VOLUME XXI

PERPETUAL TROUBLE SHOOTER'S MANUAL

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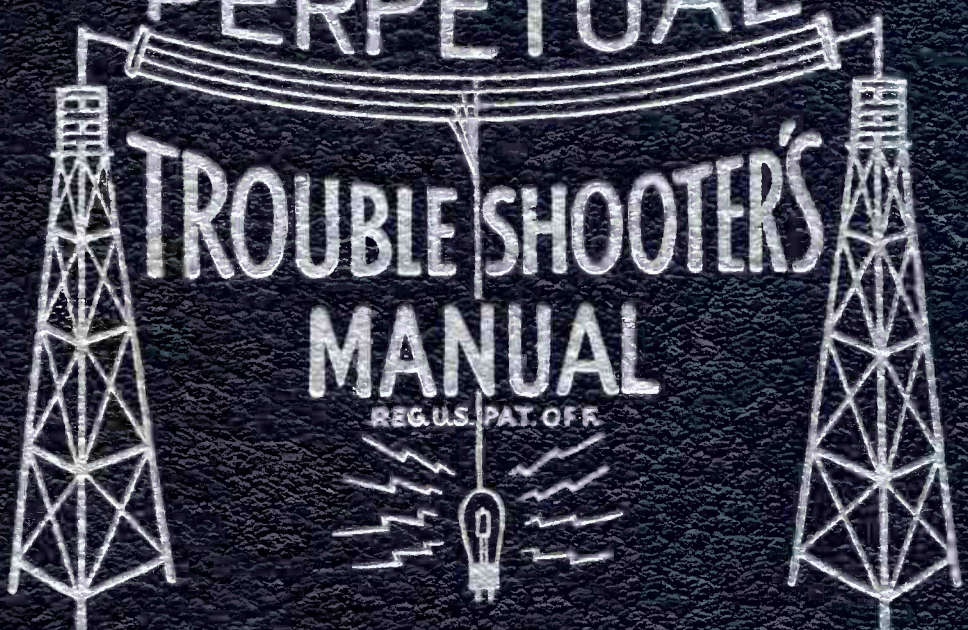

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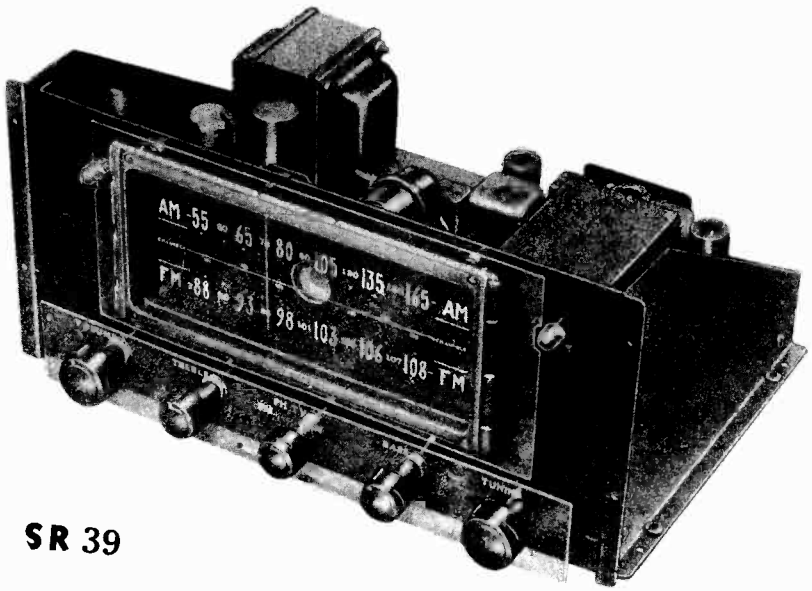
MODEL SR39



SR 39

A bandpass pre-stage tuned Radio Frequency section and one stage I.F. at 455 KC terminating in a tuned Infinite Impedence detector for those who insist on the best in a Standard Broadcast Receiver.

A Frequency Modulation Tuner employing a tuned R.F. Pre-stage for added sensitivity, a stable drift-free Triode Oscillator, two stages permiability tuned I.F. at 10.7 for superior F.M. performance and fully balanced static free Ratio Detector with 70% A.M. absorption.

Input jacks for phono pickups, either crystal pickup or properly compensated pre-amp for Variable Reluctance type pick-up and a jack for aural television on Selector Control Switch.

A new SR circuit for smooth electro-accoustical control of bass and treble emphasis allowing the controls of the audio amplifier to be pre-set.

Physical dimentions:- 14" wide, 7" high and 10" from escutcheon to back.

F.M. Sensitivity:- 10 microvolts.

Average output:- .4 volts.

Tubes: 3 6BA6; 1 each 6BE6; 6C4; 6AL5; 6SN7GT; 6SA7; 6SK7; 6SF7; 6Z5 and 6X5.

Power Consumption:- 68 watts, 110-125 volts, 50-60 cycles.

ANTENNA REQUIREMENTS.

For best non-directional standard AM broadcast results a single wire five to ten feet in length connected to antenna terminal "A" will be sufficient. Additional selectivity to this efficient input circuit would tend to restrict the wide band reception capabilities of the detector.

For best F.M. results a 100 M.C. dipole should be installed well above surrounding obstructions. The twisted 300 ohm line from the dipole should be connected to antenna terminals "D" and "G". ("G" also grounds unit.)

A console type folded dipole is supplied with the tuner and will prove a satisfactory substitute in most cases where an external dipole is impractical.

INPUT JACKS.

All phono or TV audio signals as well as the AM and FM radio are subject to the volume and tone controls of the tuner.

The jack marked "MAG" is the input for a properly compensated pre amplifier when using the variable reluctance cartridge.

XTAL is the phono input for a standard crystal pickup.

The TV jack makes it possible to channel the audio of a television tuner thru the radio's amplifier and speaker.

The OUTPUT jack should be connected to the high impedence input control (250,000 to 500,000 ohms) of a quality audio amplifier. Use the prepared shielded lead supplied with the tuner. Choose a speaker capable of wide range reproduction.

A.C.POWER. SR39 is completely powerized for 110-125 volts 50-60 cycles. The power switch (on the Volume Control) also controls the A.C.recepticle on the back of the chassis for convenience in amplifier installation.

CAUTION

VENTILATION IS EXTREMELY IMPORTANT. No multi-tube unit should be housed in an insufficiently ventilated cabinet. Damage to the unit and the cabinet will result.

USE ONLY 1 AMP. FUSE.

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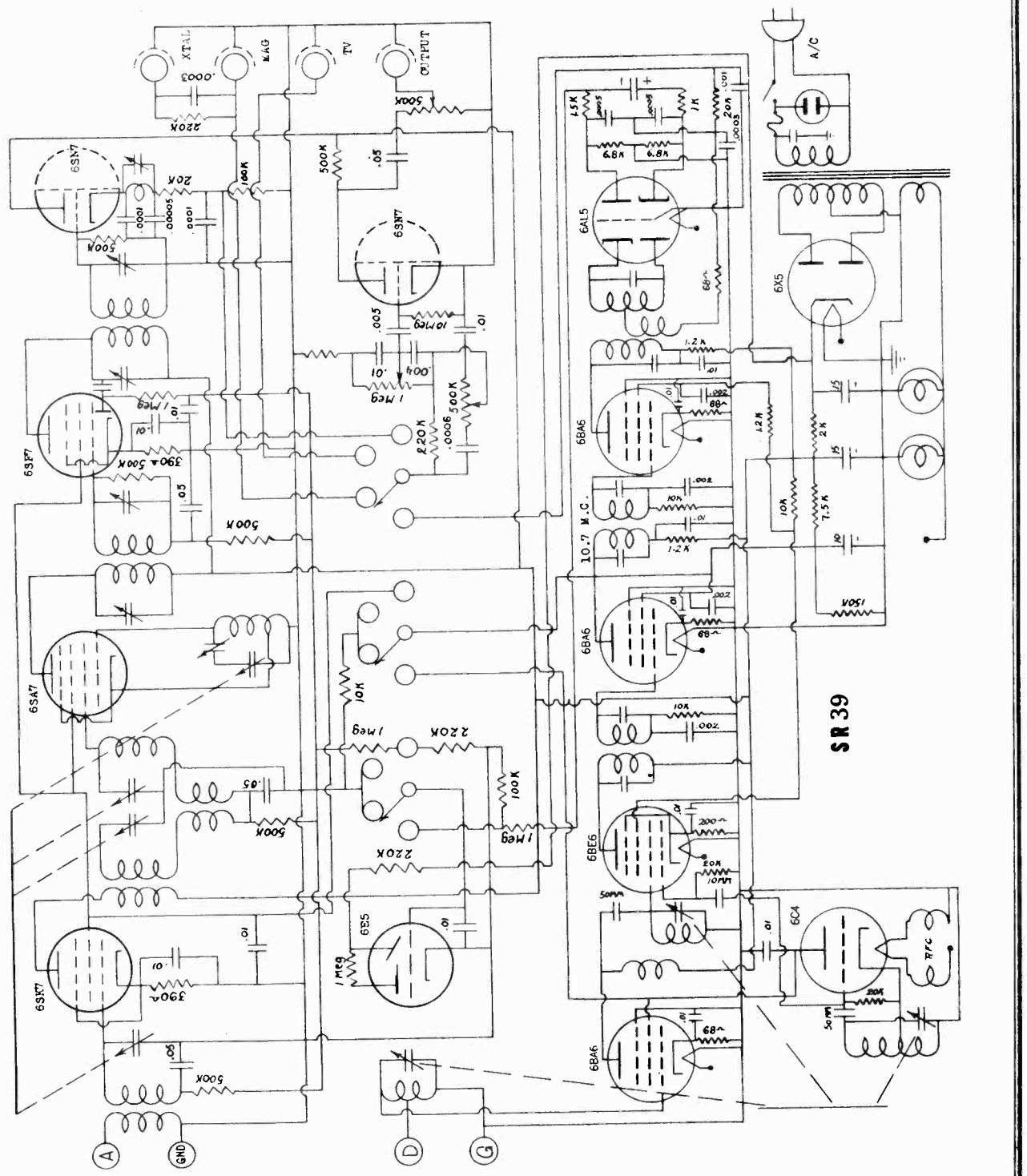
MODEL SR39



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GENERAL FEATURES

The Model 310 is a combination designed for the reception of radio broadcast programs and for the reproduction of phonograph records, television sound or other external sound. The receiver includes the following separate pieces of equipment: (1) chassis, (2) record changer, and (3) high fidelity speaker.

TECHNICAL DATA

Power Input	105 Watts at 117 Volts, 50-60 cycles. (Phono motor 60 cycles, 25 watts additional.)
Tubes	Total 12 including two rectifiers.
Circuits	Superheterodyne with RF amplifier stage (three gang tuning condenser) on all bands. Three stage FM-IF amplification (10.7 mc). One stage AM-IF (455 kc). Ratio detector on FM. Drift compensation on RF section. Push-pull output with 6 db inverse feedback. Sound input for phono and for TV or other external sound.
Tuning Range	AM - 535 - 1620 kc. FM - 87.5 - 108.5 mc.
Output	10 watts (2-6V6GT tubes in push-pull). Less than 5% distortion at full output.
Sensitivity	AM 12 microvolts FM 17 microvolts (Carrier modulated 30% at 400 cycles. Output 500 milliwatts with 10 db signal to noise ratio.)
Fidelity	Overall 30 to 20,000 cps plus or minus 1 db. Separate bass and treble control. Phono input equalized for elimination of objectionable scratch level. AM and FM audio equalized to BC standards.
Speaker	Hi-fidelity 12 inch PM. 8 ohm voice coil.

TUBE REPLACEMENT

The Model 310 has the following tube complement:

Symbol	Tube	Application	Symbol	Tube	Application
V1	6BA6	RF Amplifier	V7	6AL5	Ratio Detector, FM
V2	6BE6	Conv. & AM Osc.	V8	6SQ7	1st Audio Amplifier
V3	6C4	FM Oscillator	V9	6SN7	2nd Audio Amplifier
V4	6BA6	IF Amp., FM-AM	V10	6V6GT	Audio Power Output
V5	6AU6	IF Amp., FM & 2nd Detector, AM	V11	6V6GT	Audio Power Output
V6	6AU6	IF Amp., FM	V12	5Y3GT	Rectifier

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FUSE REPLACEMENT

A fuse is provided for protection of the receiver against excessive power line voltages, and against failure of any component in the receiver which would cause heavy current drain and fire hazard. This fuse is accessible at the rear panel of the tuner chassis. CAUTION: Always replace the fuse with one of the same rating in the event the fuse is blown. If the fuse continues to blow after replacement trouble is indicated and the equipment should be removed from the cabinet for examination.

ALIGNMENT PROCEDURE

Test Equipment

1. Voltohmyst for DC measurements.
2. AM signal generator for 455 KC, 1500 KC, 600 KC, 10.7 MC, 89 MC and 107 MC.
3. AC voltmeter such as the Ballantine voltmeter.
4. An aligning tool is included with each receiver and is taped on the 1st FM-IF transformer can. Additional aligning tools may be had by ordering under part number 94V4707.

In order to reduce instability due to ground currents it is advisable to have a metal sheet covering the test bench and to place all generators and the receivers to be tested on this metal plate.

Alignment Procedure

The alignment is preferably performed in the following order: See Figure 1 for location of adjustments on chassis.

1. AM-IF
2. AM-RF
3. FM-IF
4. FM-RF

AM-IF Alignment

A signal generator capable of modulation and accurately set to 455 KC should be attached through a .01 MFD capacitor to the lug on the service selector switch which connects to the middle AM section of the gang condenser. A good ground point for the generator is the rear support bracket of the switch.

The AC voltmeter is placed across the secondary of the audio output transformer, which is loaded with a 8 ohm 10 watt resistor connected in place of the speaker voice coil. In the event this resistor is not available the speaker may be used if the noise can be tolerated. The volume, bass and treble controls must be full on, the service selector switch in the AM position, and the tuning dial in any convenient position that does not interfere with the AM-IF output signal.

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Apply sufficient input signal at 455 KC, 30% AM modulated at 400 cycles to give an indication of about 2 volts rms AC on the AC voltmeter across the secondary of the output transformer. With the use of an aligning tool the primary and secondary of the two AM-IF transformers are peaked for a maximum indication on the output voltmeter. As the receiver approaches correct alignment, reduce the input signal level so that the output never exceeds 3-4 volts AC. It is good practice to recheck the peaking of the transformers a second time, especially if the set was badly out of alignment. The normal AM-IF sensitivity is such that when 100 uV are applied with the signal generator, the output voltmeter will read 2 volts minimum.

AM-RF Alignment

Apply the signal generator to the lug on the service selector switch that supports the loop lead (loop not connected). The AC voltmeter remains attached as for the IF alignment. The operating controls also remain as for the IF adjustment of the receiver. Set the signal generator and receiver dials on 600 KC at 30% modulation with 400 cycles and adjust the AM oscillator core (top adjustment on the 1 1/8" square can toward rear of chassis) for a maximum indication on the output voltmeter. Keep the generator input low enough to prevent the voltmeter from reading above 3-4 volts AC at all times.

The AM converter transformer (top of 1 1/8" square can toward front of chassis) is now adjusted for a maximum output indication on the voltmeter.

The generator and receiver dials are now set at 1500 KC and the oscillator and converter gang condenser trimmers (front holes in the gang cover) are adjusted for a maximum output on AC output voltmeter.

The above procedures are repeated until the 1500 KC and 600 KC points on the generator and the receiver dials coincide without further adjustment of the cores or trimmer condensers.

A sensitivity of 10 uV or less at 400 cycles 30% modulation for a 3 volt AC output and a 10 db or greater signal to noise ratio is normal for this input point.

The loop is then attached to the receiver and the generator is applied to the loop tap which is available on the antenna strip at rear of the receiver. The generator and the receiver dials are set to 1500 K and the antenna trimmer capacitor on the 1st AM section of the gang condenser is adjusted for maximum output on the AC output voltmeter.

A sensitivity of 1 uV at 400 cycles 30% modulation for a 2 volt AC output with a 10 db signal to noise ratio or better at 1500 KC and 600 KC is normal for the receiver at this input point.

FM-IF Alignment

Place the service selector switch in the FM position. Apply a signal generator unmodulated, and set accurately to 10.7 megacycles, to the grid tap on the FM converter coil. The rear mounting bracket of the service selector switch provides a convenient ground point for the generator.

