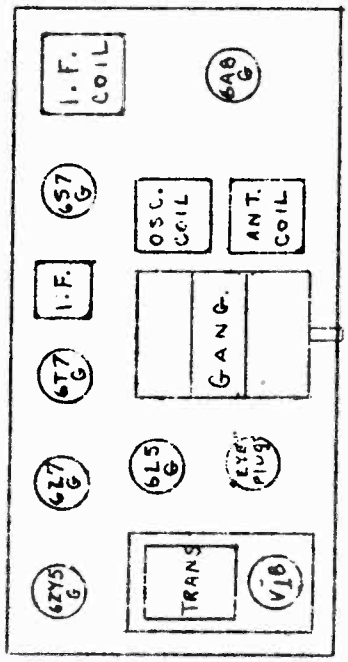
Switch to broadcast, set dial at 1400 KC and adjust the third trimmers from the bottom. Then adjust the padder located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.

The type 6A8G tube has been found to give better oscillator performance than the 6D8G and is used in present production. The switch which turns the tuning eye and dialites off and on is located on the back of the panel.

Chassis layout CQ-69

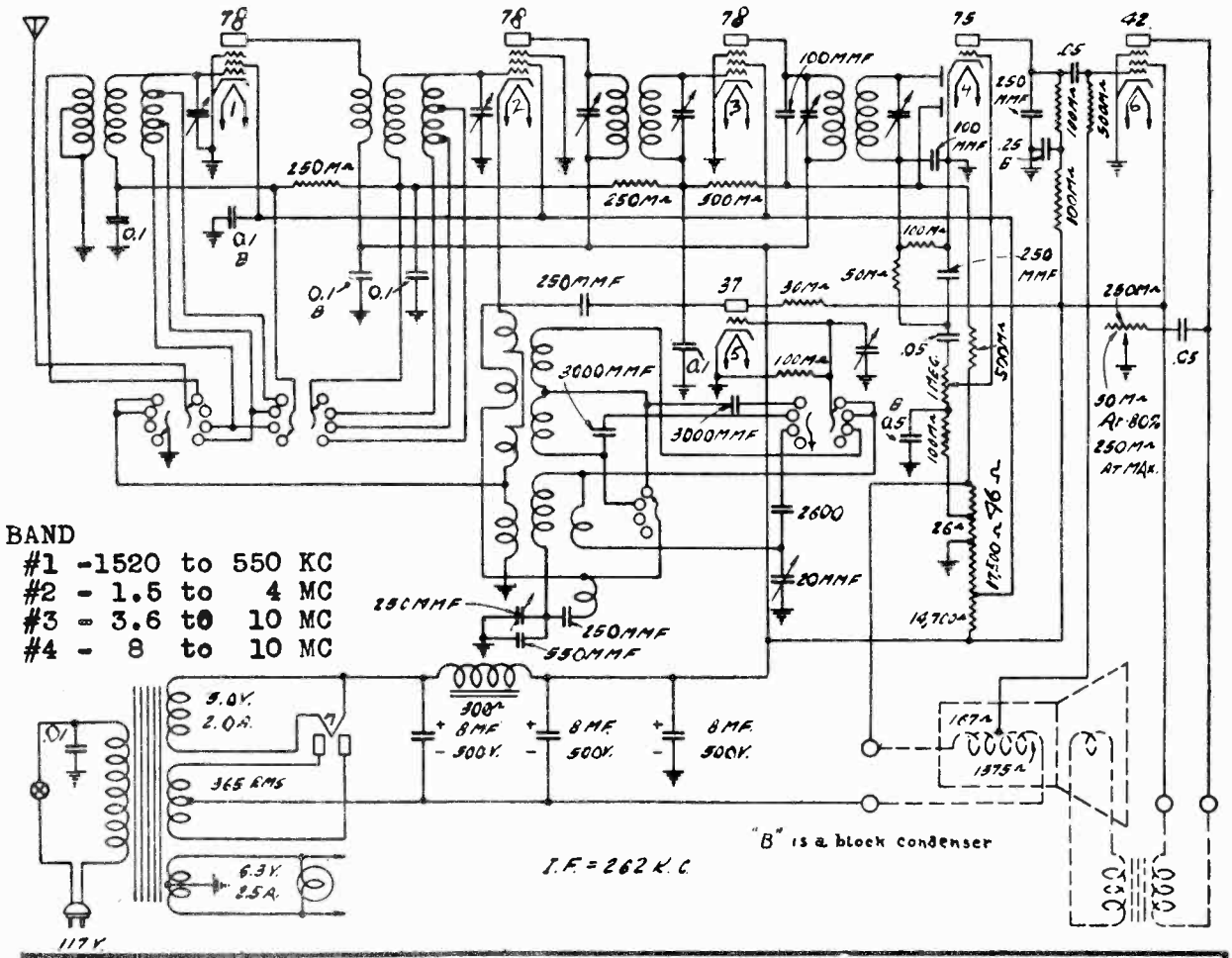


Chassis layout DQ-69



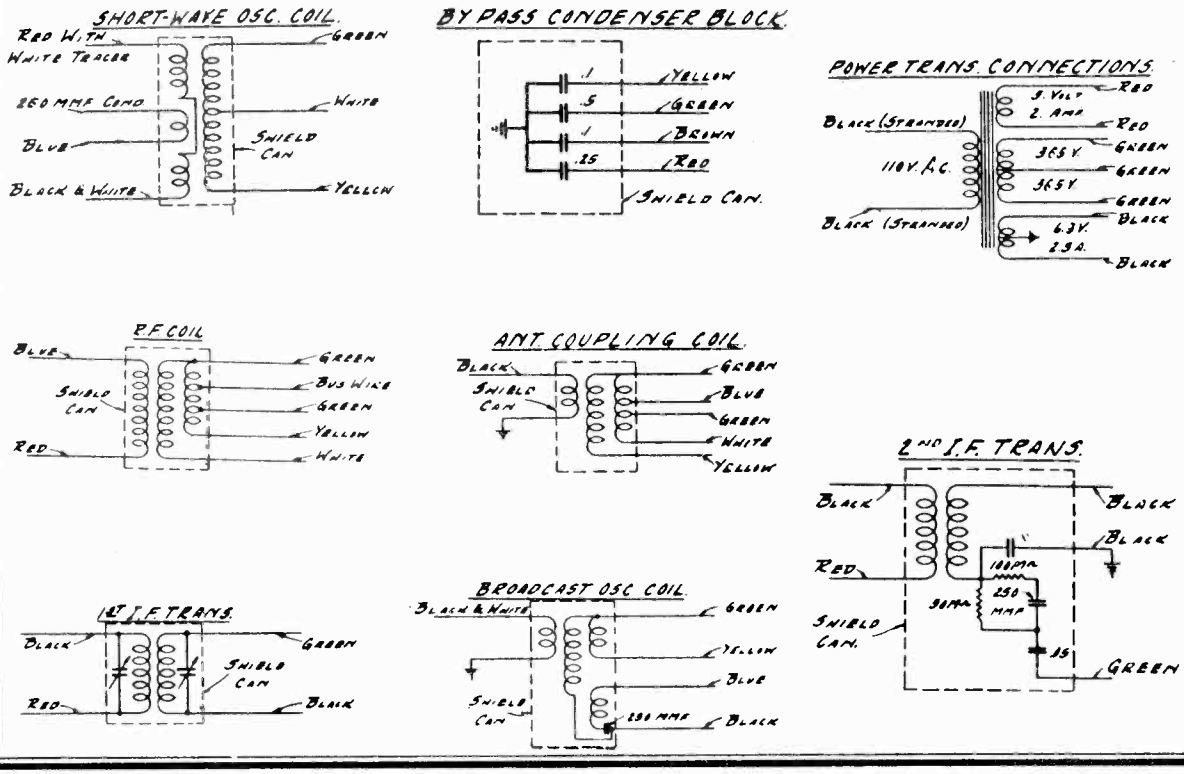
MODELS TC1, TC2
Schematic, Coils

TRANSFORMER CORP. OF AMER.



BAND
#1 -1520 to 550 KC
#2 - 1.5 to 4 MC
#3 - 3.6 to 10 MC
#4 - 8 to 10 MC

INTERNAL CONNECTIONS OF R. F. and I. F. TRANSFORMERS



MODELS TC1, TC2
Alignment, Voltage
Notes, Parts

TRANSFORMER CORP. OF AMER.

SERVICE NOTES FOR MODELS TC1 AND TC2

The Clarion TC-1 TC2 is a 7 tube all-wave super-heterodyne receiver, covering broadcast frequencies 550-1520 kilocycles and short-wave frequencies 1.5-4 megacycles, 3.6-10 megacycles, 8-10 megacycles.

Other outstanding features of this receiver are:—78 triple grid super-control tubes in the R. F. first detector and I. F. stages; 37 oscillator; 75 double diode triode, operating as a delayed AVC, second detector and first audio; and the 42 super-power amplifier, delivering 3 watts of undistorted output to the speaker.

R. F. and I. F. ALIGNMENT. The trimmer on the tuning condensers and the intermediate stages are very accurately adjusted before the receiver leaves the factory and should need little or no attention. To check adjustments the following procedure should be followed:

The action of the automatic volume control will defeat the purpose of an output meter. To overcome this, it will become necessary to reduce the coupling between the oscillator and the receiver so that only a small reading is obtained on the output meter with the volume control set for maximum volume. This will allow the output meter to work correctly. Adjust the test oscillator to 262 kilocycles and couple to the control grid of No. 2 tube and adjust trimmers on I. F. stage for maximum reading on the output meter.

R. F. ALIGNMENT. Couple oscillator to the antenna (reduce coupling as outlined in I. F. adjustment). Set pointer on tuning chart to 1400 kilocycles with wave band control switch in broadcast position. Adjust test oscillator to 1400 kilocycles. Adjust trimmers on No. 1 and 2 section of tuning condenser for maximum reading. The trimmer of No. 3 section of the tuning condenser should be set for minimum capacity, and the high frequency trimmer on back of chassis (left viewing chassis from back) should be adjusted for maximum reading. This operation should be repeated at 600 kilocycles and adjusting only the low frequency trimmer on back of chassis (right viewing chassis from back) for maximum reading. No adjustments are necessary on the short-wave band. All the coils are correctly matched so that they will be in perfect alignment if all the above adjustments are correctly made.

REPLACEMENT PARTS

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

	Stock No.	DESCRIPTION	List Price
TOT	10840	Volume control	$0.70
"	10830	Tone control and A.C. switch	1.00
"	10630	Short wave switch	2.95
"	10620	Tuning condenser for sets with full vision dial	3.20
"	12730	Tuning condenser for sets with airplane dial	3.40
"	10590	Filter choke	1.15
"	9340	A. C. cord	.30
"	10920	Pilot light socket	.15
"	5800	.05—200 volt condenser	.10
"	5630	.05—400 volt condenser	.15
"	5720	.1—200 volt condenser	.15
"	10880	100 mmf condenser	.15
"	5900	250 mmf condenser	.15
"	11070	550 mmf condenser	.20
"	11050	2600 mmf condenser	.35
"	11060	3000 mmf condenser	.40
"	6310	50,000 ohm resistor—1/5 watt	.15
"	6030	100,000 ohm resistor—1/5 watt	.15
"	6020	250,000 ohm resistor—1/5 watt	.15
"	6150	500,000 ohm resistor—1/5 watt	.15
"	10870	30,000 ohm resistor—1 watt	.15
"	11010	Cabinet for full vision dial	7.00
"	5310	Knobs	.05
"	11360	Escutcheon plate for full vision dial	.40
"	12820	Cabinet—airplane dial	7.20
"	9390	6 prong socket No. 78	.10
"	10860	5 prong socket No. 37	.10
TOT	9370	6 prong socket No. 42	.10
"	10280	6 prong socket No. 75	.10
"	9360	4 prong socket No. 80	.10
"	10980	Tube shield base	.05
"	10970	Tube shield cap	.10
"	10960	Tube shield	.15
"	10660	8" speaker	9.35
"	10610	Power transformer	3.40
"	10140	8-8, 450V filter condenser	2.10
"	10850	8—450 filter condenser	1.25
"	11750	1st IF transformer	1.55
"	11760	2nd IF transformer	1.80
"	10600	Bypass condenser block	1.20
"	10820	Double padder condenser	.40
"	5680	.01—400 volt condenser	.15
"	11040	Dial—Complete full vision	1.20
"	11790	Antenna coil	.50
"	11810	Detector coil	.50
"	11820	Broadcast oscillator coil	.50
"	11840	Short wave oscillator coil	.50
"	12740	Escutcheon plate—Airplane dial	.40
"	12750	Pyralin escutcheon window	.20
"	12030	Drive cable spring	.10
"	12090	Dial chart	.10
"	11990	Dial pointer	.05
"	12770	Dial drive cable	.05