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A DC voltohmyst voltmeter is connected from ground to the negative side of the 5 MFD electrolytic capacitor (C-37) which is across the two 8200 ohm load resistors (R-30, R-31) of the ratio detector.

Enough signal at 10.7 MC is then applied to the receiver to give an indication on the voltohmyst above the residual voltage already present. Always keep the input level of the signal generator low enough to produce not more than negative 5 volts DC on the voltohmyst.

The following FM-IF transformer cores are then adjusted in the following order for a maximum indication on the DC voltmeter:

1. Primary of ratio detector (bottom of large can).
2. Primary and secondary of 3rd FM-IF transformer.
3. Primary and secondary of 2nd FM-IF transformer.
4. Primary and secondary of 1st FM-IF transformer.

If the receiver was badly mis-aligned it is advisable to repeat the above procedure for better alignment.

The voltohmyst is then connected to the audio output of the ratio detector which is the junction of the 47,000 ohm ½ watt resistor (R-27) and the 1500 MMFD capacitor (C-36) and ground.

By tuning the secondary of the ratio detector (top of large can) it is possible to produce both positive and negative swings of the DC voltmeter from a zero position. The proper tuned position is the zero position of the voltmeter between the positive and negative swings.

In order to check the relative sensitivity of the FM-IF system move the voltohmyst back to the first position from the negative side of the 5 MFD capacitor to ground. A normal sensitivity is indicated when it is necessary to apply between 300 and 700 uV for a negative 5 volts DC on the voltohmyst.

FM-RF Alignment

Connect a signal generator unmodulated and accurately set on 89 MC to the FM antenna terminals of the receiver through a resistor of 200 ohm to 270 ohm in the hot lead of the generator to match the 300 ohm input of the FM antenna coil. The DC voltmeter is connected as it was for the FM-IF alignment, between the negative side of the 5 MFD capacitor (C-37) and ground.

Set the tuning dial of the radio to 89 MC and adjust the FM oscillator core for a maximum DC output on the voltohmyst. Adjust the input level of the signal generator so as to produce a negative 3 to 5 volts DC on the voltmeter. The correct oscillator core position is when the core is just entering the coil from the bottom of the coil. The 2nd harmonic of the oscillator is used to produce the IF frequency. By compression or expansion of the converter and antenna FM coils it is possible to bring their circuits into alignment with the oscillator at 89 MC.

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As the set becomes more accurately aligned it may be necessary to reduce the input of the signal generator to maintain an output below a negative 5 volts DC.

Now reset the signal generator and the receiver dials to 107 MC and adjust the oscillator tubular trimmer and the compression trimmers on the FM converter and antenna sections of the gang condenser for a maximum indication on the output DC voltmeter.

Again reset the generator and receiver dials back to 89 MC and repeat the operations performed formerly at this frequency setting. This realigning at the high and low ends of the FM band is necessary until it is noticed that at both 89 MC and 107 MC the receiver has been aligned to the generator frequency without adjustment of either the core of the oscillator or the oscillator trimmer to bring them into alignment.

The converter and antenna coils have been properly aligned when either compression or expansion of the turns will give no increase in the output DC voltage at 89 MC and the converter and oscillator trimmer condenser adjustment will also give no increase in DC output voltage at 107 MC.

VOLTAGE TABLE

Tube	Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6BA6	0	0	AC 6.5	0	115	115	0	-
V2	6BE6	-7 to -10	.9	AC 6.5	0	125	100	0	-
V3	6C4	120	0	AC 5.4	0	0	-7 to -10	0	-
V4	6BA6	0	0	AC 6.5	0	120	110	1.3	-
V5	6AU6	0	0	AC 6.5	0	110	110	1.2	-
V6	6AU6	0	0	AC 6.5	0	110	110	1.3	-
V7	6AL5	0	0	AC 6.5	0	.6	0	-.6	-
V8	6SQ7	0	-.8	0	0	0	20	AC 6.8	0
V9	6SN7	0	75	2.8	5.2	110	20	AC 6.3	0
V10	6V6G	0	0	260	270	0	105	AC 6.3	0
V11	6V6G	0	0	260	270	0	20	AC 6.3	0
V12	5Y3	0	300	0	AC 320	0	AC 320	0	300

Voltage readings made with Voltohmyst. Line voltage adjusted to 117 V AC. All voltages measured between indicated pin and chassis frame. Unless noted all voltages are DC and positive to frame.

No signal input.
Voltages taken with the service selector switch in the FM position.
Volume control in the counterclockwise position.
Tone controls clockwise.

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MODEL 310

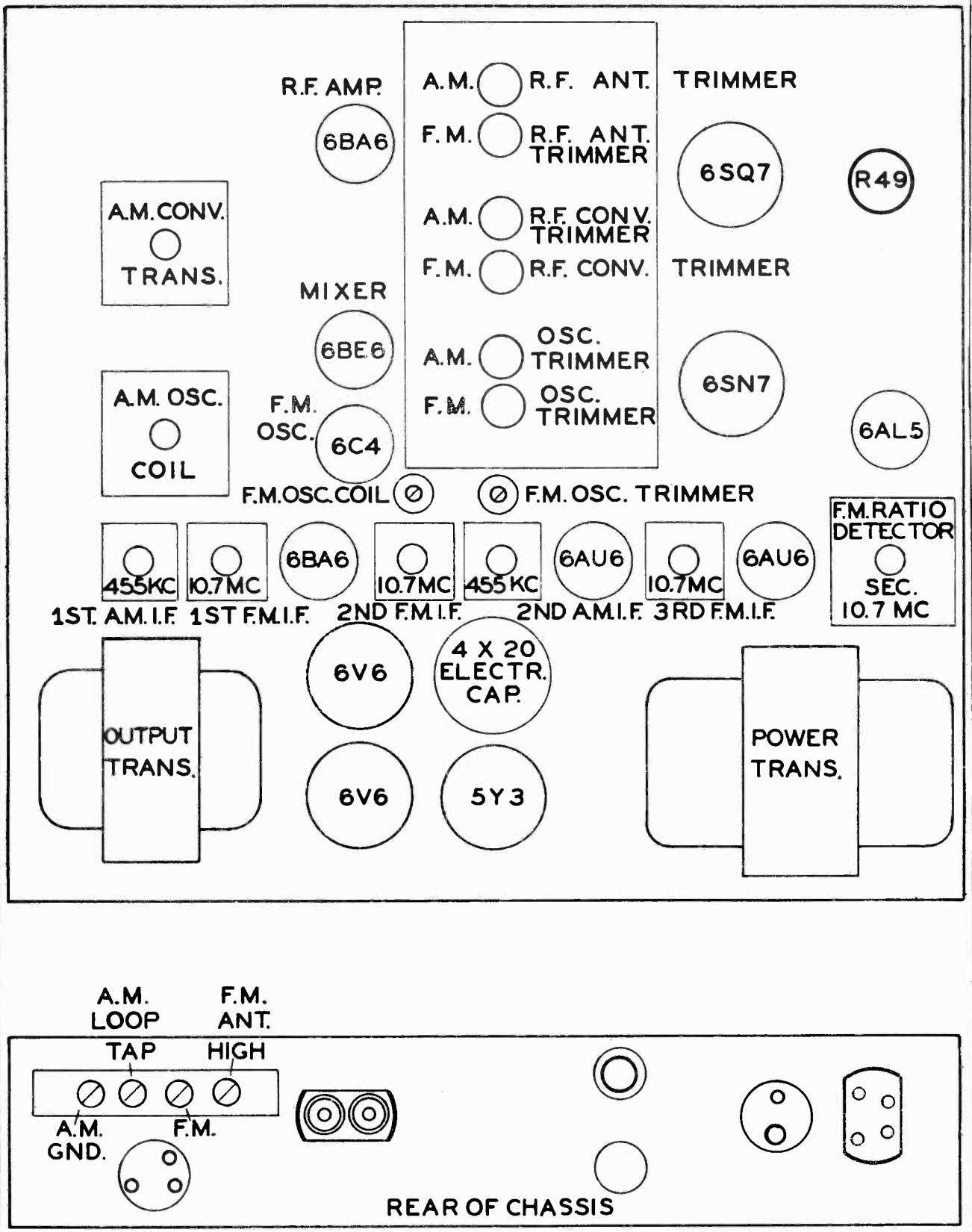

Figure 1 Model 310 Receiver Assembly

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RESISTANCE TABLE

Tube	Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6BA6	700 K	0	0	0	inf.	inf.	82	-
V2	6BE6	22 K	82	0	0	inf.	inf.	27	-
V3	6C4	inf.	inf.	3	0	inf.	47 K	0	-
V4	6BA6	200 K	0	0	0	inf.	inf.	82	-
V5	6AU6	60 K	0	0	0	inf.	inf.	220	-
V6	6AU6	0	0	0	0	inf.	inf.	220	-
V7	6AL5	inf.	inf.	0	0	10 K	0	10 K	-
V8	6SQ7	0	4.7 M	0	0	0	inf.	0	0
V9	6SN7	17 K	inf.	2.2 K	500 K	inf.	12 K	0	0
V10	6V6G	inf.	.2	inf.	inf.	220 K	10 K	0	250
V11	6V6G	inf.	0	inf.	inf.	220 K	10 K	0	250
V12	5Y3	inf.	inf.	inf.	75	inf.	80	inf.	inf.

Resistance readings taken with voltohmyst connected between pin indicated and chassis frame. Values given are in ohms except where K indicates times 1000 and M indicates times 1 megohm.

All controls to the counterclockwise or off position.
Range switch in FM position.

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
(C1 (C2 (C3	Main tuning capacitor	Capacitor, variable, 3 gang AM-FM	15U4569
C4	Grid coupling	Capacitor,ceramic 1500 MMFD 350 V	15L3459
C5	Cathode bypass, RF	Capacitor,ceramic 5000 MMFD Hi-Kap, 500 V	15L3462
C6	Cathode bypass, IF	Same as C5	
C7	Screen bypass, RF	Same as C5	
C8	Screen bypass, Conv.	Same as C5	
C9	Screen bypass, IF	Same as C5	
C10	Screen bypass, IF	Same as C5	
C11	Heater bypass, RF	Same as C5	
C12	Heater bypass, IF	Same as C5	
C13	Heater bypass, IF	Same as C5	
C14	Heater bypass, IF	Same as C5	
C15	Heater bypass, ratio detector	Same as C5	
C16	Grid decoupling, RF	Same as C5	
C17	Coupling, cathode follower	Capacitor, paper, .05 MFD 600 V, miniature tubular	15L3467
C18	Grid decoupling, Conv.	Capacitor, paper, .05 MFD 200 V, miniature tubular	15S4221
C19	Cathode bypass, audio	Capacitor, electrolytic, 25 MF 50 V, tubular	15B638
C20	RF coupling, FM	Capacitor, silver ceramic, 25 MMFD 10% 500 V NPO	15D3165
C21	Grid coupling oscillator	Capacitor, ceramic 51 MMFD 5% 500 V	15L3458
C22	Grid coupling, audio	Same as C17	
C23	Plate bypass, Conv.	Same as C5	
C24	Drift compensation	Capacitor, compensator, silver ceramic, 4 MMFD plus or minus .25 MMFD Hi-Q, temp coeff., insulated N-750	15V4678
C25	Grid oscillator, FM	Same as C21	
C26	Plate decoupling oscillator, FM	Same as C4	
C27	Plate bypass oscillator, FM	Same as C5	
C28	Plate decoupling, IF	Same as C5	
C29	Grid capacitor, AM detector	Capacitor,ceramic, 100 MMFD 10% 500 V	15L3460
(C30 (C31	Grid filter, AM Detector	Capacitor, silver ceramic, 2x100 MMFD 20% 500 V 3 wire leads	15D2923
C32	Bypass, AGC	Capacitor, paper, .1 MFD 200 V, miniature tubular	15S4298
C33	Diode load	Capacitor, mica, 390 MMFD 10% 500 V	15B799
C34	Diode load	Same as C33	
C35	Ratio detector decoupling	Same as C33	

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Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
C36	Audio filter, ratio detector	Same as C4	
C37	Ratio detector	Capacitor, electrolytic, 5 MFD 150 V, tubular	15V4599
C38	Screen bypass	Same as C17	
C39	IF grid bypass	Same as C5	
C40	Trimmer, FM oscillator	Capacitor, trimmer, .5-5 MMFD	15V4602
C41	Coupling, Audio Amp.	Capacitor, paper, .01 MFD 200 V, miniature tubular	15L3463
C42	Coupling, Audio Grid	Capacitor, paper, .1 MFD 600 V, miniature tubular	15L3468
C43	RF filter, Audio Amp.	Same as C29	
C44	Bypass, treble control	Same as C41	
C45	Bypass, treble control	Capacitor, paper, .005 MFD 20% 600 V	15H2603
C46	Bypass, bass control	Capacitor, paper, .02 MFD 200 V, tubular miniature	15U4580
C47	Bypass, bass control	Same as C45	
C48	Cathode bypass, audio	Capacitor, electrolytic, 25 MFD 25 V, tubular	15B795
C49	Plate coupling, audio	Same as C17	
C50	Coupling, audio amp.	Same as C46	
(C51 (C52 (C53 (C54	Filter, high voltage rectifier	Capacitor, electrolytic, 4x20 MFD 450 V	15L3588
C55	Plate decoupling, 1st audio	Same as C42	
E1	Dial light	Lamp, 6-8 V .150 A #47 brown	49A168
E2	Dial light	Same as E1	
E3	Overload protection	Fuse, 3 amp, 3 AG	37A162
E4	Main tuning knob	Knob, station selector, 1 7/8" dia., brass	47V4603
E5	Control knob	Knob, 1 1/8" dia. black bakelite, push-on type	47V4604
E6	Align IF	Aligning tool	94V4707
J1	Loop connection to receiver	Receptacle, 3 contact	67U4716
(J2 (	Television sound connection	Receptacle, dual, insulated	67V4657
(J3	Phono pickup connection		
J4	Phono motor power	Receptacle, 4 contact	67B645
J5	Speaker connection	Receptacle, 2 contact	67V4673

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
L1	AM signal intercept	Loop	1V4594
L2	FM antenna tuning	Coil	20V4625
L3	Coupling, RF stage	Choke	17V4668
L4	Tuning, FM-RF	Coil	20V4626
L5	Oscillator, AM	Coil	20V4621
L6	Oscillator, FM	Coil	20V4627
L7	Filter choke, RF-IF	Choke	17L3378
L8	Filter choke, RF-IF	Same as L7	
L9	Filter choke, RF-IF	Same as L7	
L10	Heater FM oscillator	Choke	17V4683
LS1	Loudspeaker	Speaker 12" PM - 8 ohm voice coil	85U4709
P1	Loop to receiver	Plug, 3 contact	65U4714
R1	Grid coupling, RF	Resistor, composition, .47 meg 10% ½ watt	70L3404
R2	Grid decoupling, RF	Resistor, composition, .1 meg 10% ½ watt	70L3401
R3	Cathode bias, RF	Resistor, composition, 82 ohms 5% ½ watt	70L3391
R4	Cathode bias, Conv.	Same as R3	
R5	Cathode bias, IF	Same as R3	
R6	Cathode bias, IF	Resistor, composition, 220 ohms 10% ½ watt	70V4783
R7	Cathode bias, IF	Same as R6	
R8	Screen decoupling, RF	Resistor, composition, 1000 ohms 10% ½ watt	70L3393
R9	Screen decoupling, IF	Same as R8	
R10	Screen decoupling, Conv.	Resistor, composition, 3300 ohms 10% ½ watt	70L3394
R11	Screen decoupling, IF	Same as R10	
R12	Screen decoupling, IF	Same as R10	
R13	Grid decoupling, Conv.	Same as R2	
R14	Oscillator grid, Conv.	Resistor, composition, 22,000 ohms 10% ½ watt	70L3397
R15	Plate decoupling, Conv.	Same as R8	
R16	Oscillator grid, FM	Resistor, composition, 47,000 ohms 10% ½ watt	70L3399
R17	Grid loading FM-IF	Same as R14	
R18	Grid decoupling, FM-IF	Same as R2	
R19	Grid decoupling, FM-IF	Resistor, composition, .22 meg 10% ½ watt	70L3403
R20	Grid decoupling	Same as R14	
R21	Grid decoupling	Same as R16	

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Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
R22	Grid	Resistor, composition, 27 ohms 10% ½ watt	70V4692
R23	Decoupling, AGC circuit	Resistor, composition, 1 meg 20% ½ watt	70L3406
R24	Plate coupling, FM oscillator	Same as R8	
R25	Plate decoupling, 1st audio	Same as R2	
R26	Decoupling, ratio detector	Resistor, composition, 47 ohms 10% ½ watt	70L3429
R27	De-emphasis, FM detector	Same as R16	
R28	Diode load, ratio detector	Resistor, composition, 1500 ohms 10% ½ watt	70L3525
R29	Diode load, ratio detector	Same as R28	
R30	Audio load, ratio detector	Resistor, composition, 8200 ohms 10% ½ watt	70L3523
R31	Audio load, ratio detector	Same as R30	
R32	Volume control	Potentiometer, volume, ½ meg	70V4583
R33	Grid loading, audio amp.	Resistor, composition, 4.7 meg 20% ½ watt	70L3530
R34	Plate load, audio amp.	Same as R2	
R35	Tone control network	Same as R16	
R36	Treble control	Potentiometer, treble, ½ meg	70V4584
R37	Bass control	Potentiometer, bass off-on, ½ meg	70V4585
R38	Bass control network	Same as R14	
R39	Grid load, audio amp.	Same as R2	
R40	Cathode bias, audio amp.	Resistor, composition, 2200 ohms 10% ½ watt	70L3432
R41	Cathode follower	Resistor, composition, 56 ohms 10% ½ watt	70V4628
R42	Cathode follower decoupling	Resistor, composition, 560 ohms 10% ½ watt	70L3527
R43	Cathode circuit	Resistor, composition, 10,000 ohms 10% ½ watt	70L3396
R44	Cathode bias, Audio Amp.	Same as R28	
R45	Plate coupling, audio amp.	Same as R16	
R46	Grid	Same as R19	
R47	Cathode bias, audio	Resistor, 220 ohms 10% 5 watt, Candohm	70U4717
R48	Filter	Same as R47	
R49	Filter	Resistor, wirewound, 2500 ohms 10% 15 watt	70U4718
R50	Grid	Same as R19	
R51	Grid	Same as R19	

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
SW1	AM, FM, Phono, TV switching	Switch, range, 4 position	89V4630
T1	Interstage coupling, Conv.	Coil	20V4620
T2	Interstage coupling,FM	Coil	20V4623
T3	Interstage coupling,AM	Coil	20V4622
T4	Interstage coupling,FM	Same as T2	
T5	Interstage coupling,AM	Same as T3	
T6	Interstage coupling,FM	Same as T2	
T7	Ratio detector transformer	Coil	20V4624
T8	Power	Transformer	91U4576
T9	Output	Transformer	91U4577
V1	RF Amplifier	Tube - 6BA6	92G2871
V2	Converter and Oscillator	Tube - 6BE6	92V4631
V3	FM Oscillator	Tube - 6C4	92B597
V4	IF Amplifier, FM-AM	Same as V1	
V5	IF Amplifier, FM & 2nd Detector, AM	Tube - 6AU6	92C2659
V6	IF Amplifier, FM	Same as V5	
V7	Ratio detector, FM	Tube - 6AL5	92G2870
V8	1st Audio Amplifier	Tube - 6SQ7	92V4632
V9	2nd Audio Amplifier	Tube - 6SN7	92A230
V10	Audio Power Output	Tube - 6V6GT	92E1061
V11	Audio Power Output	Same as V10	
V12	Rectifier	Tube - 5Y3GT	92G480
X1	Socket for V1	Socket, 7 contact, miniature type	82B663
X2	Socket for V2	Socket, 7 contact, miniature, mica filled, top mounting	82V4636
X3	Socket for V3	Same as X2	
X4	Socket for V4	Same as X1	
X5	Socket for V5	Same as X1	
X6	Socket for V6	Same as X1	
X7	Socket for V7	Same as X1	
X8	Socket for V8	Socket, 8 contact octal, black bakelite type MIP-8	82S4412
X9	Socket for V9	Same as X8	
X10	Socket for V10	Same as X8	
X11	Socket for V11	Same as X8	
X12	Socket for V12	Same as X8	

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MODEL 310

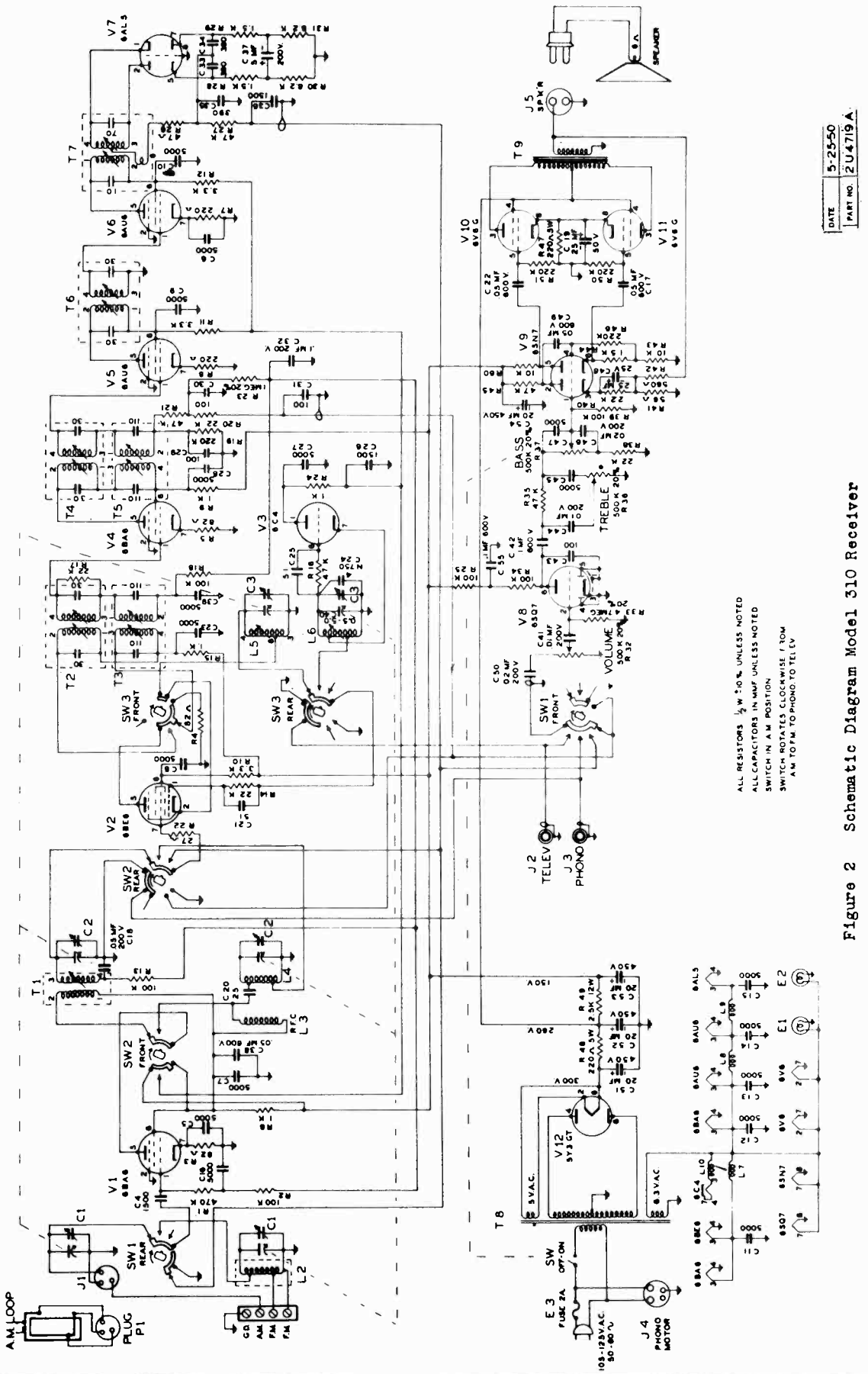

Figure 2 Schematic Diagram Model 310 Receiver

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MODELS 510; 510K, Kenilworth; 510S, Sheffield

GENERAL FEATURES

The Model 510 is a combination designed for the reception of radio broadcast programs and for the reproduction of phonograph records, television sound or other external sound. The receiver includes the following separate pieces of equipment: (1) radio-phono chassis, (2) power amplifier, (3) record changer, and (4) coaxial high fidelity speaker.

TECHNICAL DATA

Power Input	140-150 Watts at 117 Volts, 50-60 cycles. (Phono motor 60 cycles, 25 watts additional.)
Tubes	Total 14 including two rectifiers.
Circuits	Superheterodyne with RF amplifier stage (three gang tuning condenser) on all bands. Three stage FM IF amplification (10.7 mc). One stage AM IF (455 kc). Ratio detector on FM. Drift compensation on RF section. Push-pull output with 6 db inverse feedback. Separate B plus supplies for power amplifier and tuner sections for reduction of temperatures and to prevent damage to components through surges. Sound input for phono and for TV or other external sound.
Tuning Range	AM - 535 - 1620 kc. FM - 87.5 - 108.5 mc.
Output	20 watts (2-6L6 tubes in push-pull). Less than 5% distortion at full output.
Sensitivity	AM 12 microvolts FM 17 microvolts (Carrier modulated 30% at 400 cycles. Output 500 milliwatts with 10 db signal to noise ratio.)
Fidelity	Overall 30 to 20,000 cps plus or minus 1 db. Separate bass and treble control. Phono input equalized for elimination of objectionable scratch level. AM and FM audio equalized to BC standards.
Speaker	Hi-fidelity 12 inch coaxial PM. 8 ohm voice coil.

TUBE REPLACEMENT

The Model 510 has the following tube complement:

Symbol	Tube	Application	Symbol	Tube	Application
V1	6BA6	RF Amplifier	V8	6SQ7	1st Audio Amplifier
V2	6BE6	Conv. & AM Osc.	V9	6SN7	2nd Audio Amplifier
V3	6C4	FM Oscillator	V10	6SN7	3rd Audio Amplifier
V4	6BA6	IF Amp., FM-AM	V11	6L6G	Audio Power Output
V5	6AU6	IF Amp., FM & 2nd Detector, AM	V12	6L6G	Audio Power Output
			V13	5Y3GT	Rectifier
V6	6AU6	IF Amp., FM	V14	25Z6GT	Rectifier
V7	6AL5	Ratio Detector, FM			

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FUSE REPLACEMENT

A fuse is provided for protection of the receiver against excessive power line voltages, and against failure of any component in the receiver which would cause heavy current drain and fire hazard. This fuse is accessible at the rear panel of the tuner chassis. CAUTION: Always replace the fuse with one of the same rating in the event the fuse is blown. If the fuse continues to blow after replacement trouble is indicated and the equipment should be removed from the cabinet for examination.

ALIGNMENT PROCEDURE

Test Equipment

1. Voltohmyst for DC measurements.
2. AM signal generator for 455 KC, 1500 KC, 600 KC, 10.7 MC, 89 MC and 107 MC.
3. AC voltmeter such as the Ballantine voltmeter.
4. An aligning tool is included with each receiver and is taped on the 1st FM-IF transformer can. Additional aligning tools may be had by ordering under part number 94V4707.

In order to reduce instability due to ground currents it is advisable to have a metal sheet covering the test bench and to place all generators and the receivers to be tested on this metal plate.

Alignment Procedure

The alignment is preferably performed in the following order: See Figure 1 for location of adjustments on chassis.

1. AM-IF
2. AM-RF
3. FM-IF
4. FM-RF

AM-IF Alignment

A signal generator capable of modulation and accurately set to 455 KC should be attached through a .01 MFD capacitor to the lug on the service selector switch which connects to the middle AM section of the gang condenser. A good ground point for the generator is the rear support bracket of the switch.

The AC voltmeter is placed across the secondary of the audio output transformer, which is loaded with a 8 ohm 10 watt resistor connected in place of the speaker voice coil. In the event this resistor is not available the speaker may be used if the noise can be tolerated. The volume, bass and treble controls must be full on, the service selector switch in the AM position, and the tuning dial in any convenient position that does not interfere with the AM-IF output signal. Apply sufficient input signal at 455 KC, 30% AM modulated at 400 cycles to give an indication of about 2 volts rms AC on the AC voltmeter across the secondary of the output transformer. With the use of an aligning tool the primary and secondary of the two AM-IF transformers are peaked for a maximum indication on the output voltmeter. As the receiver approaches correct alignment, reduce the input signal level so that the output never exceeds 3-4 volts AC. It is good prac-

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tice to recheck the peaking of the transformers a second time, especially if the set was badly out of alignment. The normal AM-IF sensitivity is such that when 100 uV are applied with the signal generator, the output voltmeter will read 2 volts minimum.

AM-RF Alignment

Apply the signal generator to the lug on the service selector switch that supports the loop lead (loop not connected). The AC voltmeter remains attached as for the IF alignment. The operating controls also remain as for the IF adjustment of the receiver. Set the signal generator and receiver dials on 600 KC at 30% modulation with 400 cycles and adjust the AM oscillator core (top adjustment on the 1 1/8" square can toward rear of chassis) for a maximum indication on the output voltmeter. Keep the generator input low enough to prevent the voltmeter from reading above 3-4 volts AC at all times.

The AM converter transformer (top of 1 1/8" square can toward front of chassis) is now adjusted for a maximum output indication on the voltmeter.

The generator and receiver dials are now set at 1500 KC and the oscillator and converter gang condenser trimmers (front holes in the gang cover) are adjusted for a maximum output on AC output voltmeter.

The above procedures are repeated until the 1500 KC and 600 KC points on the generator and the receiver dials coincide without further adjustment of the cores or trimmer condensers.

A sensitivity of 10 uV or less at 400 cycles 30% modulation for a 3 volt AC output and a 10 db or greater signal to noise ratio is normal for this input point.

The loop is then attached to the receiver and the generator is applied to the loop tap which is available on the antenna strip at rear of the receiver. The generator and the receiver dials are set to 1500 KC and the antenna trimmer capacitor on the 1st AM section of the gang condenser is adjusted for maximum output on the AC output voltmeter.

A sensitivity of 1 uV at 400 cycles 30% modulation for a 2 volt AC output with a 10 db signal to noise ratio or better at 1500 KC and 600 KC is normal for the receiver at this input point.

FM-IF Alignment

Place the service selector switch in the FM position. Apply a signal generator unmodulated, and set accurately to 10.7 megacycles, to the grid tap on the FM converter coil. The rear mounting bracket of the service selector switch provides a convenient ground point for the generator.

A DC voltohmyst voltmeter is connected from ground to the negative side of the 5 MFD electrolytic capacitor (C-37) which is across the two 8200 ohm load resistors (R-30, R-31) of the ratio detector.

Enough signal at 10.7 MC is then applied to the receiver to give an indication on the voltohmyst above the residual voltage already present. Always keep the input level of the signal generator low enough to produce not more than negative 5 volts DC on the voltohmyst.

The following FM-IF transformer cores are then adjusted in the following order for a maximum indication on the DC voltmeter:

1. Primary of ratio detector (bottom of large can).

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2. Primary and secondary of 3rd FM-IF transformer.

3. Primary and secondary of 2nd FM-IF transformer.

4. Primary and secondary of 1st FM-IF transformer.

If the receiver was badly mis-aligned it is advisable to repeat the above procedure for better alignment.

The voltohmyst is then connected to the audio output of the ratio detector which is the junction of the 47,000 ohm $\frac{1}{2}$ watt resistor (R-27) and the 1500 MMFD capacitor (C-36) and ground.

By tuning the secondary of the ratio detector (top of large can) it is possible to produce both positive and negative swings of the DC voltmeter from a zero position. The proper tuned position is the zero position of the voltmeter between the positive and negative swings.

In order to check the relative sensitivity of the FM-IF system move the voltohmyst back to the first position from the negative side of the 5 MFD capacitor to ground. A normal sensitivity is indicated when it is necessary to apply between 300 and 700 uV for a negative 5 volts DC on the voltohmyst.

FM-RF Alignment

Connect a signal generator unmodulated and accurately set on 89 MC to the FM antenna terminals of the receiver through a resistor of 200 ohm to 270 ohm in the hot lead of the generator to match the 300 ohm input of the FM antenna coil. The DC voltmeter is connected as it was for the FM-IF alignment, between the negative side of the 5 MFD capacitor (C-37) and ground.

Set the tuning dial of the radio to 89 MC and adjust the FM oscillator core for a maximum DC output on the voltohmyst. Adjust the input level of the signal generator so as to produce a negative 3 to 5 volts DC on the voltmeter. The correct oscillator core position is when the core is just entering the coil from the bottom of the coil. The 2nd harmonic of the oscillator is used to produce the IF frequency. By compression or expansion of the converter and antenna FM coils it is possible to bring their circuits into alignment with the oscillator at 89 MC.
As the set becomes more accurately aligned it may be necessary to reduce the input of the signal generator to maintain an output below a negative 5 volts DC.