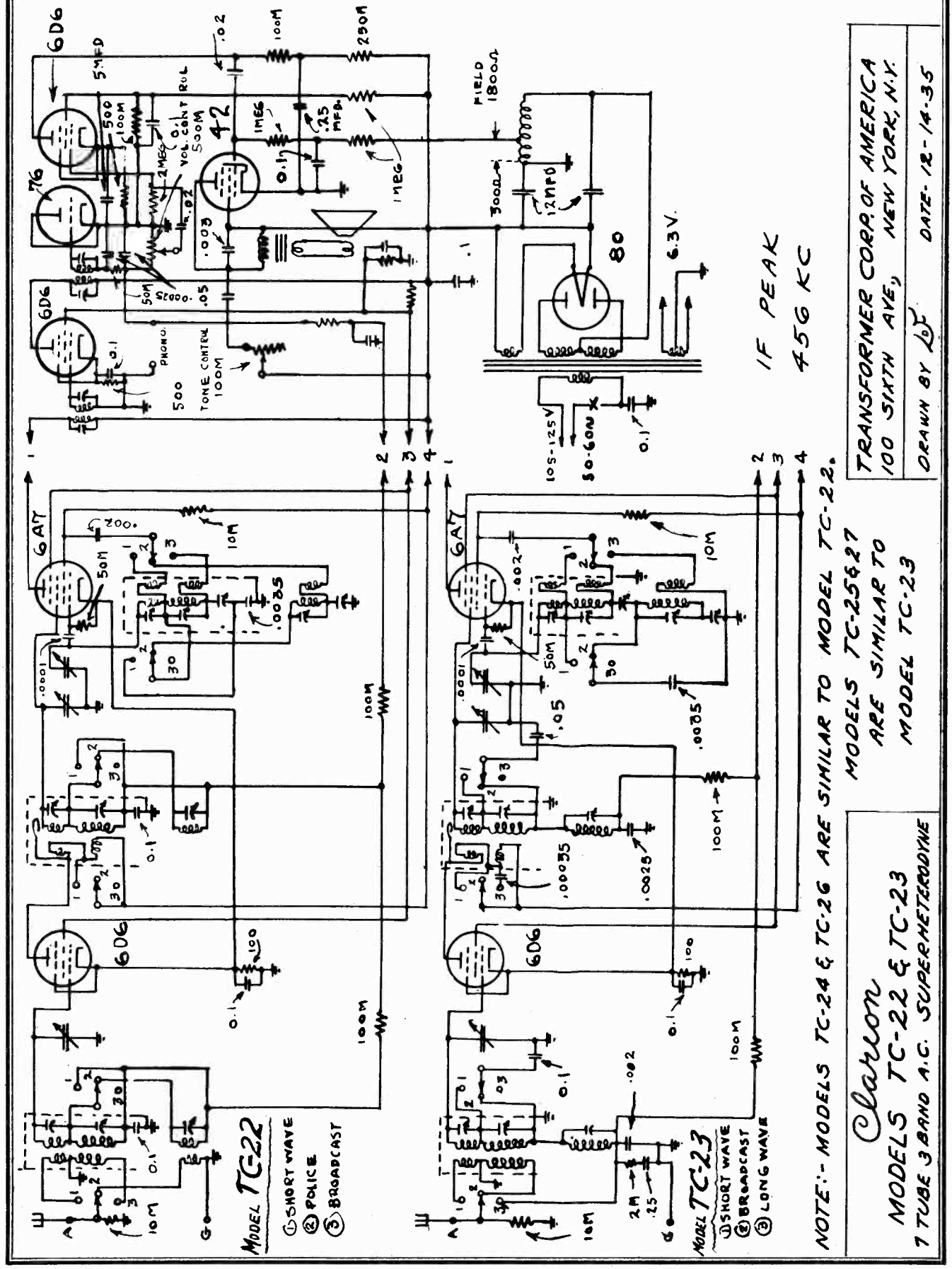
TUBE SOCKET VOLTAGES

Tube No.	Heater to Cathode Voltage	Control Grid to Cathode Voltage	Screen to Cathode Voltage	Plate to Cathode Voltage	Plate MA	Heater or Fil. Voltage
1—R. F.	0	4.5*	100	250	6.0	6.3
2—1st Det.	0	4.5*	100	250	6.0	6.3
3—I. F.	0	4.5*	100	250	6.0	6.3
4—2nd Det. AVC	0	2.0**	0	125	75	6.3
5—Osc.	0	2.6	0	95	5.5	6.3
6—Audio	0	20.0	250	225	31.0	6.3
7—Rect.	0				32 per plate	5.0

Voltage reading taken with 1000 ohm per volt meter using test prods. All tubes in sockets, Ant. ground to chassis, no signal.
*Voltage from ground to terminal No. 1 ON THE VOLTAGE DIVIDER.
**Voltage from ground to terminal No. 2 ON THE VOLTAGE DIVIDER.

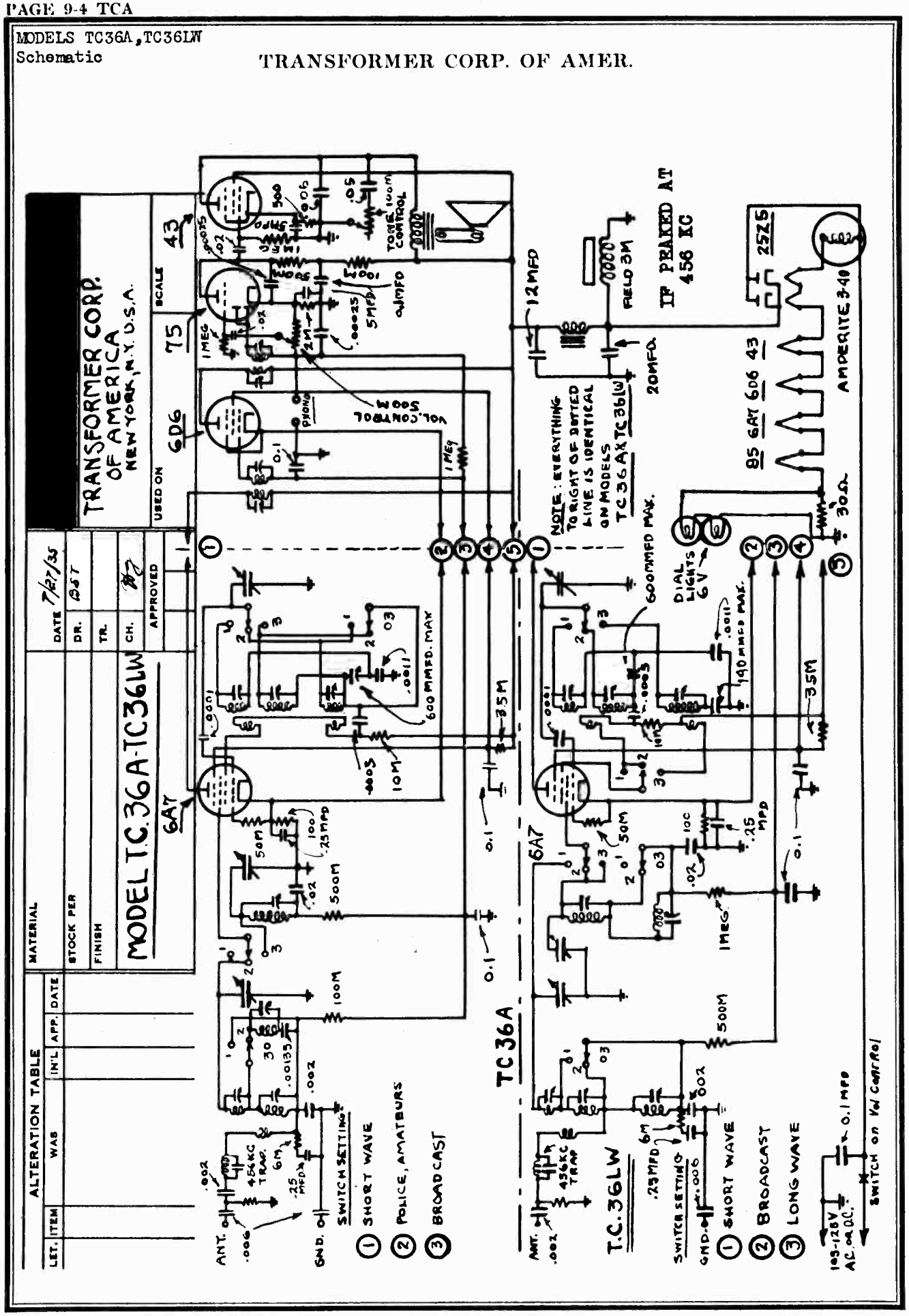
TRANSFORMER CORP. OF AMER.

MODELS TC22, TC23
Schematic



MODELS TC36A, TC36LW
Schematic

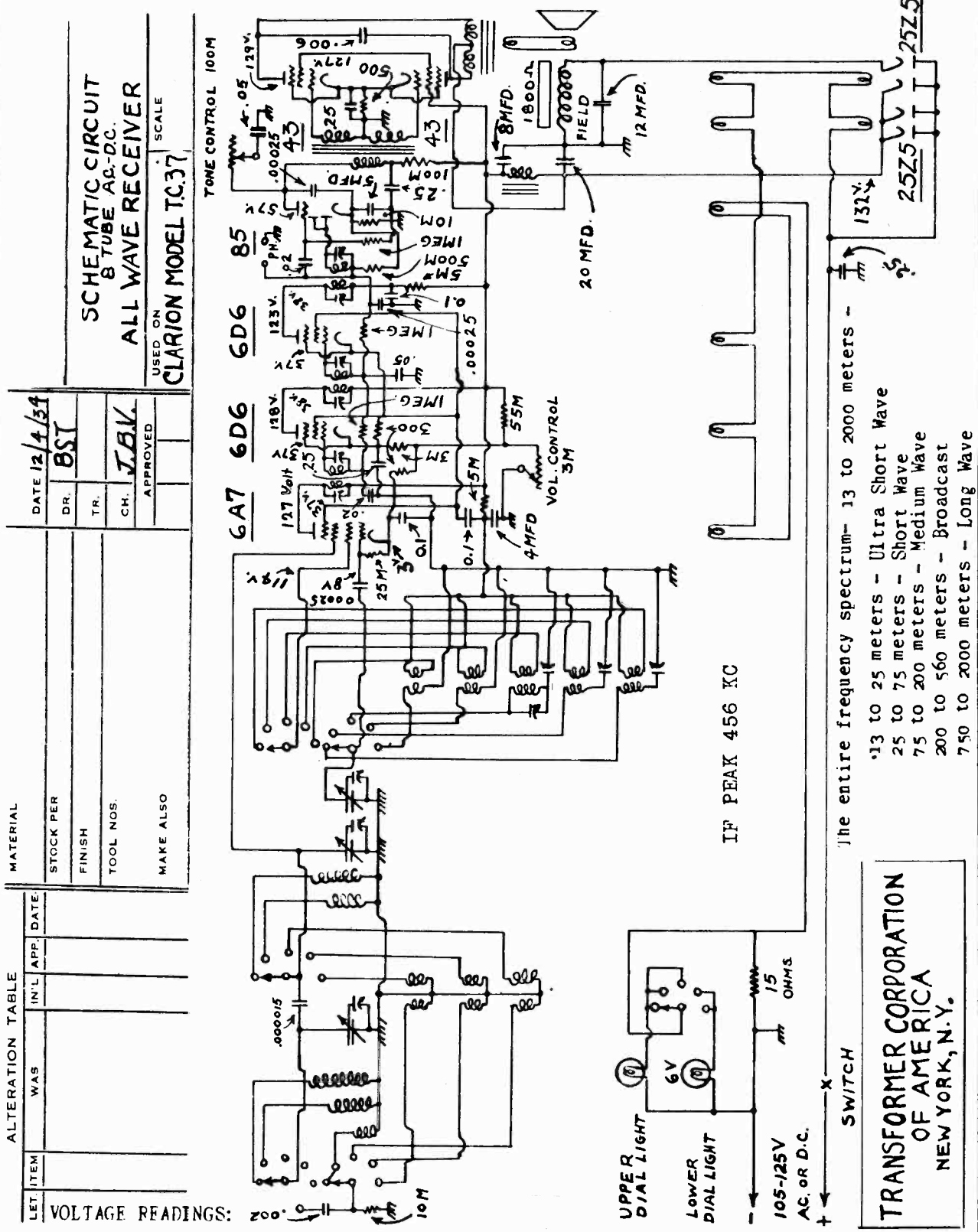
TRANSFORMER CORP. OF AMER.



MODEL TC37
Schematic

TRANSFORMER CORP. OF AMER.

Eight Tube Superheterodyne Receiver
A.C. or D.C. 105-125 Volts
(Also available for other voltages)

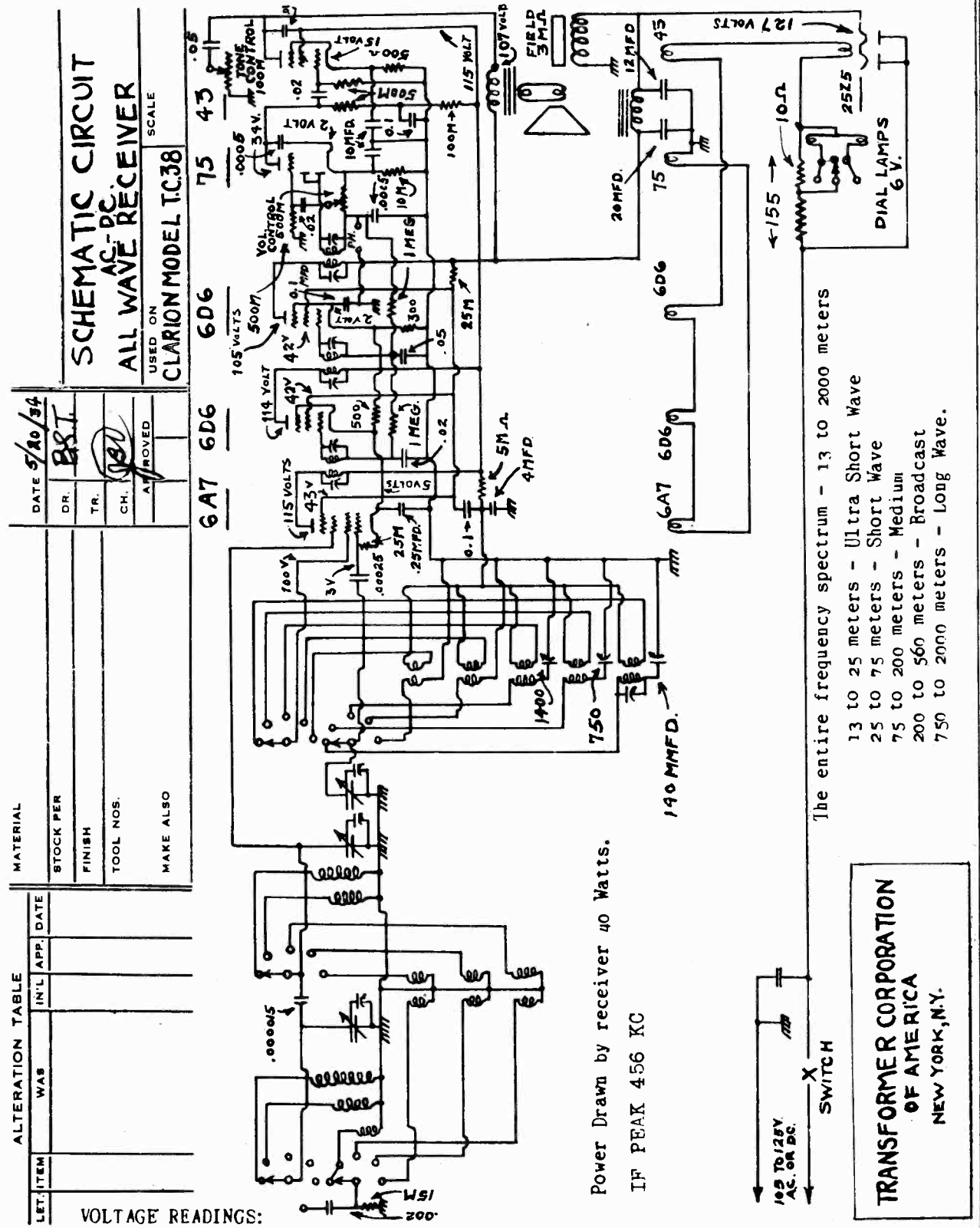


Readings should be taken with volume control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

MODEL TC38
Schematic

TRANSFORMER CORP. OF AMER.

A.C. or D.C. 105-125 Volts 25-60 Cycles
(Also available for voltages to 240)

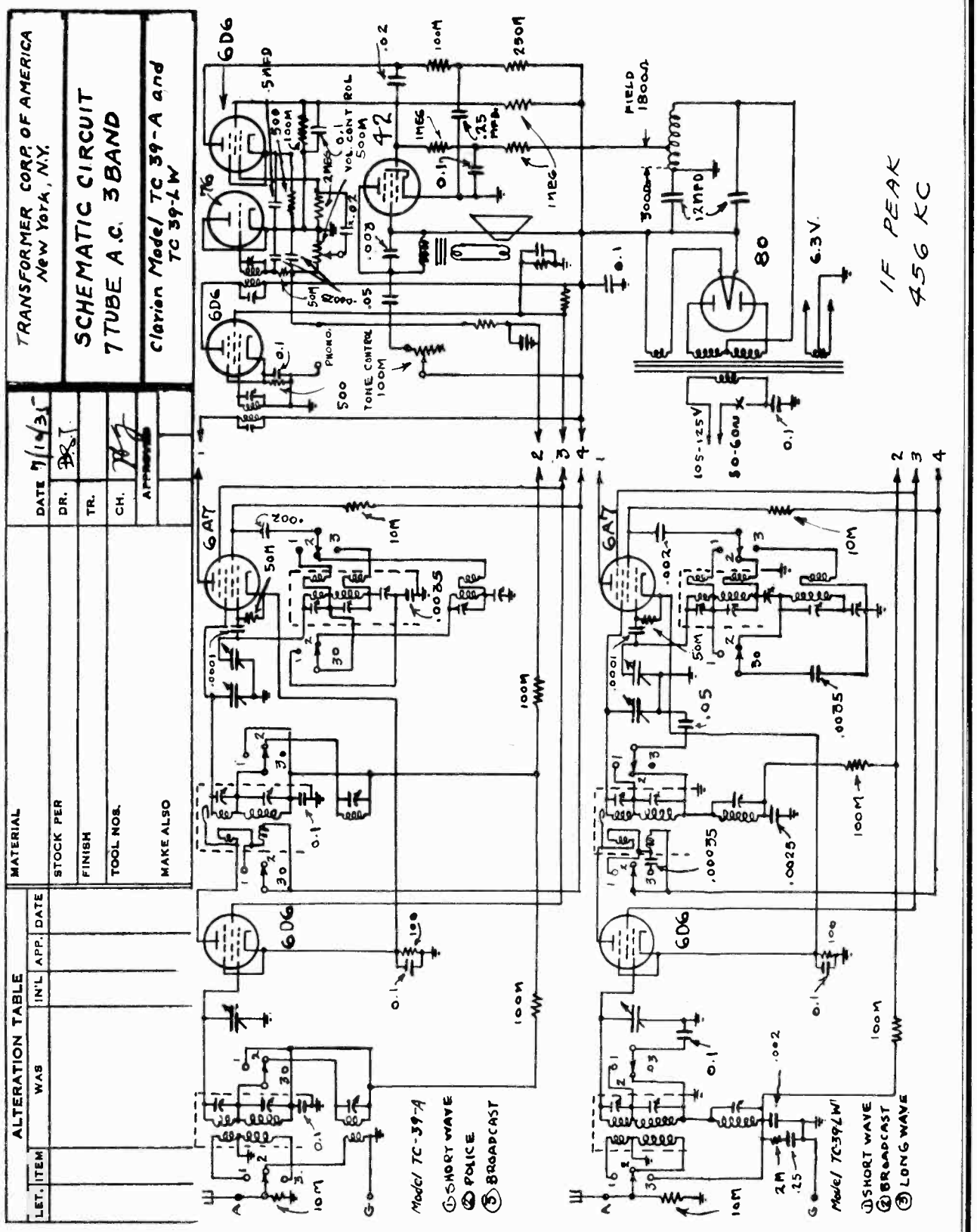


VOLTAGE READINGS:

Readings should be taken with volume control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

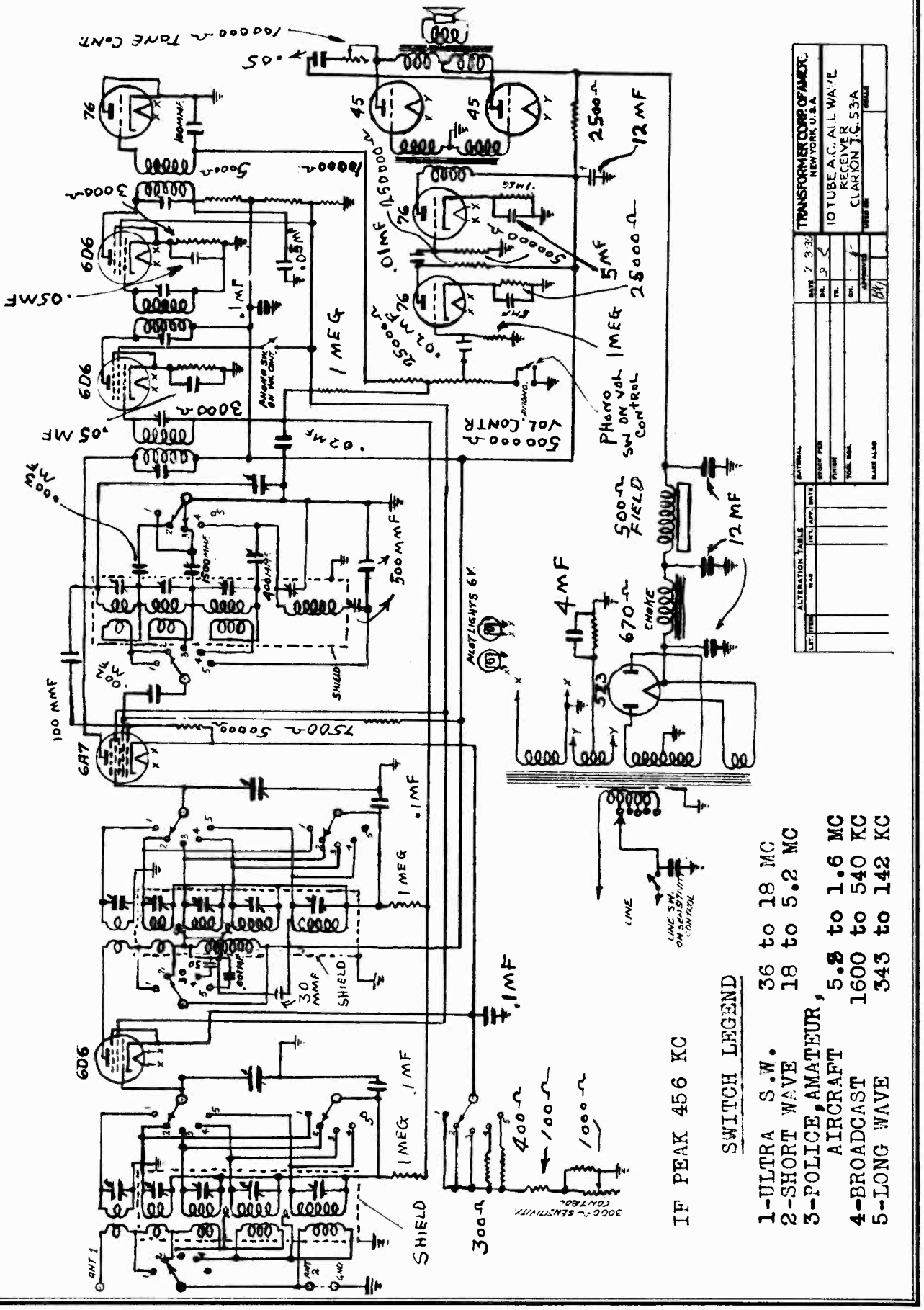
MODELS TC39A, TC39LW
Schematic

TRANSFORMER CORP. OF AMER.