Now reset the signal generator and the receiver dials to 107 MC and adjust the oscillator tubular trimmer and the compression trimmers on the FM converter and antenna sections of the gang condenser for a maximum indication on the output DC voltmeter.

Again reset the generator and receiver dials back to 89 MC and repeat the operations performed formerly at this frequency setting. This realigning at the high and low ends of the FM band is necessary until it is noticed that at both 89 MC and 107 MC the receiver has been aligned to the generator frequency without adjustment of either the core of the oscillator or the oscillator trimmer to bring them into alignment.

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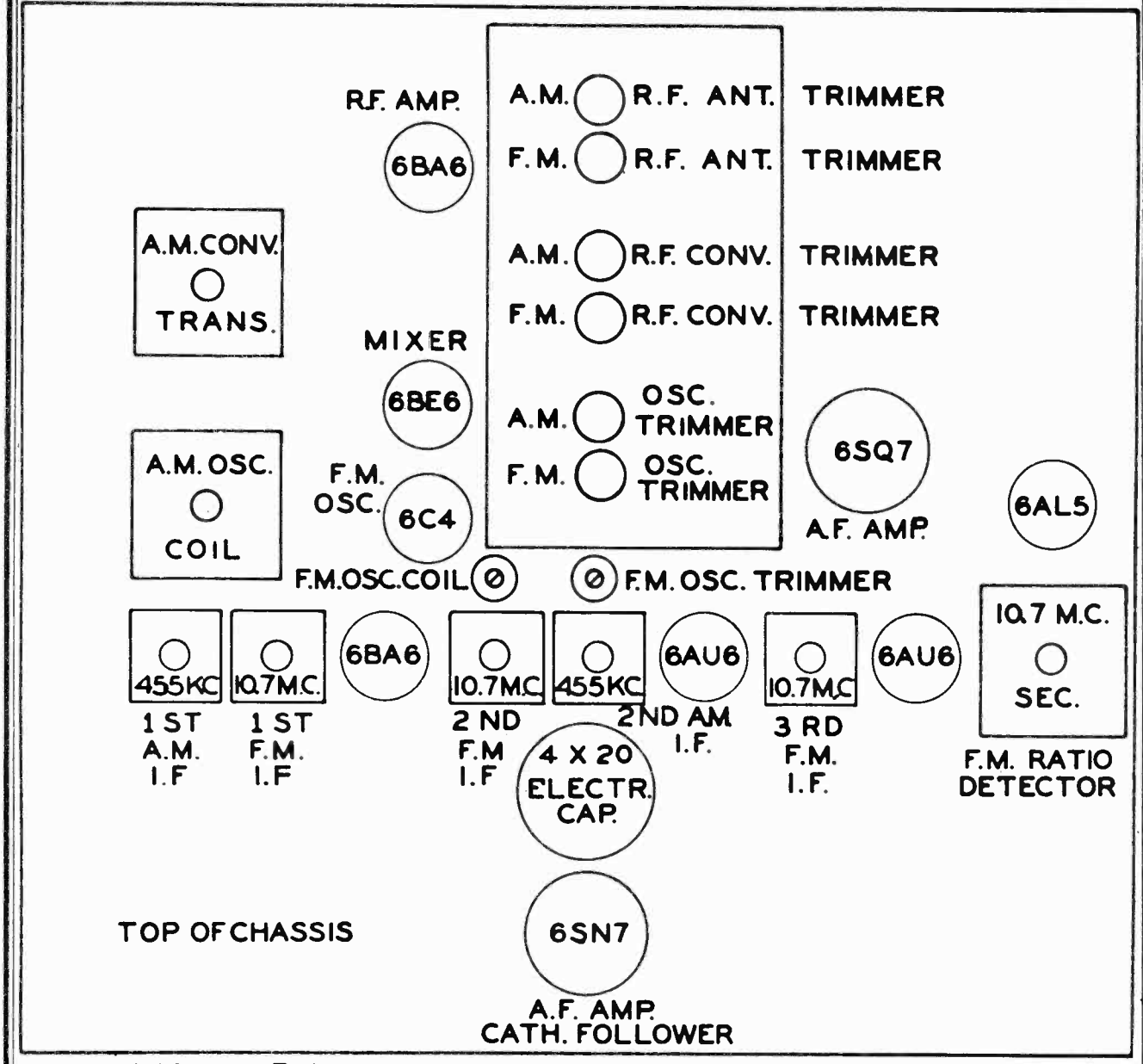
The converter and antenna coils have been properly aligned when either compression or expansion of the turns will give no increase in the output DC voltage at 89 MC and the converter and oscillator trimmer condenser adjustment will also give no increase in DC output voltage at 107 MC.



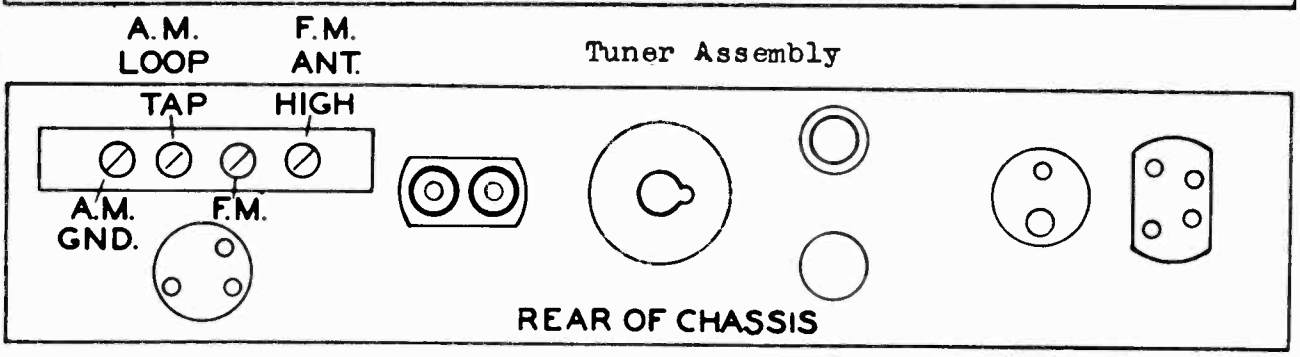


FIG. 1

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VOLTAGE TABLE

Tube	Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6BA6	0	0	AC 6.5	0	120	120	1.5	-
V2	6BE6	-7 to -10	.9	AC 6.5	0	125	110	0	-
V3	6C4	130	0	AC 6.5	0	130	-7 to -10	0	-
V4	6BA6	0	0	AC 6.5	0	120	120	1.5	-
V5	6AU6	0	0	AC 6.5	0	110	110	.7 to .9	-
V6	6AU6	0	0	AC 6.5	0	110	110	.7 to .9	-
V7	6AL5	0	0	AC 6.5	0	.6	0	-.6	-
V8	6SQ7	0	-.8	0	0	0	90	AC 6.8	0
V9	6SN7	0	150	6	40	270	55	AC 6.8	0
V10	6SN7	66	210	78	66	210	78	0	AC 6.8
V11	6L6G	0	AC 6.8	360	275	0	73	0	15
V12	6L6G	0	AC 6.8	360	275	0	73	0	15
V13	5Y3	0	400	0	AC 390	0	AC 390	0	400
V14	25Z6	0	0	AC 170	200	AC 170	0	0	200

Voltage readings made with Voltohmyst. Line voltage adjusted to 117 V AC. All voltages measured between indicated pin and chassis frame. Unless noted all voltages are DC and positive to frame.

No signal input.
Voltages taken with the service selector switch in the FM position.
Volume control in the counterclockwise position.
Tone controls clockwise.

RESISTANCE TABLE

Tube	Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6BA6	700 K	0	0	0	inf.	inf.	82	-
V2	6BE6	22 K	82	0	0	inf.	inf.	27	-
V3	6C4	inf.	inf.	0	0	inf.	47 K	0	-
V4	6BA6	200 K	0	0	0	inf.	inf.	82	-
V5	6AU6	60 K	0	0	0	inf.	inf.	82	-
V6	6AU6	0	0	0	0	inf.	inf.	82	-
V7	6AL5	inf.	inf.	0	0	10 K	0	10 K	-
V8	6SQ7	0	4.7 M	0	0	0	inf.	0	0
V9	6SN7	19 K	inf.	2.2 K	500 K	inf.	12 K	0	0
V10	6SN7	230 K	inf.	11 K	230 K	inf.	11 K	0	0
V11	6L6G	inf.	.2	inf.	inf.	470 K	10 K	0	170
V12	6L6G	inf.	.2	inf.	inf.	470 K	10 K	0	170
V13	5Y3	inf.	inf.	inf.	5	inf.	5	inf.	inf.
V14	25Z6	inf.	inf.	2	inf.	2	inf.	inf.	inf.

Resistance readings taken with voltohmyst connected between pin indicated and chassis frame. Values given are in ohms except where K indicates times 1000 and M indicates times 1 megohm.

All controls to the counterclockwise or off position.
Range switch in FM position.

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Parts List By Symbol Designation			
Symbol Desig.	Function	Description	Part No.
(C1 (C2 (C3	Main tuning capacitor	Capacitor, variable, 3 gang AM-FM	15U4569
C4	Grid coupling	Capacitor, ceramic 1500 MMFD 350 V	15L3459
C5	Cathode bypass, RF	Capacitor, ceramic 5000 MMFD Hi-Kap, 500 V	15L3462
C6	Cathode bypass, IF	Same as C5	
C7	Screen bypass, RF	Same as C5	
C8	Screen bypass, Conv.	Same as C5	
C9	Screen bypass, IF	Same as C5	
C10	Screen bypass, IF	Same as C5	
C11	Heater bypass, RF	Same as C5	
C12	Heater bypass, IF	Same as C5	
C13	Heater bypass, IF	Same as C5	
C14	Heater bypass, IF	Same as C5	
C15	Heater bypass, ratio detector	Same as C5	
C16	Grid decoupling, RF	Same as C5	
C17	Grid decoupling, RF	Capacitor, paper, .05 MFD 200 V, miniature tubular	15S4221
C18	Grid decoupling, Conv.	Same as C17	
C19	AGC bypass, AM	Same as C17	
C20	RF coupling, FM	Capacitor, silver ceramic, 25 MMFD 10% 500 V NPO	15D3165
C21	Grid coupling oscillator	Capacitor, ceramic 51 MMFD 5% 500 V	15L3458
C22	Plate bypass, Conv.	Capacitor, paper, .05 MFD 400 V, miniature tubular	15L3466
C23	Plate bypass, Conv.	Same as C5	
C24	Drift compensation	Capacitor, compensator, silver ceramic, 4 MMFD plus or minus .25 MMFD Hi-Q, temp coeff. insulated N-750	15V4678
C25	Grid oscillator, FM	Same as C21	
C26	Plate decoupling oscillator, FM	Same as C4	
C27	Plate bypass oscillator, FM	Same as C5	
C28	Plate decoupling, IF	Same as C22	
C29	Grid capacitor, AM detector	Capacitor, ceramic, 100 MMFD 10% 500 V	15L3460
(C30 (C31	Grid filter, AM detector	Capacitor, silver ceramic, 2x100 MMFD 20% 500 V 3 wire leads	15D2923
C32	Bypass, AGC	Capacitor, paper, .1 MFD 200 V, miniature tubular	15S4298
C33	Diode load	Capacitor, mica, 390 MMFD 10% 500 V	15B799
C34	Diode load	Same as C33	
C35	Ratio detector decoupling	Same as C33	

Parts List By Symbol Designation			
Symbol Desig.	Function	Description	Part No.
C36	Audio filter, ratio detector	Same as C4	
C37	Ratio detector	Capacitor, electrolytic, 5 MFD 150 V, tubular	15V4599
(C38 (C39 (C40	Filter, low frequency	Capacitor, electrolytic, 10/10/10/40, 450 V	15L3539
C41	Coupling, Audio Amp.	Capacitor, paper, .01 MFD 200 V, miniature tubular	15L3563
C42	Coupling, Audio Grid	Capacitor, paper, .1 MFD 400 V, miniature tubular	15V4685
C43	RF filter, Audio Amp.	Same as C29	
C44	Bypass, treble control	Same as C41	
C45	Bypass, treble control	Capacitor, paper, .005 MFD 20% 600 V	15H2603
C46	Bypass, bass control	Same as C40	
C47	Bypass, bass control	Same as C45	
C48	Cathode bypass, audio	Capacitor, electrolytic, 25 MFD 25 V, tubular	15B795
C49	Plate coupling, audio	Capacitor, paper, .05 MFD 600 V, miniature tubular	15L3467
C50	Coupling, Audio Amp.	Capacitor, paper, .02 MFD 200 V, tubular miniature	15U4580
C51	Coupling, cathode follower	Same as C22	
C60	Trimmer, FM oscillator	Capacitor, trimmer, .5-5 MMFD	15V4602
C61	IF grid bypass	Same as C5	
C62	Screen bypass	Same as C22	
(C52 (C53	Filter, low voltage rectifier	Capacitor, electrolytic, 2 x 60 MFD 200 V	15L3438
(C54 (C55 (C56	Filter, high voltage rectifier	Capacitor, electrolytic, 4x20 MFD 450 V	15L3588
C57	Grid coupling, power amplifier	Same as C49	
C58	Grid coupling, power amplifier	Same as C49	
C59	Cathode bypass, power amplifier	Capacitor, electrolytic, 25 MF 50 V, tubular	15B638
E1	Dial light	Lamp, 6-8 V .150 A #47 brown	49A169
E2	Dial light	Same as E1	
E3	Overload protection	Fuse, 3 amp, 3 AG	37A162
E4	Main tuning knob	Knob, station selector, 1 7/8" dia., brass	47V4603

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Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
E5	Control knob	Knob, 1 1/8" dia. black bakelite, push-on type	47V4604
E6	Align IF	Aligning tool	94V4707
J1	Loop connection to receiver	Receptacle, 3 contact	67L3560
(J2	Television sound connection	Receptacle, dual, insulated	67V4657
(J3	Phono pickup connection		
J4	Power cable connection	Receptacle, 12 contact	82S4305
J5	Phono motor power	Receptacle, 4 contact	67B645
J6	Speaker connection	Receptacle, 2 contact	67V4673
L1	AM signal intercept	Loop	1V4594
L2	FM antenna tuning	Coil	20V4625
L3	Coupling, RF stage	Choke	17V4668
L4	Tuning, FM-RF	Coil	20V4626
L5	Oscillator, AM	Coil	20V4621
L6	Oscillator, FM	Coil	20V4627
L7	Filter choke, RF-IF	Choke	17L3378
L8	Filter choke, RF-IF	Same as L7	
L9	Filter choke, RF-IF	Same as L7	
L10	Filter choke, hum	Choke	17L3312
LS1	Loudspeaker	Speaker, 12" coaxial, Jensen K210, 8 ohm voice coil	85V4593
P1	Loop to receiver	Plug, 3 contact	65L3559
P2	Amplifier to tuner	Plug, 12 contact	65S4301
R1	Grid coupling, RF	Resistor, composition, .47 meg 10% ½ watt	70L3404
R2	Grid decoupling, RF	Resistor, composition, .1 meg 10% ½ watt	70L3401
R3	Cathode bias, RF	Resistor, composition, 82 ohms 5% ½ watt	70L3391
R4	Cathode bias, Conv.	Same as R3	
R5	Cathode bias, IF	Same as R3	
R6	Cathode bias, IF	Same as R3	
R7	Cathode bias, IF	Same as R3	