MODEL TC53A
Schematic

TRANSFORMER CORP. OF AMER.



TRAV-LER RADIO & TELEV. CORP.

MODEL 131
Schematic, Socket
Trimmers, Parts

This radio is an eleven-tube Superheterodyne type which operates on AC current only at a frequency of 60 cycles and at 110 volts.

1. Meg. ½ W.	R9,R10	.10
5MW ½ W.	R11	.10
15MW 2W.	R12	.30
20MW ½ W.	R13	.10
2 Meg. ½ W.	R14	.10
.5 Meg. ½ W.	R19,R23	.10
30 MW ½ W.	R20	.10
250W 2 W.	R24	.30

Cabinet			40.00
Mica Condenser	.0014 M.F.	C7	.20
" "	.0001 M.F.	C4,C12,C13	.15
Tubular Condenser	.06 M.F. 200 V.	C1,C10,C11	.10
" "	.1 M.F. 200 V.	C19	.10
" "	" " "	C2,C3,C5	.10
" "	" " "	C9	.10
" "	" 400 V.	C8,C15,C16	.15
" "	" "	C18,C21	.15
" "	.01 M.F. "	C14	.15
" "	.002 M.F. "	C17	.20
" "	" 1000 V.	C23,C24	.25
" "	.25 M.F. 400 V.	C20	.25
" "	10 M.F. 25 V.	C22	.80
Fixed Resistor	1000W ½ W.	R1,R18,R21	.10
"	1000W 1 W.	R2,R16	.10
"	300W ½ W.	R3,R15	.10
"	50W ½ W.	R4,R22	.10
"	12W ½ W.	R5	.15
"	2W ½ W.	R6	.10
"	500W ½ W.	R7	.10
"	.25 Meg. ½ W.	R8,R17	.10

11-Tube Superheterodyne AC Receiver

For use on 110 volts AC only

MODEL 131.

I.F. PEAK - 456 KC.

110 V. A.C.

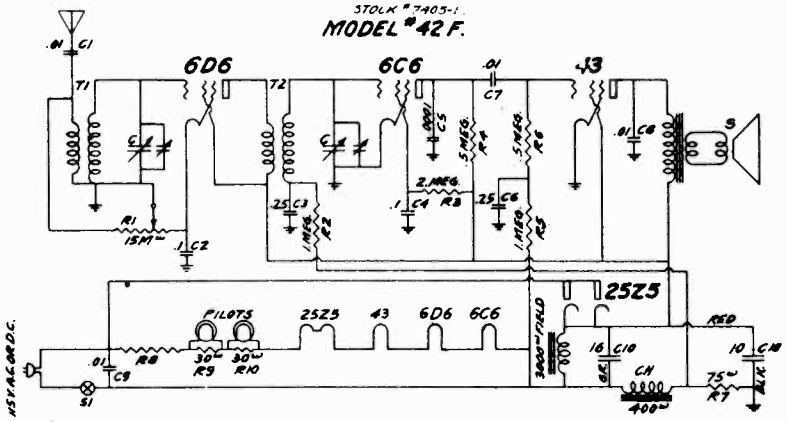
REPLACEMENT PARTS LIST

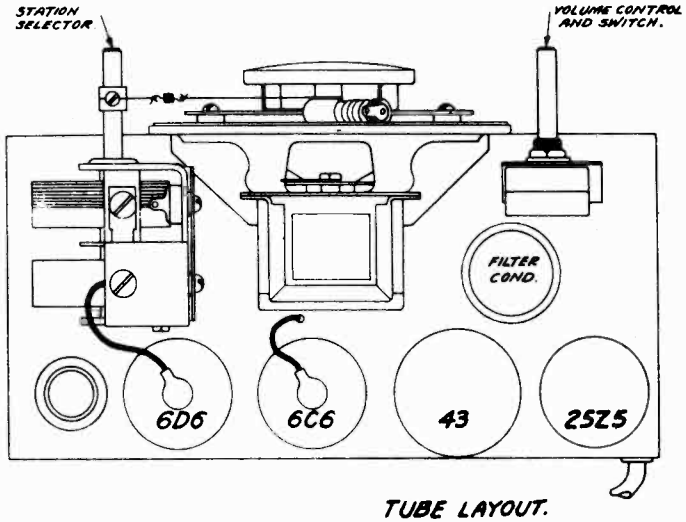
IN ORDERING ALWAYS STATE MODEL, DESCRIPTION & PART NO.

PART #	DESCRIPTION	LETTER	LIST PRICE
5514-A	Antenna Coil - Broadcast	T1	.75
5615-A	" " Police	T2	.60
5616-A	" " Short Wave	T3	.75
5805-A	R.F. Coil	T4	.65
5504-B	Osc. Coil	T5	1.30
5708-A	1st. I.F. Coil	T6	1.50
5706-B	2nd. I.F. Coil	T7	1.10
5804-A	Power Transformer	T8	5.00
5209-A	Tuning Condenser	C	4.00
3010-A	Loud Speaker	S	10.00
4112-A	Volume Control & Switch	V.C. & S1	1.06
4113-A	Tone Control	T.C.	.85
4608-A	High Fidelity Switch	S2	.75
4609A	Band Switch	S3	1.70
4461-K	Pilot Bulb		.15
4558-D	Line Cord		.30
4804-C	Filter Condenser	C25,C26	.70
5303-A	Padder Condenser	C6	.46
5506-A	Dial (Complete)		6.50

Standard broadcast band 540 - 1760 kc.
Police and Amateur band 1760 - 5600 kc.
Short-wave, American & Foreign 18 - 5.6 mg.

LAYOUT OF TUBES



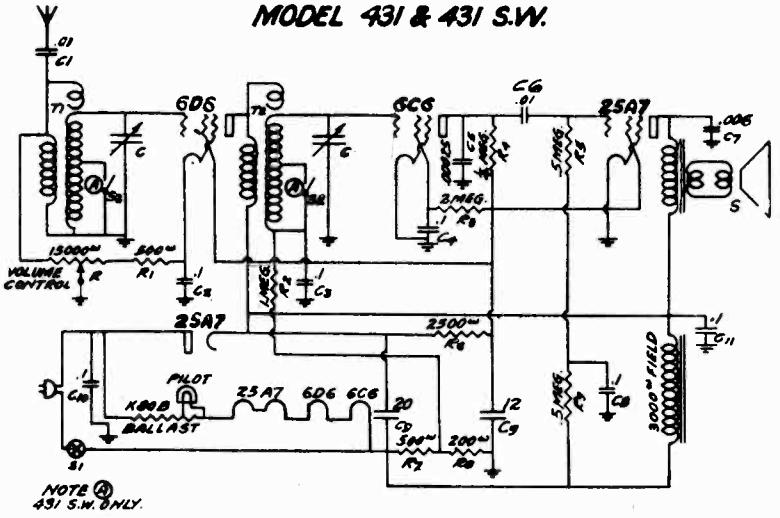


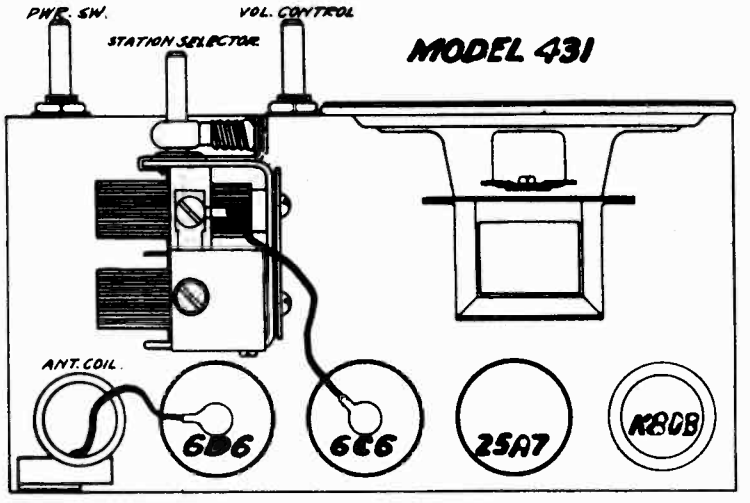
TUBE LAYOUT.

FOR
AIR CHIEF

4-Tube AC-DC Receiver
For Use on 110-115 Volts AC or DC Current Only

This receiver is a four-tube tuned-radio-frequency type which operates on either AC or DC current. It will provide very satisfactory entertainment for those who desire a small set.