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
R8	Screen decoupling, RF	Resistor, composition, 1000 ohms 10% ½ watt	70L3393
R9	Screen decoupling, IF	Same as R8	
R10	Screen decoupling, Conv.	Resistor, composition, 3300 ohms 10% ½ watt	70L3394
R11	Screen decoupling, IF	Same as R10	
R12	Screen decoupling, IF	Same as R10	
R13	Grid decoupling, Conv.	Same as R2	
R14	Oscillator grid, Conv.	Resistor, composition, 22,000 ohms 10% ½ watt	70L3397
R15	Plate decoupling, Conv.	Same as R8	
R16	Oscillator grid, FM	Resistor, composition, 47,000 ohms 10% ½ watt	70L3399
R17	Grid loading, FM-IF	Same as R14	
R18	Grid decoupling, FM-IF	Same as R2	
R19	Grid decoupling, FM-IF	Resistor, composition, .22 meg 10% ½ watt	70L3403
R20	Grid decoupling	Same as R14	
R21	Grid decoupling	Same as R16	
R22	Grid loading, FM-IF	Same as R14	
R23	Decoupling, AGC circuit	Resistor, composition, 1 meg 20% ½ watt	70L3406
R24	Plate coupling, FM oscillator	Same as R8	
R25	Grid loading, FM-IF	Same as R14	
R26	Decoupling, ratio detector	Resistor, composition, 47 ohms 10% ½ watt	70L3429
R27	De-emphasis, FM detector	Same as R16	
R28	Diode load, ratio detector	Resistor, composition, 1500 ohms 10% ½ watt	70L3525
R29	Diode load, ratio detector	Same as R28	
R30	Audio load, ratio detector	Resistor, composition, 8200 ohms 10% ½ watt	70L3523
R31	Audio load, ratio detector	Same as R30	
R32	Volume control	Potentiometer, volume, ½ meg	70V4583
R33	Grid loading, audio amp.	Resistor, composition, 4.7 meg 20% ½ watt	70L3530
R34	Plate load, audio amp.	Same as R2.	
R35	Tone control network	Same as R16	
R36	Treble control	Potentiometer, treble, 1/2 meg	70V4584
R37	Bass control	Potentiometer, bass off-on, 1/2 meg	70V4585
R38	Bass control network	Same as R14	
R39	Grid load, audio amp.	Same as R2	
R40	Cathode bias, audio amp.	Resistor, composition, 2200 ohms 10% ½ watt	70L3432

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Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
R41	Cathode follower	Resistor, composition, 56 ohms 10% ½ watt	70V4628
R42	Cathode follower decoupling	Resistor, composition, 560 ohms 10% ½ watt	70L3527
R43	Cathode circuit	Resistor, composition, 10,000 ohms 10% ½ watt	70L3396
R44	Cathode bias, Audio Amp.	Resistor, composition, 1800 ohms 10% ½ watt	70V4700
R45	Plate coupling, Audio Amp.	Same as R16	
R46	Plate decoupling, Audio Amp.	Same as R8	
R47	Power filter	Resistor, 750 ohms 10% 5 watt, Candohm	70V4662
R58	Grid resistor	Resistor, composition, 27 ohms 10% ½ watt	70V4692
R59	Grid loading	Same as R1	
R48	Filter	Resistor, 375 ohms 10% 5 watt, Candohm	70V4589
R49	Filter	Resistor, composition, 3900 ohms 10% 2 watt	70V4693
R50	Cathode coupling	Resistor, composition, 10,000 ohms 10% 1 watt	70L3427
R51	Cathode bias	Resistor, composition, 680 ohms 10% ½ watt	70V4691
R52	Grid	Same as R19	
R53	Plate coupling	Same as R50	
R54	Grid	Same as R1	
R55	Grid	Same as R1	
R56	Cathode bias	Resistor, 167 ohms 10% 5 watt, Candohm	70V4588
R57	Used on two tap transformer only	Resistor, wirewound, 10 ohms 10 watt 10%	70E2630
SW1	AM, FM, Phono, TV switching	Switch, range, 4 position	89V4630
T1	Interstage coupling, Conv.	Coil	20V4620
T2	Interstage coupling, FM	Coil	20V4623
T3	Interstage coupling, AM	Coil	20V4622
T4	Interstage coupling, FM	Same as T2	
T5	Interstage coupling, AM	Same as T3	

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part No.
T6	Interstage coupling, FM	Same as T2	
T7	Ratio detector transformer	Coil	20V4624
T8	Power	Transformer	91V4666
T9	Output	Transformer	91V4667
V1	RF amplifier	Tube - 6BA6	92G2871
V2	Converter and Oscillator, AM	Tube - 6BE6	92V4631
V3	FM oscillator	Tube - 6C4	92B597
V4	IF amplifier, FM-AM	Same as V1	
V5	IF amplifier, FM-AM Detector	Tube - 6AU6	92C2659
V6	IF amplifier, FM	Same as V5	
V7	Ratio detector	Tube - 6AL5	92G2870
V8	Audio amplifier	Tube - 6SQ7	92V4632
V9	Audio amplifier and cathode follower	Tube - 6SN7	92A230
V10	Driver for power stage	Same as V9	
V11	Audio power amplifier	Tube - 6L6G	92A233
V12	Audio power amplifier	Same as V11	
V13	High voltage rectifier	Tube - 5Y3	92B480
V14	Low voltage rectifier	Tube - 25Z6GT	92E1419
X1	Socket for V1	Socket, 7 contact, miniature type	82B663
X2	Socket for V2	Socket, 7 contact, miniature, mica filled, top mounting	82V4636
X3	Socket for V3	Same as X2	
X4	Socket for V4	Same as X1	
X5	Socket for V5	Same as X1	
X6	Socket for V6	Same as X1	
X7	Socket for V7	Same as X1	
X8	Socket for V8	Socket, 8 contact octal, black bakelite type MIP-8	82S4412
X9	Socket for V9	Same as X8	
X10	Socket for V10	Socket, 8 contact octal, bakelite	82E1322
X11	Socket for V11	Same as X10	
X12	Socket for V12	Same as X10	
X13	Socket for V13	Same as X10	
X14	Socket for V14	Same as X10	

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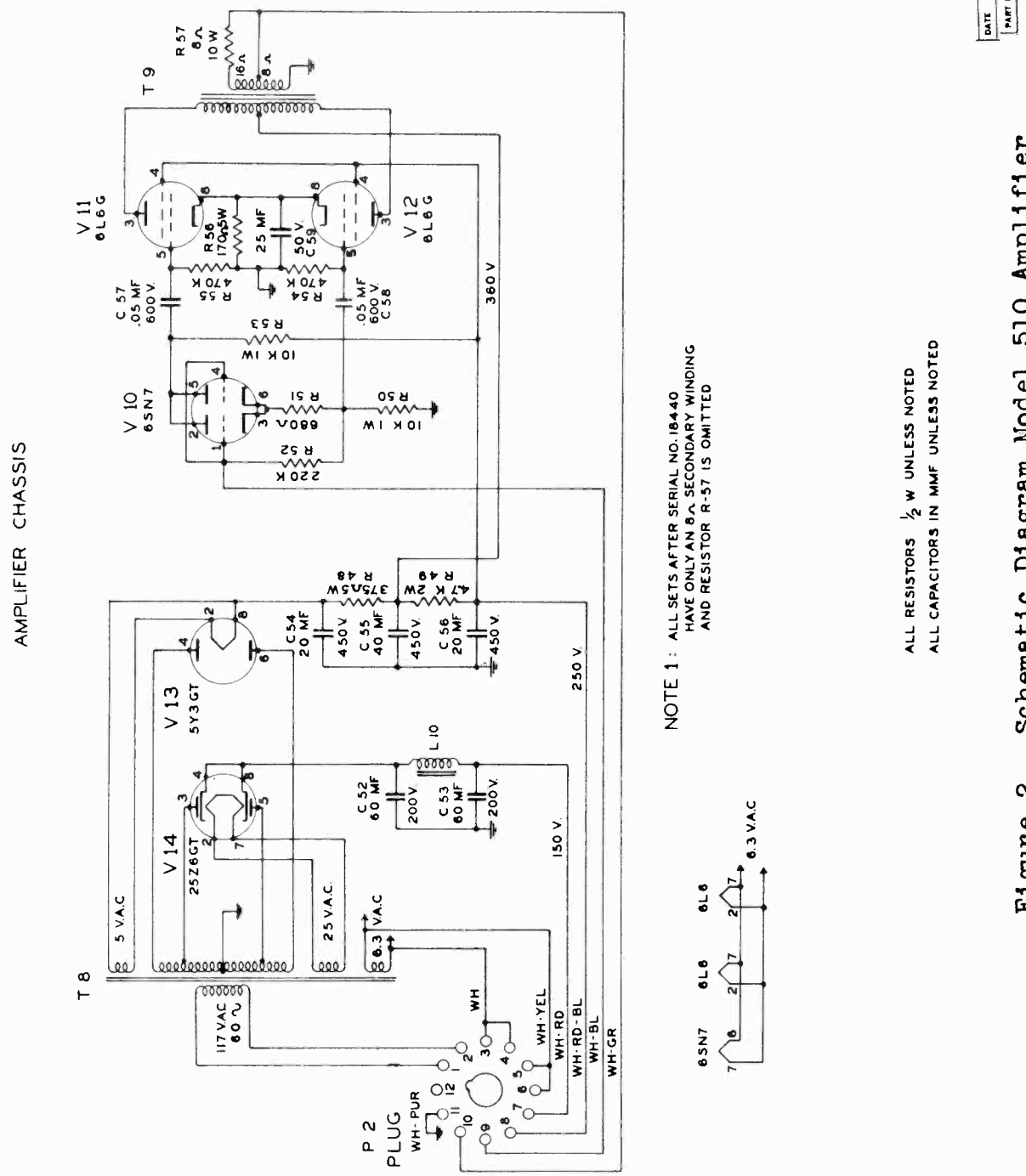
MODELS 510; 510K,
Kenilworth; 510S,
Sheffield



NOTE 1 : ALL SETS AFTER SERIAL NO. 18440 HAVE ONLY AN 8Ω SECONDARY WINDING AND RESISTOR R-57 IS OMITTED

ALL RESISTORS ½ W UNLESS NOTED
ALL CAPACITORS IN MMF UNLESS NOTED

DATE	2/15/50
PART NO.	2V4596A

Figure 2 Schematic Diagram Model 510 Amplifier

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MODELS 510; 510K, Kenilworth; 510S, Sheffield

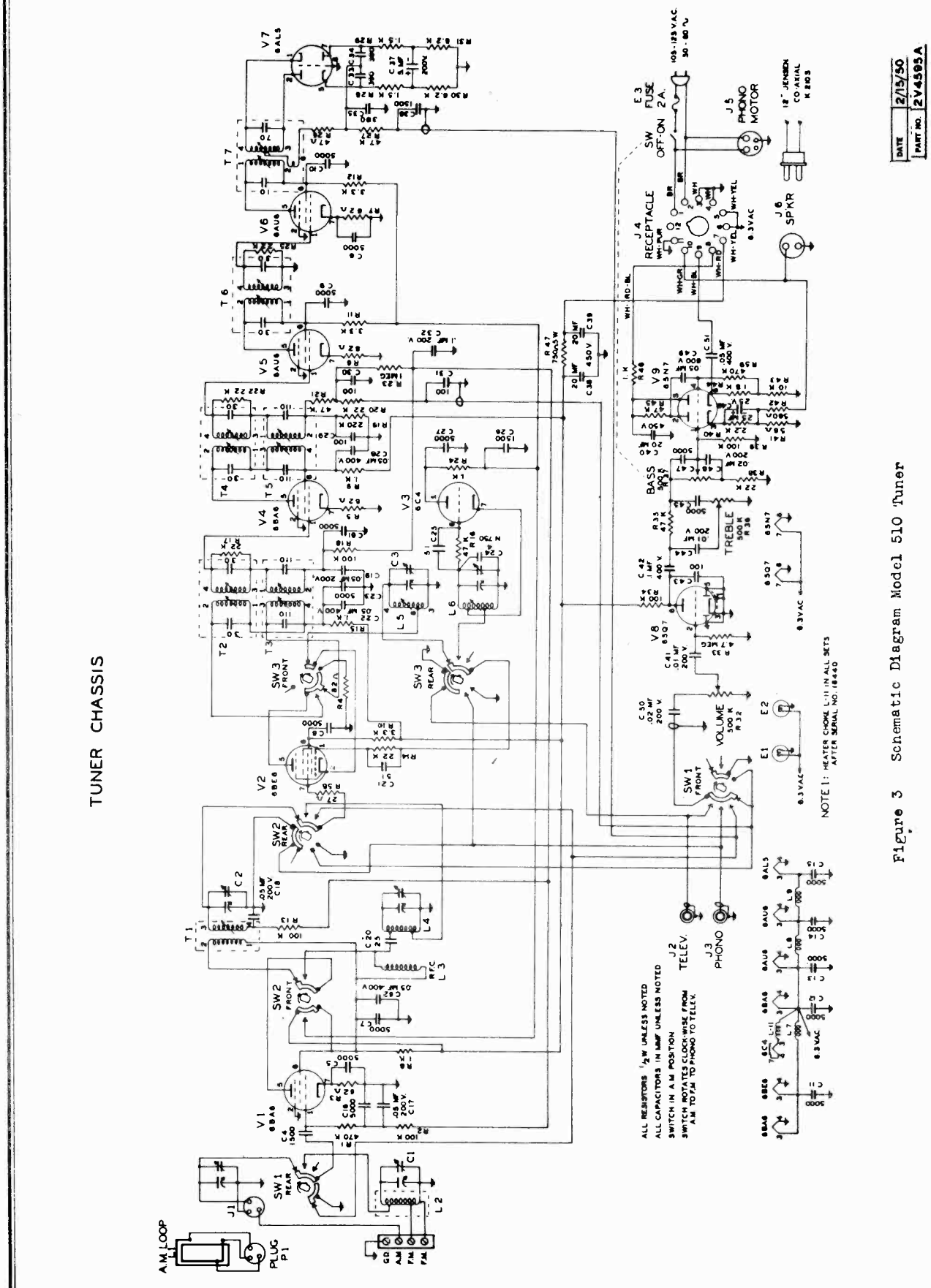

Figure 3 Schematic Diagram Model 510 Tuner

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ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection ---------- Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts (Standard Output) ---------- 1.26 volts
Dummy antenna to be in series with signal generator output ---------- See chart below
Connection of generator ground lead ---------- Floating ground
Generator modulation ---------- 30% 400 cycles
Position of Volume Control ---------- Fully clockwise

Position of Variable	Generator Frequency	Dummy Antenna	Generator Output Connection	Trimmers Adjusted	Trimmer Function	Approximate Sensitivity
Open	455 Kc	.05 uf	12SA7 Grid (Stator of C-1)	A1 A2	IF	4000 uv.
1400 Kc	1400 Kc		Antenna Lug with hank removed	**A3	Oscillator	500 uv.

** Since the antenna section of the variable has no trimmer, the rotor of the variable should be rocked back and forth on both sides of 1400 Kc while adjusting the oscillator trimmer for maximum output. This is to obtain the combination of rotor and trimmer setting to give perfect tracking of the two sections of the variable condenser and consequently give maximum output. Check sensitivity at 600 Kc. If weak, adjust antenna section plates for maximum output at 600 Kc. Tracking of the condenser at points other than 1400 Kc is accomplished by bending the outside plates on the variable condenser rotor, which are cut for this purpose. When bending plates to track the condenser at any given frequency, keep in mind the fact that this will effect the tracking at all frequencies below that point. A tuning wand is very helpful in checking the tracking of this condenser, to indicate whether more or less capacity is needed.

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.