TUBE LAYOUT

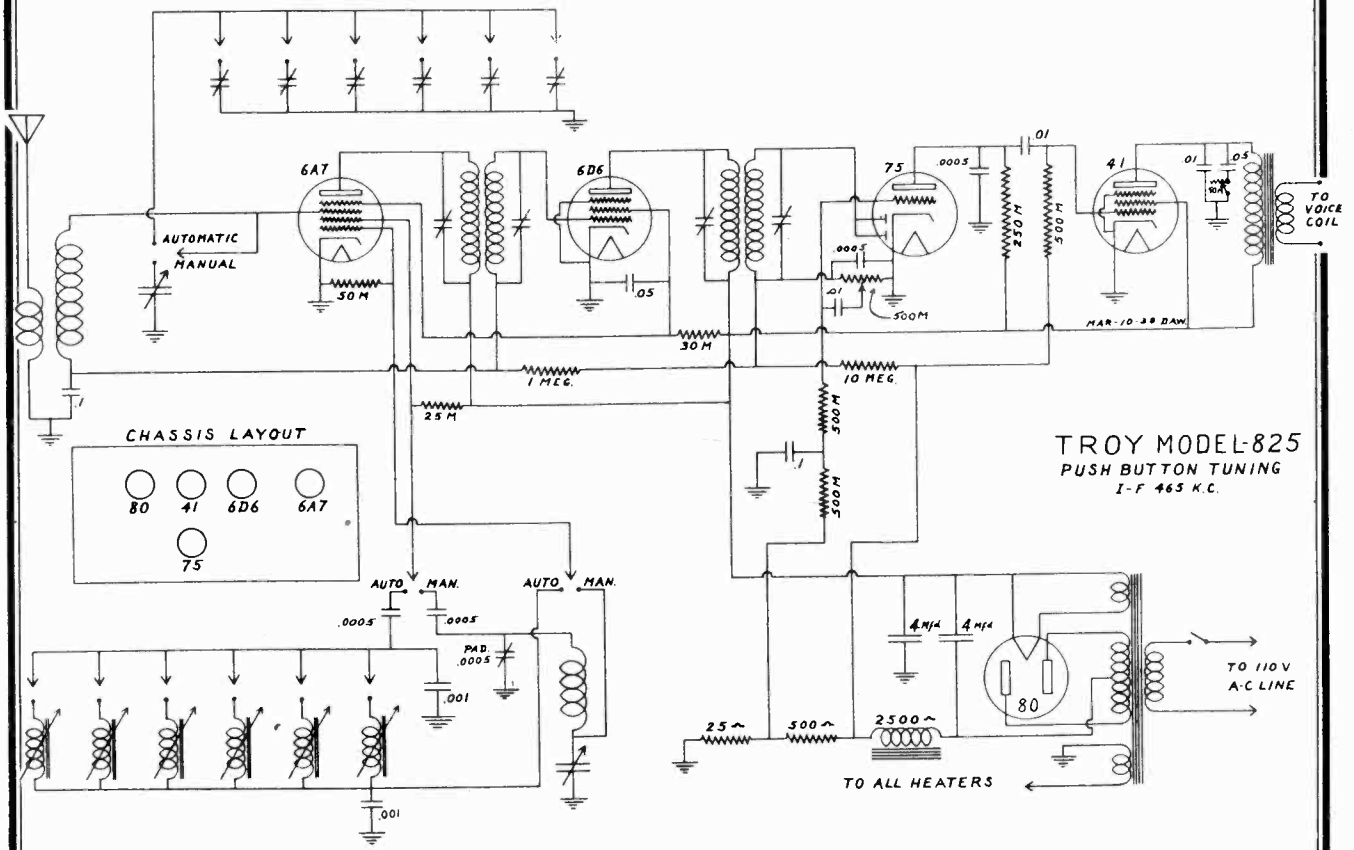
4-Tube AC-DC Receiver

For Use on 110-115 Volts AC or DC Current Only

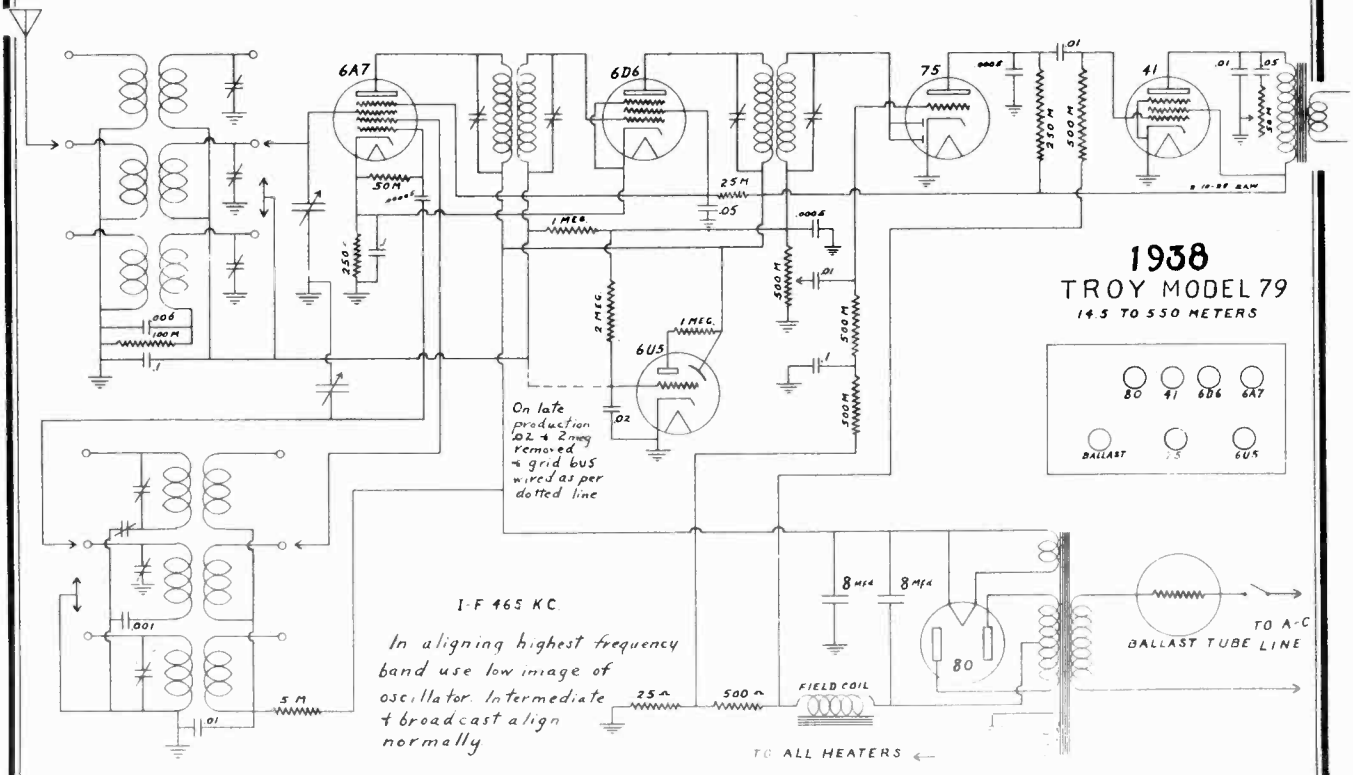
This receiver is a four-tube tuned-radio-frequency type which operates on either AC or DC current. It will provide very satisfactory entertainment for those who desire a small set.

TROY RADIO MFG. CO.

MODEL 79
MODEL 825
Schematics, Socket



TROY MODEL-825
PUSH BUTTON TUNING
I-F 465 K.C.



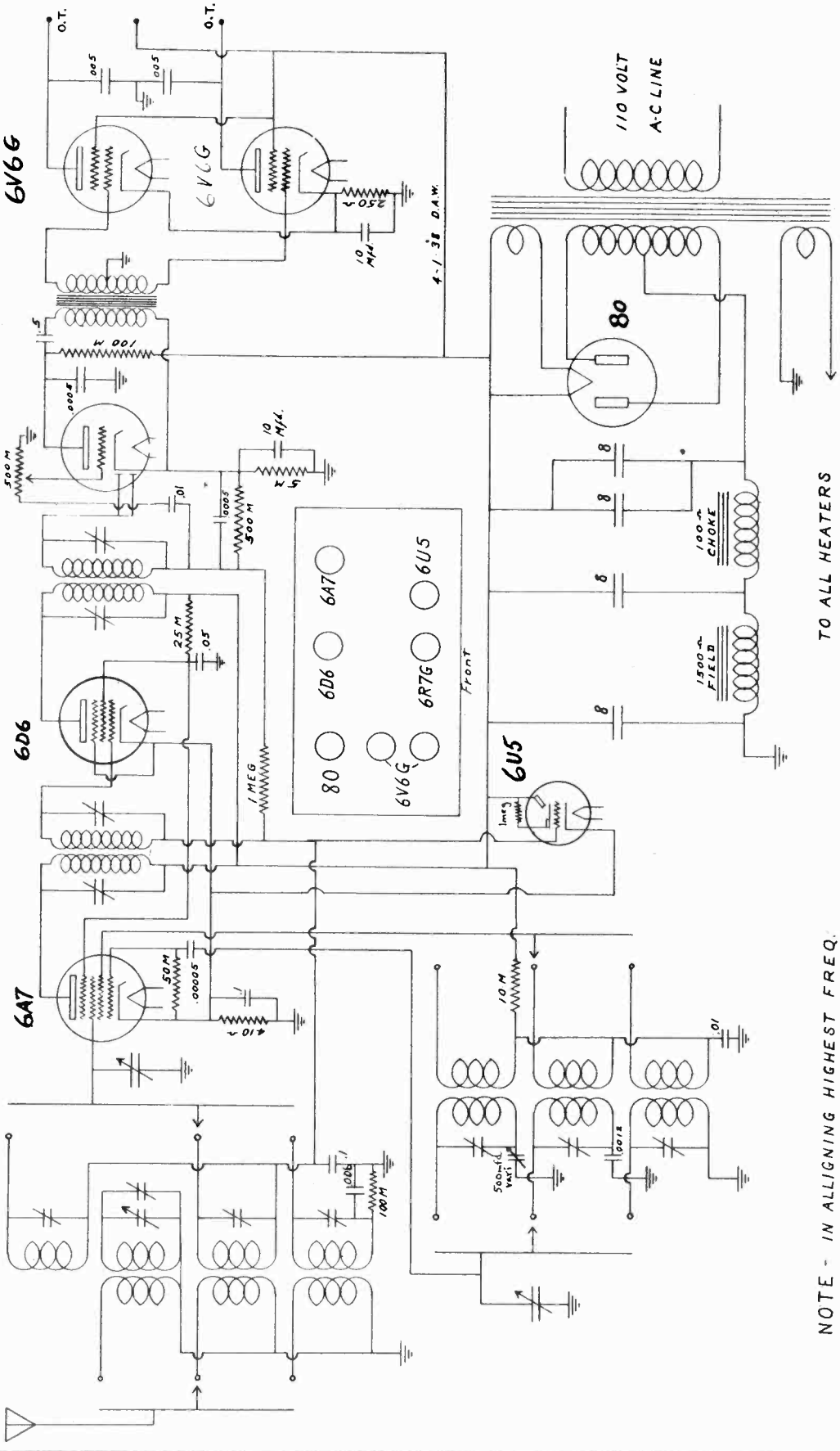
1938
TROY MODEL 79
14.5 TO 550 METERS

I-F 465 KC

In aligning highest frequency band use low image of oscillator. Intermediate & broadcast align normally

MODEL 170
Schematic, Socket

TROY RADIO MFG. CO.



ULTRAMAR MFG. CORP.

MODELS 307,317
Schematic,Socket
Trimmers,Alignments

MODEL 307

BAND	FREQUENCY COVERAGE.
A -	SHORT WAVE - 13.6-52 METERS.
B -	MEDIUM WAVE - 1730-600 K. C.
C -	BROADCAST - 527-175 K. C.

MODEL 317

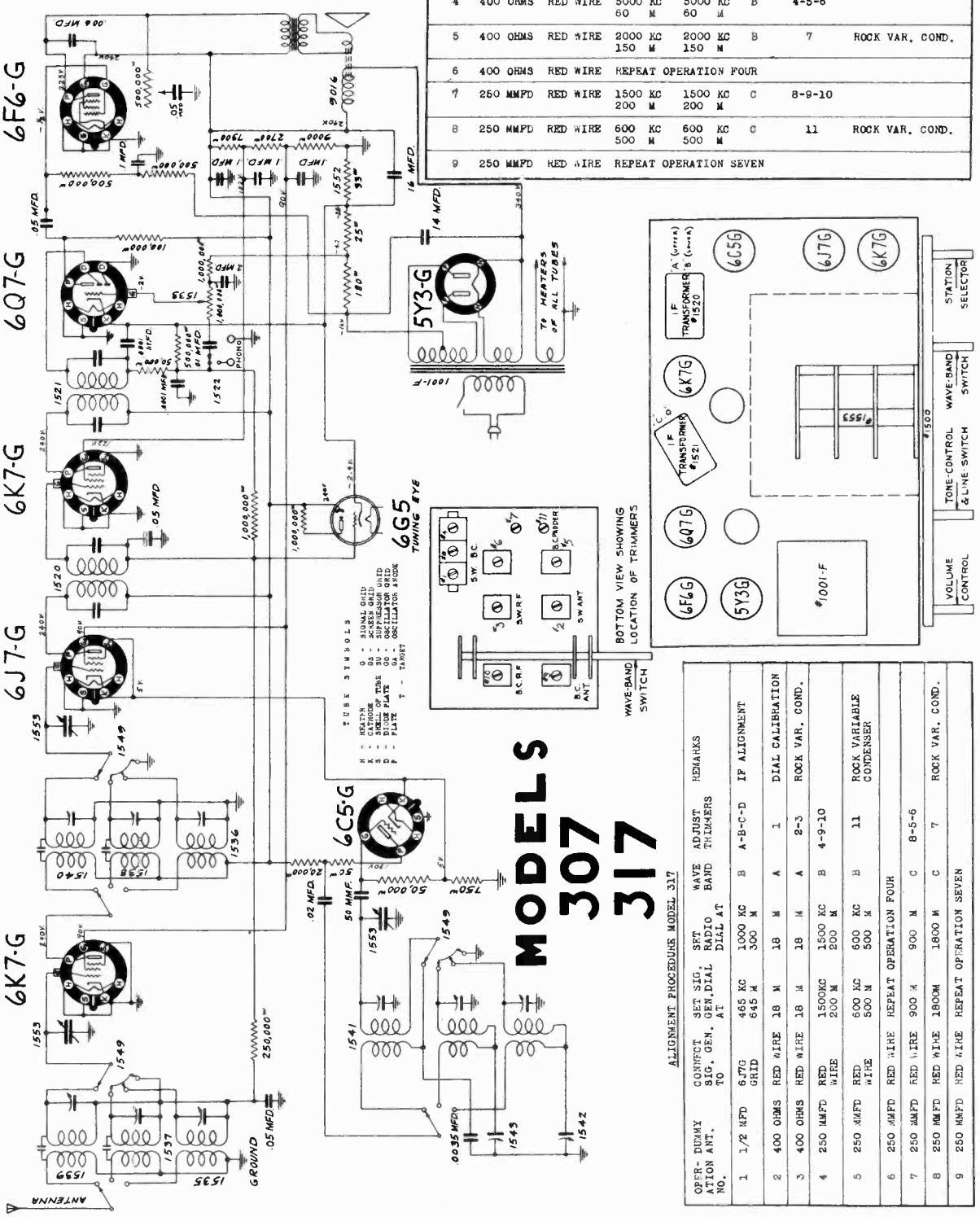
BAND	FREQUENCY COVERAGE.
A -	SHORT WAVE - 13.5-52 METERS.
B -	BROADCAST - 527-1750 K. C.
C -	LONG WAVE - 800-2000 METERS.