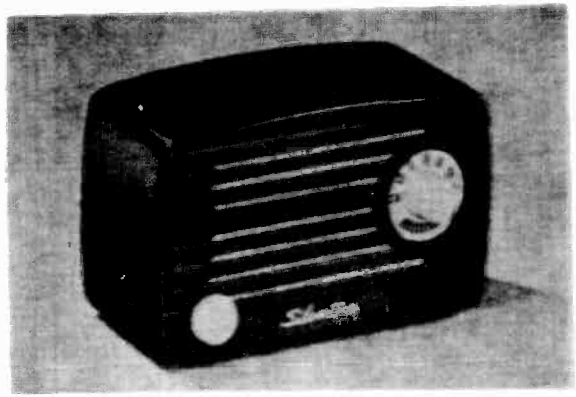
SPECIFICATIONS

Power Output
Undistorted . . . . . 8 watt
Maximum . . . . . 2 watt
Speaker Voice Coil Impedance 3.2 ohms

Power Supply
105-125 Volts 30 Watts
Frequency Range
Broadcast . . . . . 540 - 1600 Kc

REPAIR PART LIST

Schematic Location	Part No.	Description
	N22934-1	Cabinet, Brown, (Cat. No. 1)
	N22934-2	Cabinet, Ivory, (Cat. No. 2)
	N22990-1	Cloth, Grille, White, (Cat. No. 1)
	N22990-2	Cloth, Grille, Maroon, (Cat. No. 2)
L1	N22864	Coil, Antenna
L2	N22865	Coil, Oscillator
C1A, C1B	N22919	Condenser, Variable, 2 Gang
C2A, C2B	N21042	Condenser, Trimmers, I.F. Trans.
C3, C6		Condenser, .05 mfd., 400 volt
C4		Condenser, .05 mfd., 200 volt
C5		Condenser, .01 mfd., 400 volt
C7	N22876	Condenser, Electrolytic, 40-20 uf., 150 volt 20 uf., 25 volt
C8, C10		Condenser, .0001 mfd., 500 volt, mica
C9, C11		Condenser, .002 mfd., 600 volt
P	N20257-1	Cord, Power with Plug
	N22974-1	Knob, Volume, Ivory, (Cat. No. 1)
	N22975-1	Knob, Tuning, Ivory, (Cat. No. 1)
	N22974-2	Knob, Volume, Maroon, (Cat. No. 2)



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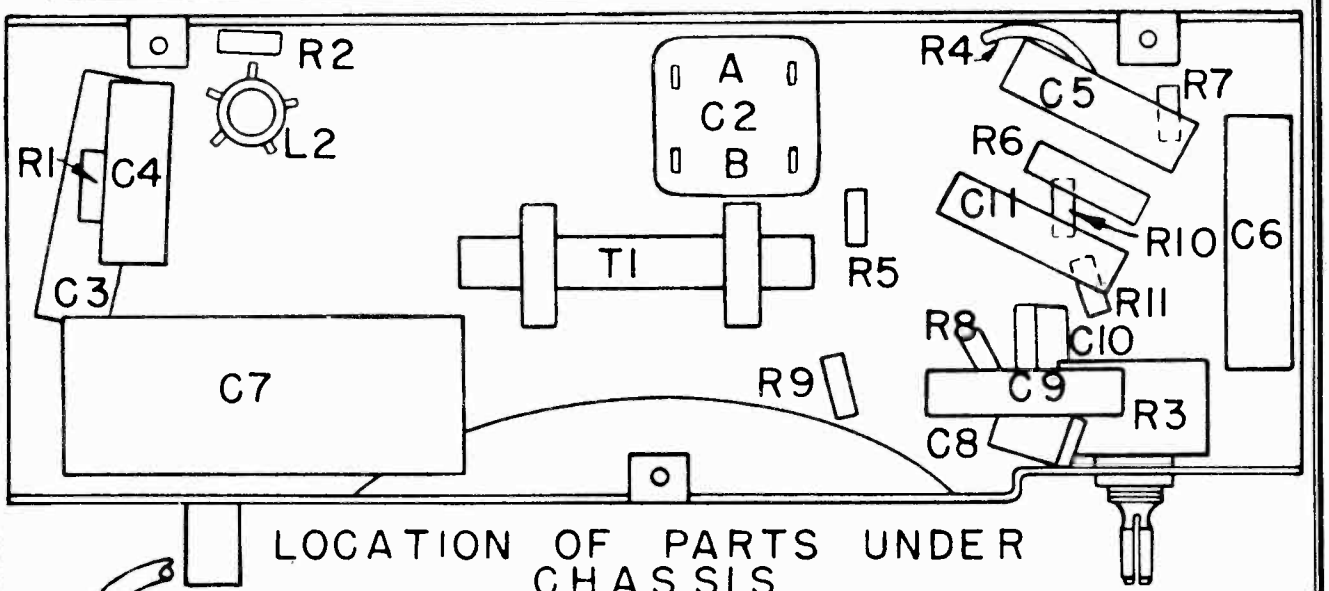
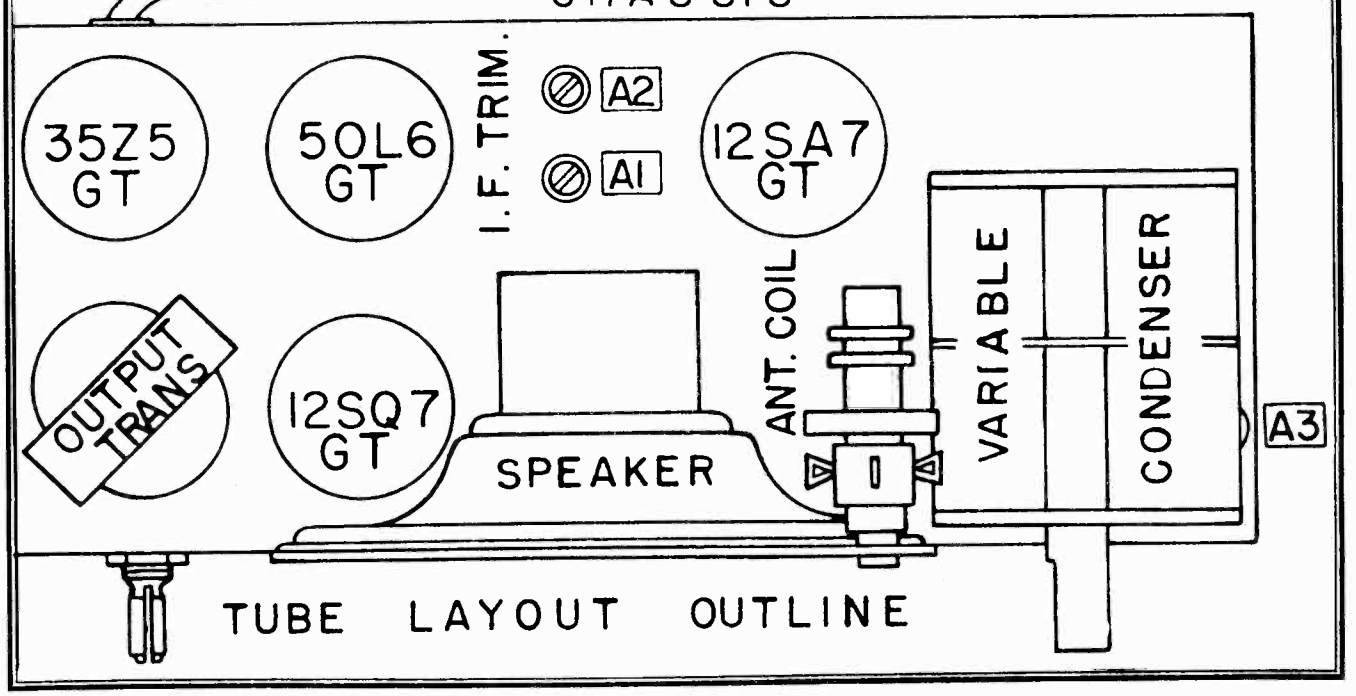
MODELS 1, 2,
Ch. 132.878

Schematic Location	Part No.	Description
	N22975-2	Knob, Tuning, Maroon, (Cat. No. 2)
	N22978	Leaflet, Instruction
R1		Resistor, 330,000 ohms, 1/4 watt
R2		Resistor, 22,000 ohms, 1/4 watt
R3	N21630	Resistor, 2 Megohm, Volume Control & Switch
R4	N19177	Resistor, 47 ohm, 1 watt wire wound
R5		Resistor, 120 ohm, 1/4 watt
R6		Resistor, 2200 ohm, 1 watt
R7		Resistor, 15 ohm, 1/4 watt
R8		Resistor, 4.7 megohm, 1/4 watt
R9		Resistor, 15 megohm, 1/4 watt
R10		Resistor, 470,000 ohm, 1/4 watt
R11		Resistor, 1 megohm, 1/4 watt
SPK	N22875	Speaker, 4" P.M.
T1	N22863	Transformer, I.F.
T2	N22878	Transformer, Output
	N18136	Wire, Antenna



LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT OUTLINE

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MODELS 1, 2,
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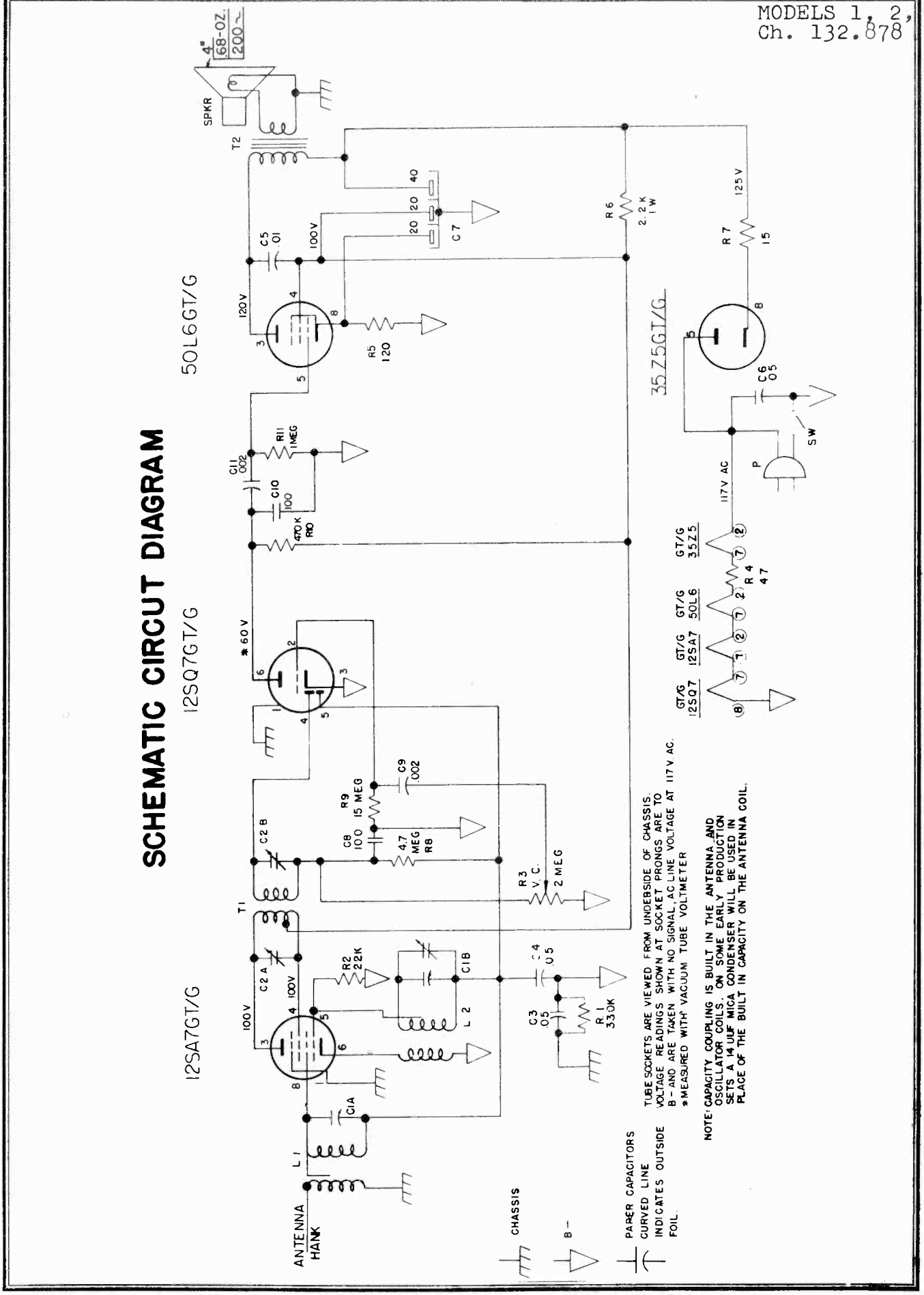
SCHEMATIC CIRCUIT DIAGRAM



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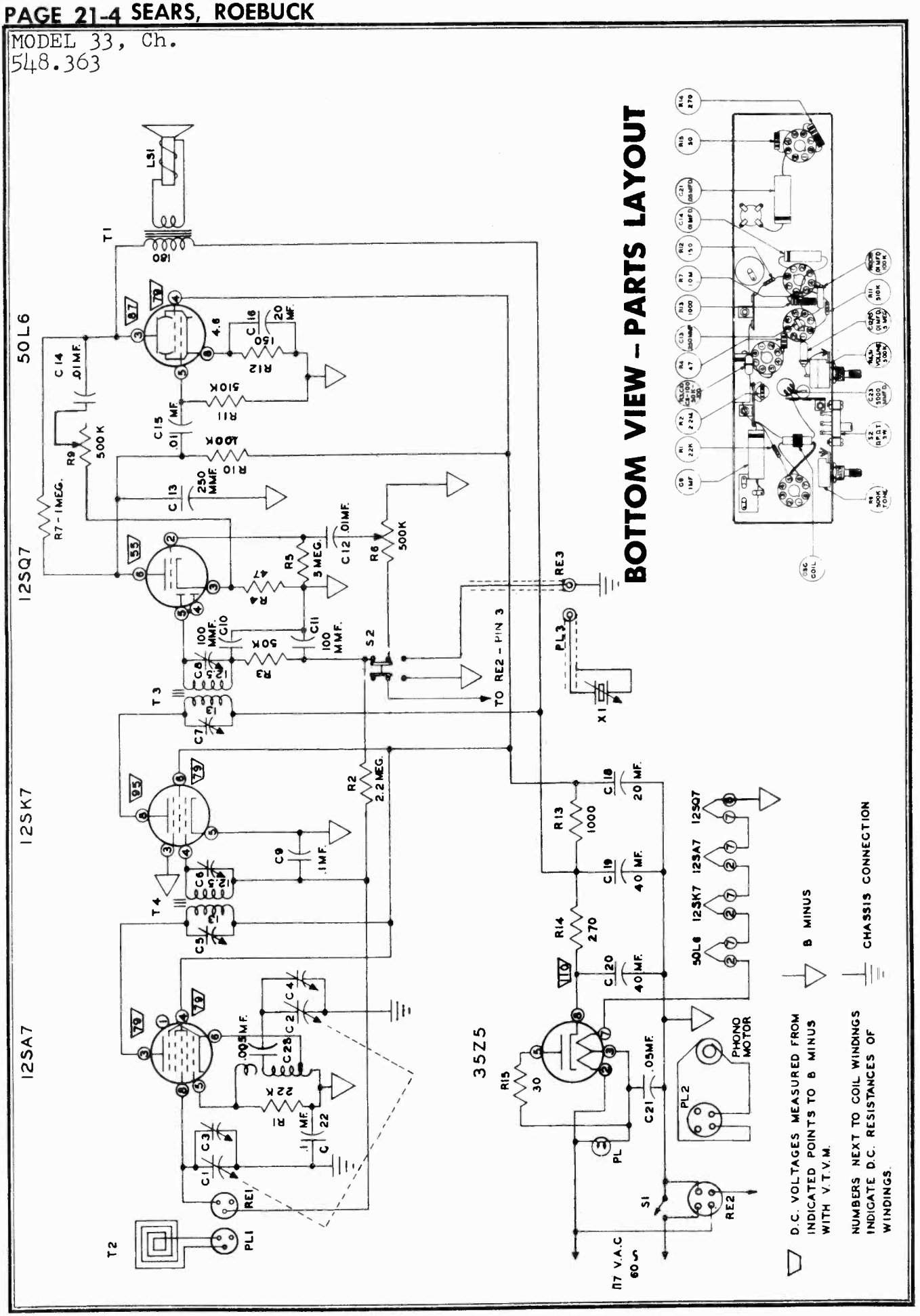
MODEL 33, Ch.
548.363



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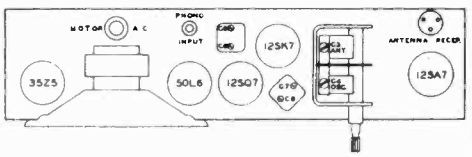
MODEL 33,
Ch. 548.363

POWER SUPPLY . . . . . 117 V. A.C. 45 WATTS

PARTS LIST

SCHEMATIC LOCATION	PART NO.	DESCRIPTION
R1	517	Resistor 22,000 Ohm. 1/2 Watt
R2	615	Resistor 2.2 Meg Ohm. 1/2 Watt
R4	520	Resistor 47 Ohm. 1/2 Watt
R6	401	Control, Volume, 500,000 Ohm. with Switch
R7	516	Resistor, 1 Meg Ohm. 1/2 Watt
R9	408	Control, Tone, 500,000 Ohm.
R11	502	Resistor 510,000 Ohm. 1/2 Watt
R12	505	Resistor 150 Ohm. 1/2 Watt
R13	607	Resistor 1000 Ohm. 1 Watt
R14	622	Resistor 270 Ohm. 1 Watt
R15	534	Resistor 30 Ohm. 1/2 Watt
C1, C2, C3, C4	1004A	Tuning Gang and Trimmer Assembly
C5, C6, C7, C8		Trimmer Condensors in I. F. Cans
C9, C22	804	Capacitor .1 Mfd. 200 V.
C13	817	Capacitor 250 Mmfd. Ceramic
C14	802	Capacitor .01 Mfd. 400 V.
C16, C18	1010	Capacitor Filter 40, 40, 20 Mfd. 150 Volts
C19, C20		20 Mfd. 25 Volts
C21	803A	Capacitor .05 Mfd. 400 V.
C23	906	Capacitor 5000 Mmfd. Ceramic
R3, C10	811	Capristor 100 Mmfd. 50,000 Ohm.
C11		100 Mmfd. Dual Shunt
R5, C12	813	Capristor .01 Mfd. 5 Meg Ohm. Common Terminal
R10, C15	814A	Capristor .01 Mfd. 100,000 Ohm.
T2	1512A	Loop Antenna
T3, T4	1402	Transformers I. F. #118
S2	1892A	Switch, Radio-Phono
PL1	307A	Plug, Loop Antenna
PL2	307C	Plug, Motor A. C.
PL3	305	Plug, Pick up
RE1	106A	Receptacle, Loop Antenna
RE2	107A	Receptacle, A. C.
RE3	104	Receptacle, Pick up
X1	2530	Pick up, Ceramic Cartridge and Plastic Arm
LS1, T1	2607	Speaker, 5" P.M. with 2500 Ohm. Output Transformer
	2108A	Portable Carrying Case
	2411A	Knob, Volume
	2411B	Knob, Tuning
	2411C	Knob, Tone
	1736A	Dial Pointer
	2307	Dial Bezel
	1722B	Dial

TUBE LAYOUT



ALIGNMENT PROCEDURE

The following equipment is required for aligning: A signal generator which will provide an accurately calibrated signal at the indicated test frequencies; an output indicating meter; a non-metallic screwdriver.