ALIGNMENT PROCEDURE MODEL 307

OPERATION NO.	DUMMY ANT.	CONNECT SIG.GEN. TO	SET SIG. GEN.DIAL AT	SET RADIO DIAL AT	WAVE BAND	ADJUST TRIMMERS	REMARKS
1	1/2 MFD	6J7G	465 KC 645 M	1000 KC 300 M	C	A-B-C-D	IF ALIGNMENT
2	400 OHMS	RED WIRE	18 M	18 M	A	1	DIAL CALIBRATION
3	400 OHMS	RED WIRE	18 M	18 M	A	2-3	ROCK VAR. COND.
4	400 OHMS	RED WIRE	5000 KC 60 M	5000 KC 60 M	B	4-5-6	
5	400 OHMS	RED WIRE	2000 KC 150 M	2000 KC 150 M	B	7	ROCK VAR. COND.
6	400 OHMS	RED WIRE	REPEAT OPERATION FOUR				
7	250 MMFD	RED WIRE	1500 KC 200 M	1500 KC 200 M	C	8-9-10	
8	250 MMFD	RED WIRE	600 KC 500 M	600 KC 500 M	C	11	ROCK VAR. COND.
9	250 MMFD	RED WIRE	REPEAT OPERATION SEVEN				

ALIGNMENT PROCEDURE MODEL 317

OPERATION NO.	DUMMY ANT.	CONNECT SIG. GEN. TO	SET SIG. GEN. DIAL AT	SET RADIO DIAL AT	WAVE BAND	ADJUST TRIMMERS	REMARKS
1	1/2 MFD	6J7G GRID	465 KC 645 M	1000 KC 300 M	B	A-B-C-D	IF ALIGNMENT
2	400 OHMS	RED WIRE	18 M	18 M	A	1	DIAL CALIBRATION
3	400 OHMS	RED WIRE	18 M	18 M	A	2-3	ROCK VAR. COND.
4	250 MMFD	RED WIRE	1500KC 200 M	1500 KC 200 M	B	4-9-10	
5	250 MMFD	RED WIRE	600 KC 500 M	600 KC 500 M	B	11	ROCK VARIABLE CONDENSER
6	250 MMFD	RED WIRE	REPEAT OPERATION FOUR				
7	250 MMFD	RED WIRE	900 M	900 M	C	8-5-6	
8	250 MMFD	RED WIRE	1800M	1800 M	C	7	ROCK VAR. COND.
9	250 MMFD	RED WIRE	REPEAT OPERATION SEVEN				



MODELS 309,319
Schematic,Socket
Trimmers,Alignments

ULTRAMAR MFG. CORP.

MODELS 309 319

MODEL 309

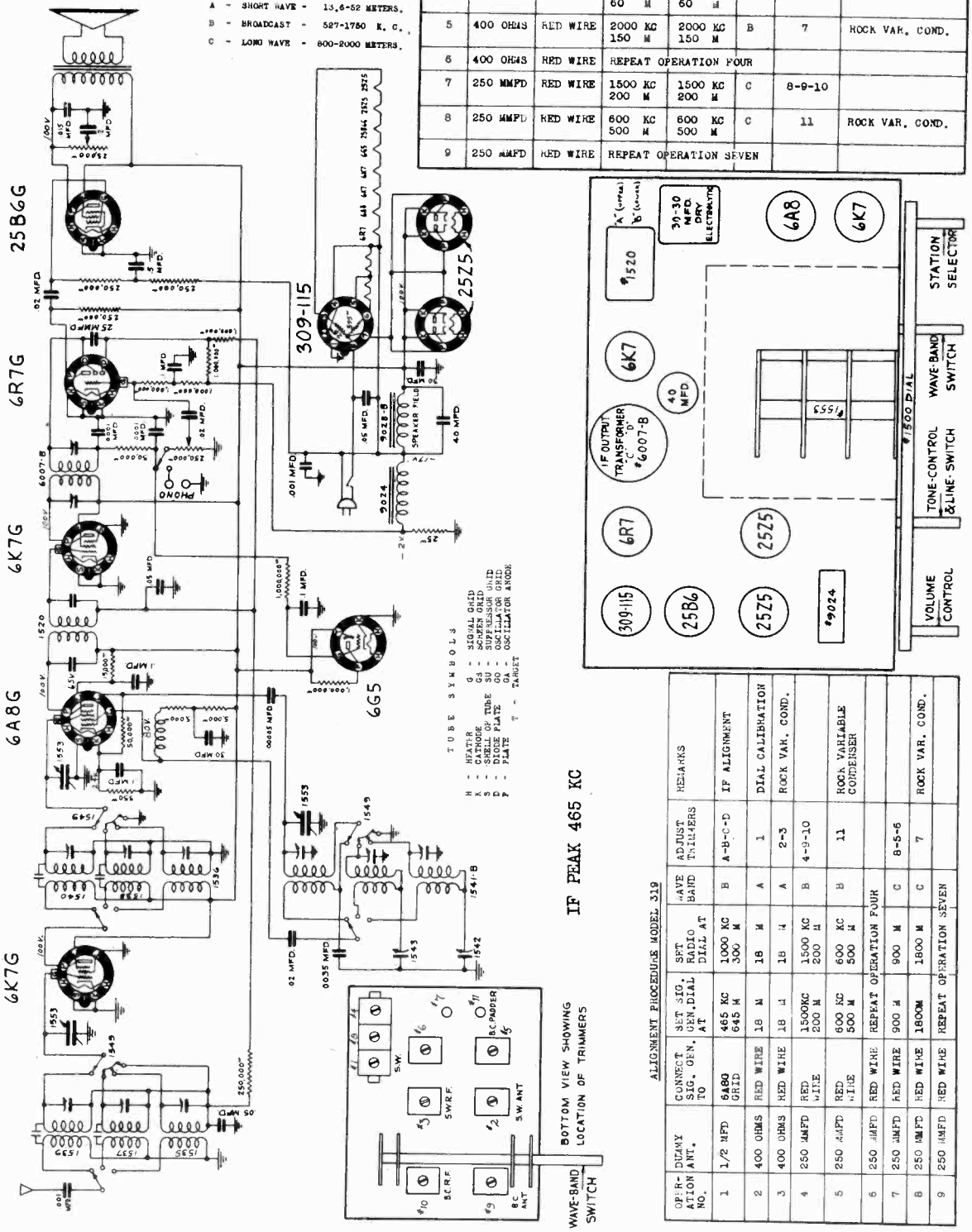
BAND	FREQUENCY COVERAGE.
A -	SHORT WAVE - 13.6-52 METERS.
B -	MEDIUM WAVE - 1730-6000 K. C.
C -	BROADCAST - 527-1750 K. C.

MODEL 319

BAND	FREQUENCY COVERAGE.
A -	SHORT WAVE - 13.6-52 METERS.
B -	BROADCAST - 527-1750 K. C.
C -	LONG WAVE - 800-2000 METERS.

ALIGNMENT PROCEDURE MODEL 309

OPERATION NO.	DUMMY ANT.	CONNECT SIG.GEN. TO	SET SIG. GEN.DIAL AT	SET RADIO DIAL AT	WAVE BAND	ADJUST TRIMMERS	REMARKS
1	1/2 MFD	6A8G GRID	465 KC 645 M	1000 KC 300 M	C	A-B-C-D	IF ALIGNMENT
2	400 OHMS	RED WIRE	18 M	18 M	A	1	DIAL CALIBRATION
3	400 OHMS	RED WIRE	18 M	18 M	A	2-3	ROCK VAR. COND.
4	400 OHMS	RED WIRE	5000 KC 60 M	5000 KC 60 M	B	4-5-6	
5	400 OHMS	RED WIRE	2000 KC 150 M	2000 KC 150 M	B	7	ROCK VAR. COND.
6	400 OHMS	RED WIRE	REPEAT OPERATION FOUR				
7	250 MMFD	RED WIRE	1500 KC 200 M	1500 KC 200 M	C	8-9-10	
8	250 MMFD	RED WIRE	600 KC 500 M	600 KC 500 M	C	11	ROCK VAR. COND.
9	250 MMFD	RED WIRE	REPEAT OPERATION SEVEN				



ALIGNMENT PROCEDURE MODEL 319

OPERATION NO.	DUMMY ANT.	CONNECT SIG. GEN. TO	SET SIG. GEN.DIAL AT	SET RADIO DIAL AT	WAVE BAND	ADJUST TRIMMERS	REMARKS
1	1/2 MFD	6A8G GRID	465 KC 645 M	1000 KC 300 M	B	A-B-C-D	IF ALIGNMENT
2	400 OHMS	RED WIRE	18 M	18 M	A	1	DIAL CALIBRATION
3	400 OHMS	RED WIRE	18 M	18 M	A	2-3	ROCK VAR. COND.
4	250 MMFD	RED WIRE	1500KC 200 M	1500 KC 200 M	B	4-9-10	
5	250 MMFD	RED WIRE	600 KC 500 M	600 KC 500 M	B	11	ROCK VARIABLE CONDENSER
6	250 MMFD	RED WIRE	REPEAT OPERATION FOUR				
7	250 MMFD	RED WIRE	900 M	900 M	C	8-5-6	
8	250 MMFD	RED WIRE	1800M	1800 M	C	7	ROCK VAR. COND.
9	250 MMFD	RED WIRE	REPEAT OPERATION SEVEN				

UNITED AMERICAN BOSCH CORP.

MODEL 224
MODEL 226
Socket, Trimmers
Voltage, Alignment

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 4 #39, 1 #37, 1 #71A, 2 #52 - Total 8
Power Supply Characteristics ..... 105 to 125 Volts D.C.
Power Consumption ..... 200 Watts
Total Plate Dissipation ..... 560 to 1500 K.C.
Maximum Undistorted Output ..... 2 Watts
Tuning Range ..... I.F. 175 K.C., 1400 K.C., 600 K.C.
Line-Up Frequencies .....

SOCKET VOLTAGES

TUBE	STAGE	FIL.	PLATE	SCREEN	CATHODE	GRID
39	R.F.	6.2	90	57	1.4	--
37	OSC.	6.0	80	--	--	--
39	1st. DET.	6.0	90	59	4.4	--
39	I.F.	6.1	90	57	1.4	--
39	2nd DET.	5.4	80	47	0	--
71A	DRIVER	5.0	85	--	--	1.8
52	OUTPUT	6.2	110	--	(6.3 FIL. to GND)	--
52	OUTPUT	6.2	110	--	(6.3 FIL. to GND)	--

GENERAL DESCRIPTION

The Model 224 is an eight tube direct current superheterodyne receiver whose circuit consists of a stage of radio frequency amplification, an oscillator, a stage of intermediate frequency amplification, a second detector, a driver and a push-pull stage of class B audio amplification.

The receiver is designed to operate on the standard broadcast band extending from 550 to 1500 K.C.

LINEUP CAPACITOR ADJUSTMENTS

To properly align the chassis, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the chassis, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Figure #1 and should be carefully studied before the actual work is started.

I.F. ADJUSTMENTS - 175 K.C.

1. Set volume control on full.
2. Set test oscillator to 175 K.C. and apply test signal to grid of 39 I.F. tube through a .5 mfd. blocking condenser.
3. Adjust the two trimmers on top of second I.F. transformer to maximum output reducing output of test oscillator as required.
4. Apply test signal to grid of 39 first detector tube and adjust the two trimmers on top of first I.F. transformer to maximum output.
5. Repeat above operations for accuracy.

OSCILLATOR & R.F. ADJUSTMENTS

1. Set test oscillator and dial scale to 1400 K.C.
2. With test signal still applied to the grid of the first detector, adjust oscillator trim condenser A to maximum output.
3. Apply test signal to antenna lead of the set and adjust trimmer B and the antenna adjustment screw to maximum output.
4. Set test oscillator and dial scale to 600 K.C. and adjust oscillator lagging condenser on top of oscillator coil to maximum output.
5. Return to 1400 K.C. setting and readjust B and the antenna adjustment as the adjustment of the oscillator lagging condenser may have altered these settings.
6. Check the sensitivity and calibration at several different positions of the dial scale.