Radiation Loop: 2-turn loop, 6 inches in diameter.

Conditions for Alignment:

Tone - Treble

Volume - Maximum

Selector Switch - "Radio" position

Test loop coupled loosely to receiver by spacing - receiver loop in same position as it will be with chassis in cabinet.

SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	REMARKS	ADJUST FOR MAXIMUM OUTPUT
LOOP	455 KC	Low End of Band	Across Voice Coil	Short out osc. tuning gang section C-2; compress C-3	C-8, C-7, C-6, C-5
LOOP	1620 KC	High End of Band	"	Remove short across C-2	C-4
LOOP	1400 KC	Point of Maximum Output	"	Set pointer to 140 on dial	C-3
LOOP	600 KC	Point of Maximum Output	"	Knife C-1 plates for maximum output	
LOOP	1400 KC	1400	"	Recheck alignment.	C-3 if necessary

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MODELS 51, 53,
Ch. 132.887

Specifications

Power Supply
105-120 volts 60 cycle AC, 65 watts
Frequency Range
Broadcast - 1600 - 540 Kc

Power Output
Undistorted .8 watt
Maximum 1.5 watt
Speaker Voice Coil Impedance 3.2 ohms

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
L1	N23159	Antenna Loop Assembly
	N22953	Bracket, Antenna Loop Mtg.
	N23207	Bracket, Var. Con. Mtg.
	N23427	Bracket, Dial Scale Mtg.
	N19361	Clip, Hairpin
L2	N23163	Coil, R.F.
L3	*N23751	Coil, Oscillator
C1A,C1B,C1C	*N23743	Condenser, Variable, 3 Gang
C2,C5,C13		Condenser, .05 mfd., 400 volt
C3		Condenser, .05 mfd., 200 volt
C4		Condenser, .00005 mfd., 500 volt, mica
C6,C8		Condenser, .0002 mfd., 350 volt, Ceramic
C7,C9		Condenser, .01 mfd., 400 volt
C11		Condenser, .02 mfd., 400 volt
C12A,C12B	N22111	Condenser, Electrolytic, 50-50 mfd., 150 volt
	N19132	Cord, Dial Drive
P	N20138-15	Cord, Power with Plug
	N23484	Cover, Rear Cabinet
	N23573	Cover, Record Changer, Bottom
	N23402	Escutcheon, Dial with Crystal
	N23450-1C	Knob, On-Off-Volume
	N23450-1B	Knob, Radio-Phono
	N23450-1A	Knob, Tuning

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
		Lamp, Dial, Mazda, No. 47
	N23534	Leaflet, Instruction
	N22956-1	Pointer, Dial
R1,R9		Resistor, 330,000 ohms, ½ watt
R2		Resistor, 1000 ohms, ½ watt
R3		Resistor, 22,000 ohms, ½ watt
R4		Resistor, 6.8 megohm, ½ watt
R5		Resistor, 1 megohm, ½ watt
R6		Resistor, 15 ohm, ½ watt
R7	N22963	Resistor, Volume Control & Switch, 500,000 ohms
R8		Resistor, 3.3 megohm, ½ watt
R10		Resistor, 470,000 ohms, ½ watt
R11,R13		Resistor, 150 ohm, ½ watt
R12		Resistor, 1200 ohms, 2 watt
	N23430	Scale, Dial
	N22957	Shaft, Tuning
	N23537-1	Socket, Dial-lite with leads
	N19551	Socket, Phono Motor
	N19552	Socket, Phono input
SPKR	N23406	Speaker, 6" P.M.
	N19133	Spring, Dial Cord
T1	N23161	Transformer, 1st I.F.
T2	N23162	Transformer, 2nd I.F.
T3	N23407	Transformer, Output
	N22763	Weight, Cabinet

*On some of the first sets manufactured variable condenser N23155 (with a single spaced oscillator section) and oscillator coil N23160 were used. If either the oscillator coil or the variable condenser is replaced with the part listed here, the other part should also be replaced for correct tracking. N23155 and N23160 should be used together, and N23743 and N23751 should be used together.

TECHNICAL INFORMATION

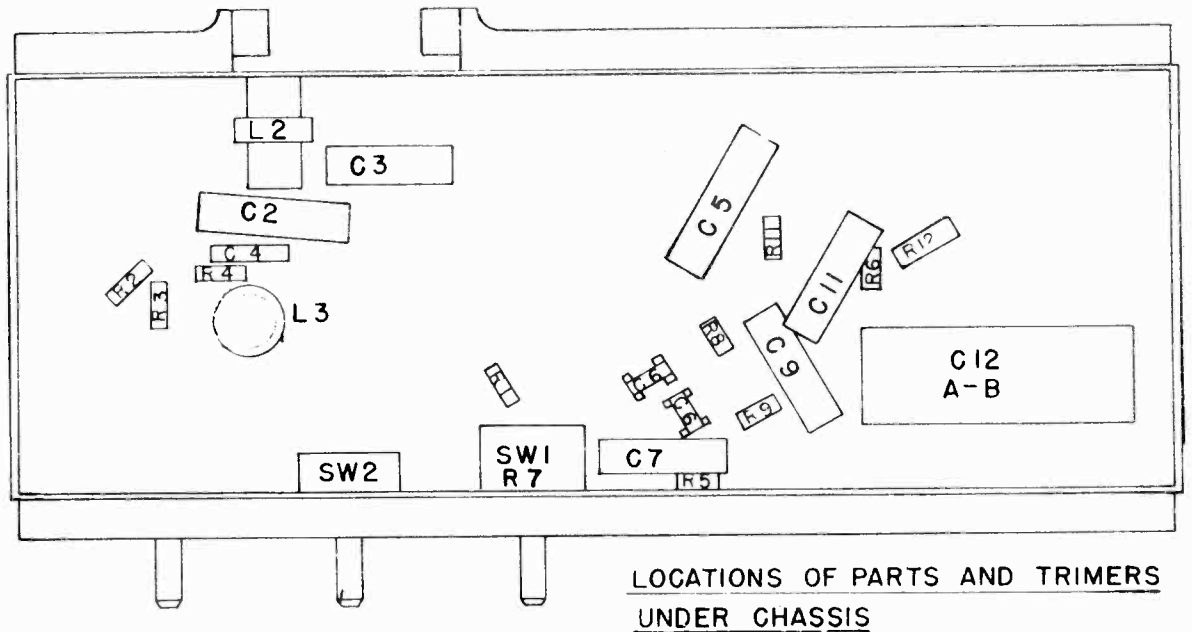
Tuning range 540 Kc. to 1600 Kc. Intermediate frequency - 455 Kc. I-f and r-f measurements made at .5 watt output - approximately 1.26 volts on a rectifier type voltmeter connected across the voice coil.

Approximate inputs for a .5 watt output: I-f 200 uv. R-f with standard loop: at 600 Kc. 500 uv/m; at 1000 Kc. 400 uv/m; at 1400 Kc. 400 uv/m. R-f at external antenna connection: at 600 Kc. 250 uv; at 1000 Kc. 200 uv; at 1400 Kc. 200 uv.

ALIGNMENT DATA

With variable condenser closed, set the pointer horizontally to the left.

Position of Variable	Generator Frequency	Dummy Ant.	Generator Connection (High)	Generator Connection (Low)	Adjust Trimmers (in order shown)	Trimmer Function
Open	455 Kc	.05 mfd.	Mixer Grid	Float.Gnd.	A1,A2,A3,A4	I.F.
1400 Kc	1400 Kc	50 mmfd.	Ext.Ant.Conn.	Float.Gnd.	A5,A6,A7	Osc.R.F.Ant.
600 Kc	600 Kc	50 mmfd.	Ext.Ant.Conn.	Float.Gnd.	Check Point	



LOCATIONS OF PARTS AND TRIMERS UNDER CHASSIS

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MODELS 51, 53,
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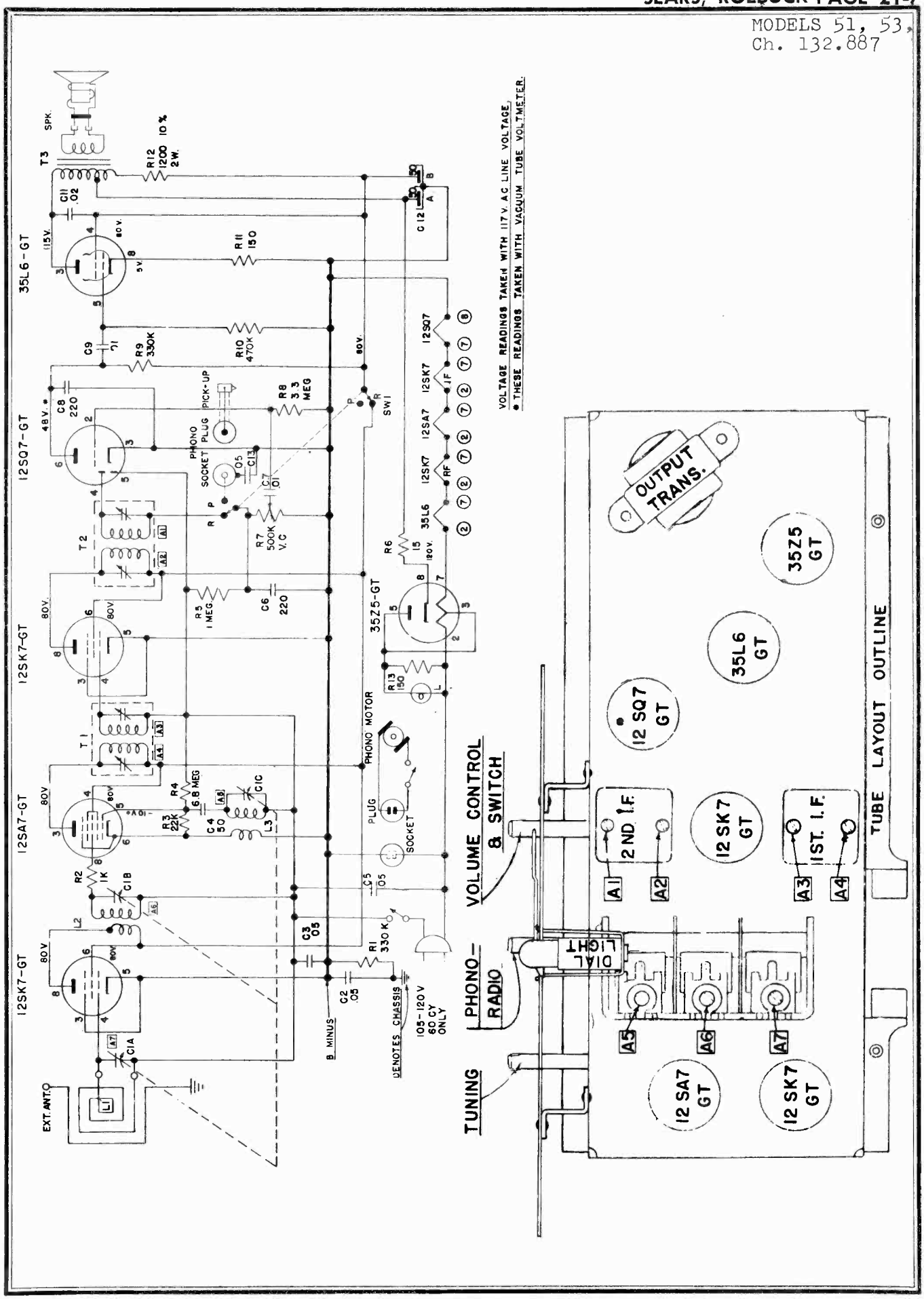

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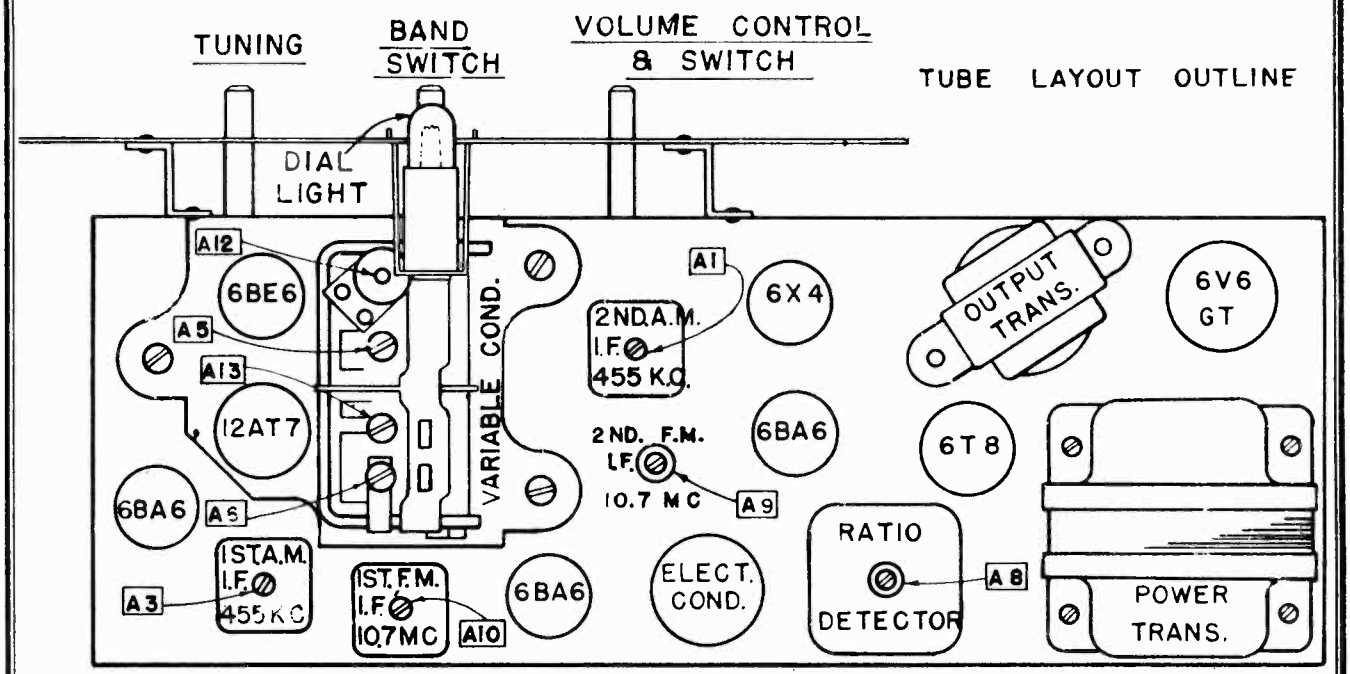
MODELS 54, 56,
Ch. 132.888

Specifications

Power Supply
105-120 volt 60 cycle AC, 65 watts
Frequency Range
Broadcast - 1600 - 540 Kc
FM - 108 - 88 Mc
Power Output
Undistorted 1.5
Maximum 2.5