For Schematics, see Index

GENERAL DESCRIPTION

The Model 226 is an eight-tube superheterodyne battery receiver whose circuit consists of a stage of radio frequency amplification, an oscillator, a first detector, an audio driver, and a stage of push-pull class B audio amplification.

The receiver is designed to operate on the standard broadcast band extending from 550 to 1500 K.C.

LINEUP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A. V.C. to function, making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the chassis, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

I.F. ADJUSTMENTS (176 K.C.)

1. Connect the receiver to the batteries as shown in Fig. #1.
2. Set volume control on full and set test oscillator to 176 K.C.
3. Apply test signal to the grid of the 234 I.F. tube and adjust the two trimmers on top of the second I.F. transformer to maximum output reducing output of test oscillator as required.
4. Apply test signal to grid of the 232 first detector and adjust the two trimmers on top of the first I.F. transformer to maximum output.
5. Recheck the above two operations for accuracy.

OSC. & R.F. ADJUSTMENTS

1. Set test oscillator and dial scale to 1400 K.C.
2. With test signal still applied to the grid of the first detector, adjust trimmer A on top of condenser gang to maximum output.
3. Apply test signal to antenna lead and adjust trimmer B and the antenna adjustment screw to maximum output.
4. Set test oscillator and dial scale to 600 K.C. and adjust oscillator lagging condenser on top of oscillator coil to maximum output.
5. Return to 1400 K.C. setting and readjust A and B trimmers as the adjustment of the oscillator lagging condenser may have altered the setting of these trimmers.

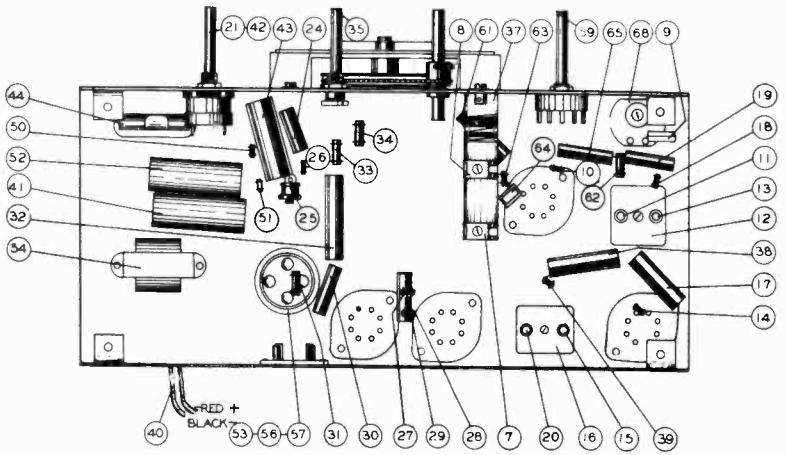
ELECTRICAL SPECIFICATIONS

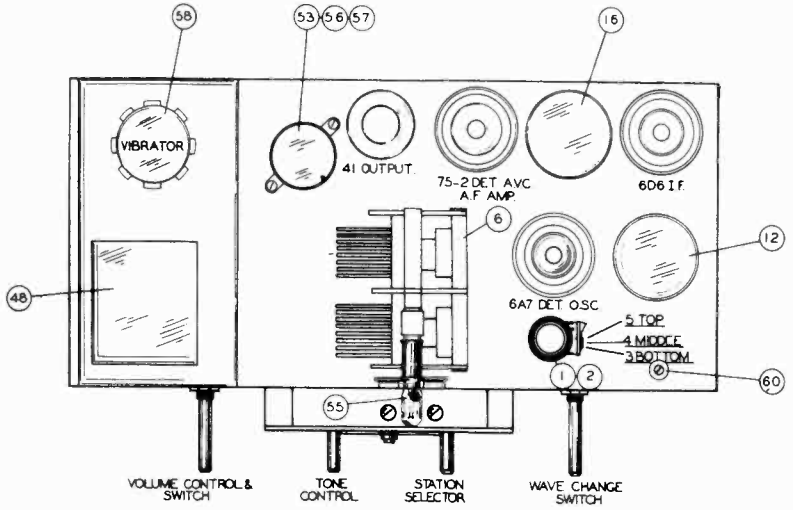
Type and Number of Tubes ..... 2 #32, 2 #30, 2 #34, 2 #49 - Total 8
Total A Battery Current ..... .525 Amps.
Total B Battery Current ..... 14.5 M.A. (No Signal)
Batteries Required ..... A Battery ..... 2 Volt Airdell
B Battery ..... 4 - 45 Volt Batteries
Maximum Undistorted Output ..... 3. Watts
Tuning Range ..... 550 to 1500 K.C.
Line-Up Frequencies ..... I.F. 175 K.C., 600 K.C., 1400 K.C.

SOCKET VOLTAGES

Stage	Tube	Plate	Screen	Fil.	Fil. to Ground
R.F.	232	155	65	1.95	0.3
1st Det.	232	150	65	1.95	5.2
Osc.	230	85		1.95	0.2
I.F.	232	155	65	1.95	0.3
2nd Det.	234		57	1.95	
Driver	230	157		1.95	6.2-7.2
Audio	49	157		1.95	
Audio	49	157		1.95	

MODEL 600 UNITED AMERICAN BOSCH CORP.
Final Schematic Specs. Alignment
Socket, Trimmers Chassis, Notes





THE FINAL SCHEMATIC IS THE SAME AS THE PRELIMINARY ON PAGE 7-19, WITH EXCEPTION OF CHANGES IN FOLLOWING PARTS NULBERS :

Dia #	Part #	Description and Value of Parts
1	RC95237	Antenna Coil assembly
2	Part of RC95237	Trap Coil
3	Part of RC95237	30-60 MMF Trimmer Condenser
4	Part of RC95237	1.5-10 MMF Trimmer Condenser
5	Part of RC95237	4-25 MMF Trimmer Condenser
7	Part of RC95238	6-30 MMF Trimmer Condenser
8	Part of RC95238	4-25 MMF Trimmer Condenser
11	Part of IC9569	45-135 MMF Trimmer Condenser
12	IC9569	1st I.F. coil (465 KC)
13	Part of IC9569	45-135 MMF Trimmer Condenser
14	RE95117	500 Ohm, 1/4 watt resistor
15	Part of IC9574	30-100 MMF Trimmer Condenser
16	IC9574	2nd IF coil (465 KC)
20	Part of IC9574	30-100 MMF Trimmer Condenser
21	VR9523	.5 Megohm Volume Control
22	RE9524	50000 Ohm, 1/8 Watt resistor
23	Part of IC9574	.0001 MF Mica Condenser
27	RE9585	1/4 Megohm, 1/4 Watt resistor
30	CW4-005	.005 MF , 400 Volt condenser
32	CW4-05	.05 MF , 400 Volt Condenser
37	RC95238	Oscillator Coil
40	CB9556	Power supply cable
41	CW-2550	.5 Mf, 200 Volt Condenser
49	CW-9513	.05 MF, 200 Volt Condenser
51	RE9516	50 Ohm, 1/4 Watt Resistor
63	RE9575	50000 Ohm, 1/4 Watt Resistor
66	Part of IC9574	.0001 MF Mica Condenser

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ---------- 1 #6A7, 1 #6D6, 1 #75, 1 #41 - Total 4
Total Battery Current (6 volt battery) ---------- 2.6 Amps.
Battery Required ---------- 6 Volt Storage Battery
Maximum Output ---------- 0.6 Watts
Maximum Undistorted Output ---------- .25 Watts
Tuning Ranges ---------- 540 to 1725 KC., 2000 to 6800 KC.
Line-Up Frequencies ---------- 465 KC. I.F., 1600 KC., 600 KC., 6000 KC.

GENERAL DESCRIPTION

This model is a four tube, two band, superheterodyne receiver designed to be operated with only a six-volt storage battery. The receiver employs a type #6A7 tube as a combined first detector-oscillator, a type #6D6 tube as an intermediate frequency amplifier, a type #75 tube as a combined second detector, A.V.C. first audio amplifier, and a type #41 tube as an audio output amplifier. The power supply for this model is secured from a six volt storage battery. The plate voltage is secured by the use of a combined vibrator and mechanical rectifier.

SPEAKER ADJUSTMENT

This speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its adjustment. However, if for any reason an adjustment is needed, it may be done by turning the screw, located nearer the speaker magnet, in either direction. Do not touch the other screw as this should always remain tight.

LINE-UP CAPACITOR ADJUSTMENTS

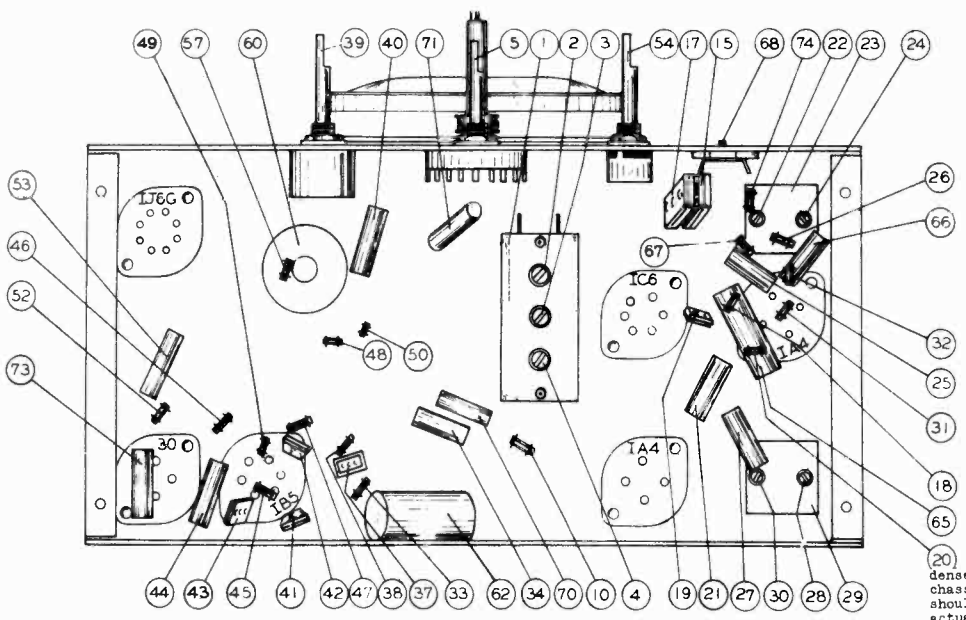
To properly align this receiver it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making proper alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal. Before attempting to align the chassis, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. Top and bottom views of the chassis are shown in figures #1 and #2 and should be carefully studied before the actual work is started.

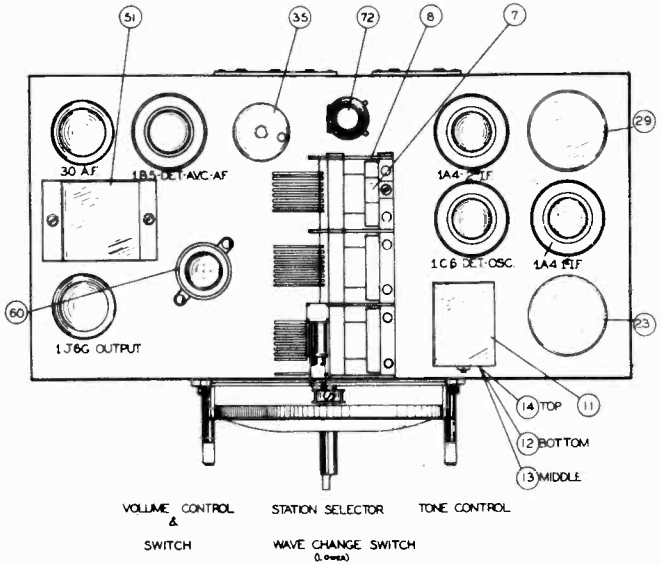
I.F. ADJUSTMENTS (465 KC.)

1. Connect the receiver to the storage battery by connecting the red lead to the positive terminal and the black lead to the negative terminal of the battery.
2. Set the volume control to the maximum position, the tone control to the treble position, the wave change switch to the broadcast band position and the dial indicator to approximately 600 KC.
3. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type #6D6 I.F. amplifier tube thru a .5 mfd. condenser.
4. Adjust trimmer condenser #15 and #20 to maximum output.
5. Apply the test signal to the grid of the type #6A7 first detector-oscillator tube and adjust trimmer condensers #12 and #13 to maximum output.
6. Apply the test signal to the antenna lead of the receiver and adjust the trap coil trimmer #3 to minimum output.

SHORT-WAVE BAND ADJUSTMENTS

1. Set the wave change switch to the short wave band position.
2. Set the test oscillator and dial indicator to 6000 KC. and adjust the short-wave oscillator trimmer condenser, #7, to maximum output.
3. Adjust the short wave antenna trimmer #5 to maximum output.
4. Check the receiver over the shortwave band for sensitivity and calibration.





ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #1C6, 2 #1A4, 1 #1B5, 1 #30, 1 #1J6G, Total - 6
Total "A" Battery current	.65 amps.
Total "B" Battery current	.23 Mils.
Batteries Required	(Aircell, 3 Volt dry pack, or 2 V. storage battery (3 - 45 Volt "B" Batteries (2 - 4½ Volt "C" Batteries
Maximum Output	1.2 Watts
Undistorted Output	.5 Watts
Tuning Ranges	540 to 1725 KC., 2200 to 6000 KC., 5800 to 16000 KC.
Tune-Up Frequencies	465 KC. I.F., 1600 KC.. 600 KC., 6000 KC., 14000 KC.

The Schematic is the same as the 602 PRELIMINARY on PAGE 7-21 with the exception of a .1 Megohm resistor, Part # RE9584, indicated by # (74), connected in parallel with primary of 1st IF Transformer, indicated on Schematic as # (23).

Changes in parts numbers and values are as follows :

DIA #	PART #	DESCRIPTION AND VALUE OF PART
5	SW9548	Wave Change Switch
16	RE95128	2500 Ohm, 1/8 watt resistor
22	Part of IC9572	45-135 MMF trimmer condensor
23	IC9572	1st I.F. Coil (465 KC)
24	Part of IC9572	45-135 MMF trimmer condensor
28	Part of IC9569	45-135 MMF trimmer condensor
29	IC9569	2nd I.F. Coil (465 KC)
30	Part of IC9569	45-135 MMF trimmer Condensor
35	IC9568	3rd I.F. Coil (465 KC)
36	Part of IC9568	30-60 MMF trimmer condenser
66	SA107257	Speaker Socket
62	CW 2-50	.5 MFD., 200 Volt Condenser
69	RE9527	5000 Ohm, 1/8 watt resistor
74	RE9584	.1 Megohm, 1/4 watt resistor
75	TR9596	Output transformer
76	DM9520	Speaker diaphragm

GENERAL DESCRIPTION

These models are six-tube, three band, battery-operated, superheterodyne receivers whose circuits employ a type 1C6 tube as a combined first detector-oscillator, two type 1A4 tubes as intermediate frequency amplifiers, a type 1B5 as a combined second detector - A.V.C. - first audio amplifier, a type 30 as an audio frequency amplifier, and a type 1J6G as a power output amplifier. This receiver is equipped with a permanent magnet dynamic speaker.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the receiver, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. 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 location of the tubes and the various alignment condensers. The top and bottom view of the chassis are shown in Figure #1 and #2 and should be carefully studied before the actual work is started.

1. Connect the receiver to the batteries by plugging the "B" battery plugs and "C" battery plugs in their respective batteries. Connect the wire coming from the rear of the receiver to the terminal marked for the type of "A" supply you plan on using. Connect the red "A" battery lead to the positive terminal of the "A" battery and the black lead to the negative terminal of the "A" battery.

2. Set the volume control to the maximum position, the tone control to the treble position, the wave change switch to the broadcast band and the dial indicator to approximately 600 KC.

3. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 1A4 second I.F. tube through a .5 mfd. blocking condenser and adjust I.F. trimmer #36 to maximum output.

4. Apply the test signal to the grid of the type 1A4 first I.F. tube and adjust I.F. trimmers #28 and #30 to maximum output.

5. Apply the test signal to the grid of the type 1C6 first detector-oscillator tube and adjust I.F. trimmer condensers #22 and #24 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set the test oscillator and dial indicator to 1600 KC.

2. Apply the test signal to the antenna terminal of the receiver through a .0002 mfd. condenser and adjust the broadcast oscillator trimmer condenser #14 to maximum output.

3. Adjust the broadcast band preselector trimmer condensers #7 and #4 to maximum output.

4. Set the test oscillator and dial indicator to 600 KC. and adjust the broadcast oscillator series condenser #68 to maximum output at the same time rocking the variable condenser.

5. Return both the test oscillator and dial indicator to 1600 KC. and check the adjustment of trimmer condenser #14, #7, and #4.

ADJUSTMENT OF GREEN BAND

1. Set the wave change switch to the green band position.

2. Set the test oscillator and dial indicator to 6000 KC. and adjust the green band oscillator trimmer condenser #13 to maximum output.

3. Adjust the green band preselector trimmer condenser #3 to maximum output.

4. Check the receiver over the green band for sensitivity and calibration.

ADJUSTMENT OF RED BAND

1. Set the wave change switch in the red band position.

2. Set the test oscillator and dial indicator to 14000 KC. and adjust the red band oscillator trimmer condenser #12 to maximum output.

3. Adjust the red band preselector trimmer condenser #2 to maximum output.

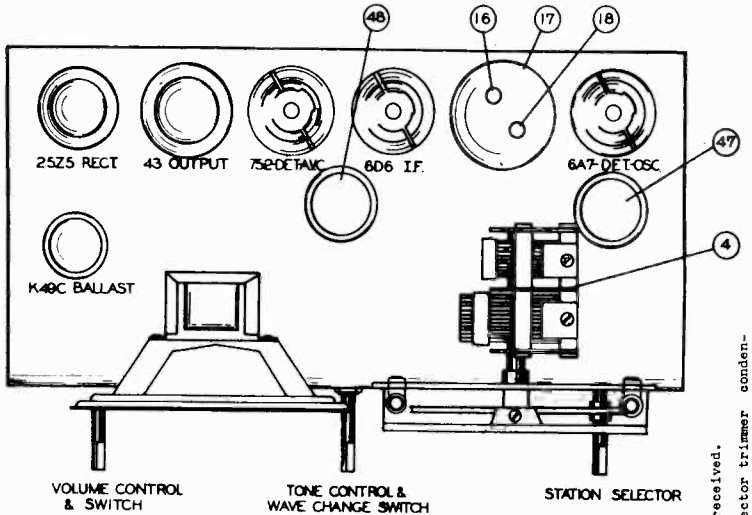
4. Check the receiver over the red band for sensitivity and calibration.

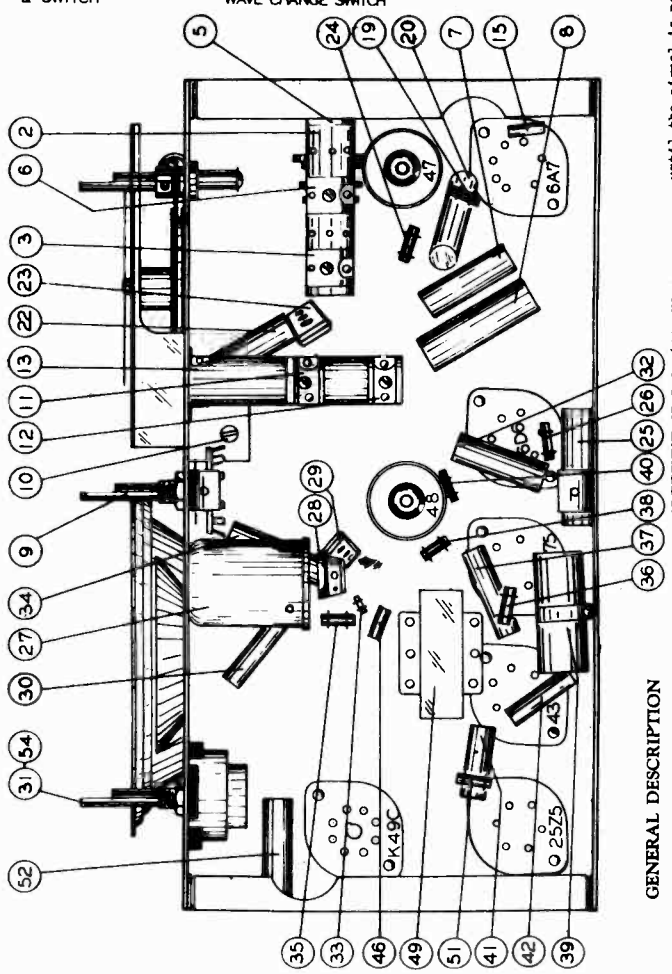
MODELS 610,610A
Final Schematic
Socket,Trimmers
Alignment,Notes

UNITED AMERICAN BOSCH CORP.

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes - 1 #6A7,1 #6D6,1 #75,1 #43,1 #25Z5,1 #K49C(Ballast) - Total 6
Power Supply Characteristics ---- 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.
Power Consumption ---------- 47 Watts
Maximum Output ---------- 1.0 Watt
Maximum Undistorted Output ---------- 0.75 Watt
Tuning Ranges ---------- (Broadcast Band - 540 to 1720 KC.
(Short-wave Band - 2100 to 7200 KC.
Line-Up Frequencies ---------- I.F. 465 KC., 1600 KC., 600 KC., 6000 KC.





THE FINAL SCHEMATIC IS THE SAME AS THE PRELIMINARY SCHEMATIC GIVEN ON PAGE 7-38,WITH THE EXCEPTION OF THE FOLLOWING PARTS NUMBERS :

Dia.#	Part #	Description
2	RC95262-	Antenna Coil
3	- - - - -	4-25 MMF Trimmer
		(Part of RC96262)
5	- - - - -	30-60 MMF Trimmer
		(Part of RC95262)
6	- - - - -	1.5-10 MMF Trimmer
		(Part of RC95262)
11	- - - - -	4-25 MMF Trimmer
		(Part of RC95199)
12	- - - - -	10-35 MMF Trimmer
		(Part of RC95199)
15	RC95199-	Oscillator coil assembly

GENERAL DESCRIPTION

This model is a six-tube, two-band, A.C.-D.C. superheterodyne receiver. A type 6A7 tube is used as a combined first detector-oscillator, a type 6D6 tube as an intermediate frequency amplifier, a type 75 tube as a second detector and automatic volume control and first audio frequency amplifier, a type 43 as an output amplifier, a type 25Z5 as a rectifier, and a type K49C as a ballast tube.

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, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figs. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set the volume control to maximum position and tone control to treble position.

2. Connect the output meter to the terminals of the voice coil.

3. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 6D6 I.F. tube through a .1 mfd. blocking condenser.

4. Adjust trimmer condenser #28 to maximum output.

5. Apply the test signal to the grid of the type 6A7 first detector-oscillator tube and adjust trimmer condensers #16 and #18 to maximum output.

6. Connect the test oscillator to the antenna of the receiver and with a strong input signal, adjust wave trap condenser #5 to minimum output.

BROADCAST BAND ADJUSTMENT

1. Set the test oscillator and dial indicator to 1600 KC.

2. Apply the test signal to the antenna of the receiver through a .0002 mfd condenser.

3. Adjust oscillator trimmer condenser #11 until the signal is received.

4. Adjust the preselector trimmer condenser #6 to maximum output.

5. Set test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #10 until the signal is received. Tune the receiver to a slightly lower frequency and readjust trimmer #10 to maximum output. If the sensitivity increases, continue this procedure in the same direction until maximum sensitivity is reached. If the sensitivity decreases, try this procedure at slightly higher frequencies until maximum sensitivity is reached.

6. Return test oscillator and dial indicator to 1600 KC. and check adjustment of the oscillator and preselector trimmer condensers.

ADJUSTMENT OF SHORT-WAVE BAND

1. Set the wave-change switch to the short-wave band position.

2. Set the test oscillator and dial indicator to 6000 KC. and adjust the oscillator trimmer condenser #12 until the signal is received.

3. Adjust the preselector trimmer condenser #3 to maximum output.

4. Check the sensitivity and calibration over scale.