Speaker Voice Coil Impedance 3.2

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
L3	N22586	Antenna Loop Ass'y.
L1	N22648-1	Choke, High Frequency, 1.5 uh
L2	N21445-1	Choke, High Frequency, 7.5 uh
L7	N22597-1	Choke, High Frequency, 3 uh
L8	N21673	Choke, R.F., Iron core, 14 uh
L4	N22593	Coil, R.F., FM
L5	N22594	Coil, Oscillator, FM
L6	N22567-1	Coil, Oscillator, AM
C1,C2,C3,C4	N22962	Condenser, Variable
C4A	N22724	Condenser, Osc. Temp. Cor. 5-25 uuf
C5,C14		Condenser, Ceramic, 47 uuf, 350 v.
C6,C18,C19, C21,C23,C25 C7,C20,C24 C8,C26,C28, C30,C31 C9,C12,C13, C16,C17		Condenser, Disc, 5K uuf, 350 v. Condenser, Disc, 10 K uuf,350 v. Condenser, Ceramic, 100 uuf, 350 v. Condenser, Ceramic, 1K uuf, 350 v.
C10		Condenser, Ceramic, 1.5 uuf, 350 v. Gimmick
C11		Condenser, Ceramic, 50 uuf, 500 v. N750
C15,C34		Condenser, P.T., .01 uf, 400 v.
C22		Condenser, Ceramic, 15 uuf, 350 v.
C27		Condenser, P.T., .003 uf, 600 v.
C29	N22659	Condenser, Electrolytic, 4 uf, 25 v.
C32,C35A,C35B		Condenser, Ceramic, 220 uuf, 350 v.
C35C	N22806	Condenser, Electrolytic, 40-20-20 uf, 250 v.
C36,C38		Condenser, P.T., .02 uf, 400 v.
C37	N22602	Condenser, Electrolytic, 10 uf, 25 v.
C39		Condenser, Molded, .01 uf, 400 v.
C40		Condenser, P.T., .05 uf, 200 v.
R24,SW-2	N22963	Control, Volume & Switch, 500K ohms
	N19132	Cord, Dial Drive
P	N20138-14	Cord, Power with Plug
	N23484	Cover, Rear Cabinet
	N23402	Escutcheon, Dial with Crystal
	N23450-1C	Knob, On-Off Volume
	N23450-1D	Knob, AM-FM-Phono
	N23450-1A	Knob, Tuning
		Lamp, Dial, Mazda No. 47
	N23524	Leaflet, Instruction
	N22956-1	Pointer, Dial
R1,R11,R15		Resistor, 68 ohms, 1/4 watt
R2		Resistor, 27K ohms, 1 watt
R3		Resistor, 47 ohms, 1/4 watt
R4,R6		Resistor, 22K ohms, 1/4 watt
R5		Resistor, 2200 ohms, 1/4 watt
R7,R8,R13, R17,R30		Resistor, 1K ohms, 1/4 watt
R9		Resistor, 8.2K ohms, 1 watt
R10,R20		Resistor, 1 megohm, 1/4 watt
R12		Resistor, 10K ohms, 1 watt
R14,R22		Resistor, 100K ohms, 1/4 watt
R16		Resistor, 3.3K ohms, 1 watt
R18		Resistor, 180 ohms, 1/4 watt
R19		Resistor, 39K ohms, 1/4 watt
R21		Resistor, 220K ohms, 1/4 watt
R23		Resistor, 15K ohms, 1/4 watt
R25		Resistor, 10 megohms, 1/4 watt
R26		Resistor, 330K ohms, 1/4 watt
R27A,R27B	N22624	Resistor, 2 x 500 ohms, 5 watts
R28		Resistor, 470 K ohms, 1/4 watt
R29		Resistor, 270 ohms, 1 watt
	N23429	Scale, Dial
	N22957	Shaft, Tuning
	N23537-1	Socket, Dial-Lite with Leads
	N19551	Socket, AC Phono Motor
	N19552	Socket, Phono Input
Spk.	N23406	Speaker, 6" P.M.
	N19133	Spring, Dial Cord
PS.-2	N22334-1	Suppressor Ass'y. Parasitic-AM
PS.-1	N22335-1	Suppressor Ass'y. Parasitic-FM
SW-1	N23485	Switch, Band, FM-AM-Phono
T2,T4	N22352-1	Transformer, I.F., AM, 445 Kc.
T1	N22590	Transformer, 1st I.F., FM, 10.7 Mc.
T3	N22967	Transformer, 2nd I.F., FM, 10.7 Mc.
T6	N23669	Transformer, Output
T7	N22959	Transformer, Power
T5	N22592	Transformer, Ratio Detector
	N22763	Weight, Cabinet



TECHNICAL INFORMATION

AM Tuning range—540 Kc. to 1600 Kc. Immediate Frequency—455 Kc. I.F. and R.F. measurements made at 500 milliwatts output—approximately 1.27 volts on a receiver type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I.F. 300 uv; R.F. with standard loop: at 00 Kc. 1200 uv/m; at 1000 Kc. uv/m; at 1400 Kc. 800 uv/m.

FM Tuning range—88 megacycles to 108 megacycles. Intermediate frequency 10.7 megacycles. I.F. and R.F. measurements made at 500 milliwatts output—approximately 1.27 volts on a recitfier type voltmeter connected across speaker voice coil. Approximate input for 500 MW output: I.F. 300 uv; R.F. "Absolute Measurements": 91 megacycles 125 uv; 105 megacycles, 100 uv.

ALIGNMENT PROCEDURE

Output meter connection—Across speaker voice coil.
Output meter reading to indicate 500 MW—1.27 volts.
Generator Modulation—30%, 400 cycles
Position of volume control—Fully clockwise.
Set dial pointer—Horizontal, variable condenser closed.
Set band switch—To left for AM alignment, center for FM alignment

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MODELS 54, 56,
Ch. 132.888

FM ALIGNMENT

Detector and I.F. alignment using Signal Generator and Oscilloscope.

1. Connect FM Generator, High side, to grid (pin 1) of 6BA6 2nd I.F. tube through .005 mfd. dummy.
2. Set generator frequency to 10.7 Mc. modulated either 60 cycles or 400 cycles, 250 Kc sweep (125 Kc. deviation).
3. Connect vertical input of scope across volume control of receiver (grounded terminal to chassis, ungrounded terminal to high side of control).
4. Set scope switch for internal synchronization and set horizontal oscillator to 2X frequency of modulating voltage of generator. (120 or 800 cycles)
5. Turn variable condenser fully open, and band switch to right (FM).
6. Adjust frequency vernier of horizontal oscillator on scope until the pattern becomes stationary.
7. Adjust ratio detector primary slug No. A7 for maximum vertical sweep of the scope pattern.
8. Adjust ratio detector secondary slug No. A8 to center the cross over point of the pattern. Pattern should look like Fig. 1 with the same amount of curve on both ends, and the cross over point in the center.
9. Connect generator, high side, to center antenna screw terminal on rear of chassis.
10. Adjust I.F. slugs A9, A10 and A11 for the greatest vertical sweep of the pattern, consistent with linearity. If the I.F. slugs are adjusted for maximum sweep of the pattern, the pattern may become non-linear. Therefore, adjustment should be made for the greatest sweep which can be obtained and still have all four ends of the "X" pattern similar in size and shape.
11. Check the alignment of the I.F. and detector circuits by varying the signal generator frequency above and below the center frequency of 10.7 Mc. If the receiver is perfectly aligned, two smaller "X" patterns of similar size and shape will result, one on either side of the center frequency. See Figure 2.

X PATTERN
CENTER FREQUENCY

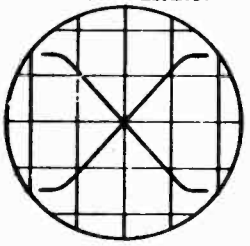


FIG 1

SMALL X PATTERN
ABOVE AND BELOW
CENTER FREQUENCY

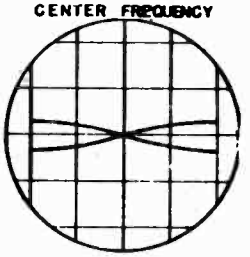
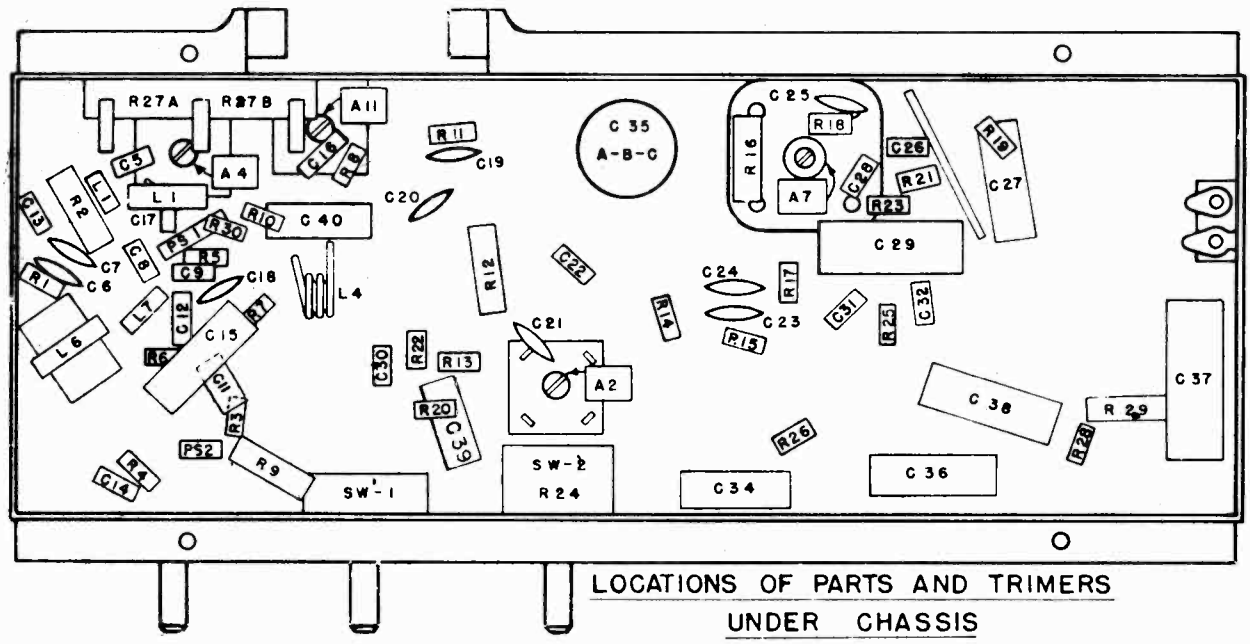


FIG. 2

Position of Variable	Generator Frequency	Dummy Ant.	RF Generator Connection High Side	Generator Connection Ground Lead	Adjust Trimmers In Order Shown	Trimmer Function
Fully open	108.5 Mc.	*300 ohm	Ant. (FM) Terminal	Ground (G) Terminal	A12	Oscillator
Fully Closed	87.5 Mc.	*300 ohm	Ant. (FM) Terminal	Ground (G) Terminal	Check Point	Oscillator
105 Mc.	105 Mc.	*300 ohm	Ant. (FM) Terminal	Ground (G) Terminal	A13	R.F.
91 Mc.	91 Mc.	*300 ohm	Ant. (FM) Terminal	Ground (G) Terminal	Check Point	R.F.

For R.F. alignment use FM generator signal modulated with 400 cycles 45 Kc. sweep (22.5 Kc.) deviation).
*The 300 ohm dummy should be made up to two 150 ohm resistors, one placed in each lead at the receiver antenna terminals.



LOCATIONS OF PARTS AND TRIMERS
UNDER CHASSIS

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AM ALIGNMENT

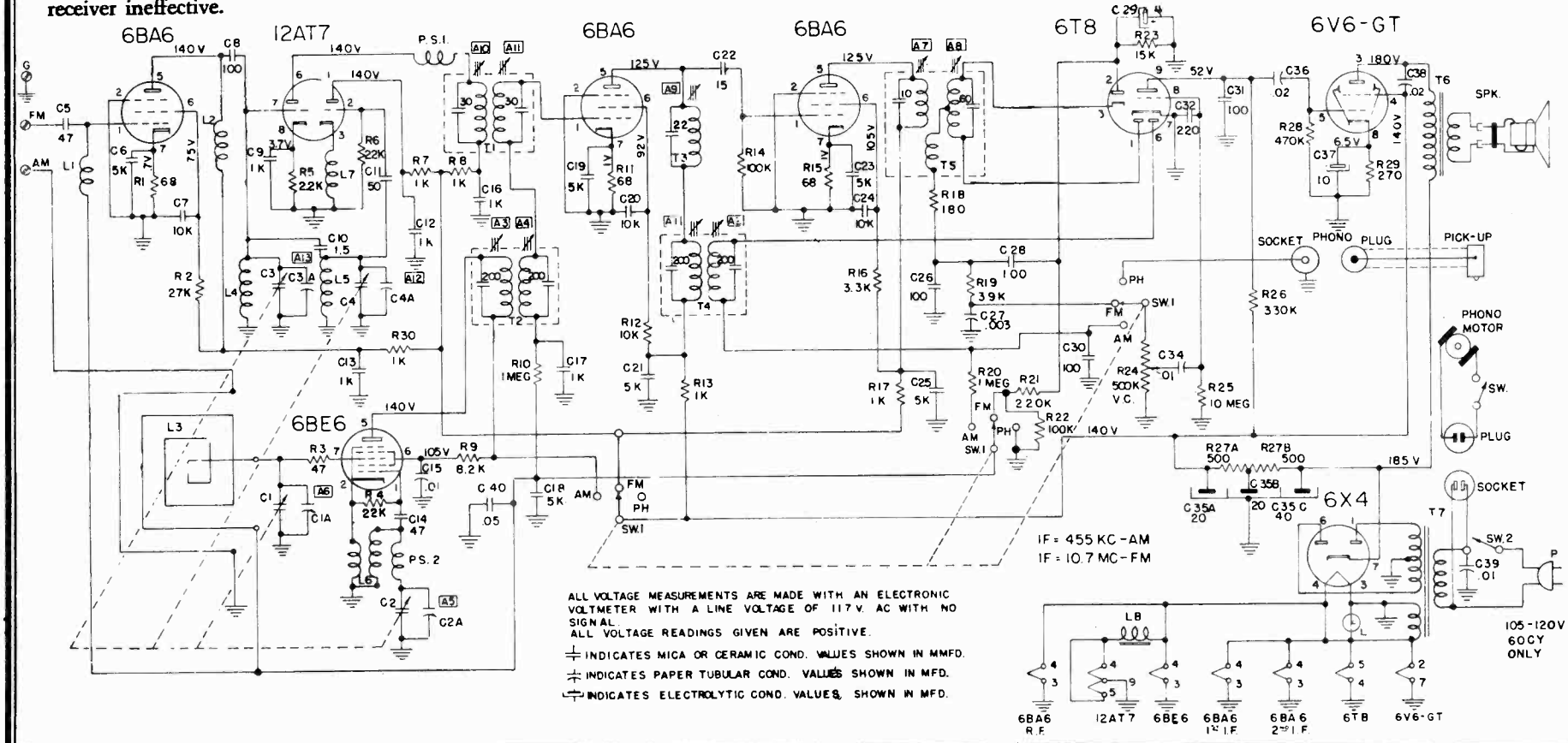
Position of Variable	Generator Frequency	Dummy Ant.	Generator Connection (high)	Generator Connection Ground Lead	Adjust Trimmers In Order Shown For Max. Output	Trimmer Function
Open	455 Kc	.05 mfd.	Mixer Grid	Chassis	A1, A2, A3, A4,	I. F.
Open	1650 Kc		*Test. Loop	Test Loop	A5	Oscillator
1400 Kc	1400 Kc		*Test Loop	Test Loop	A6	Antenna
**600 Kc	600 Kc		*Test Loop	Test Loop	Check Point	Antenna

* Connect generator lead to Standard Hazeltine Test Loop, Model 1150, placed two feet from the set loop, or three turns of wire about six inches in diameter, placed about one foot from the set loop. Or the generator can be connected with the high side lead to the AM antenna screw terminal and the ground lead to the chassis.

**With a generator signal of 600 Kc, tune the set to the point where maximum output is obtained, which should be approximately 600 Kc on the dial. Adjust antenna section plates of variable for maximum output.

The alignment procedure should be repeated in the original order for greatest accuracy

Always keep the output from the signal generator at its lowest possible value to make the A. V. C. action of the receiver ineffective.



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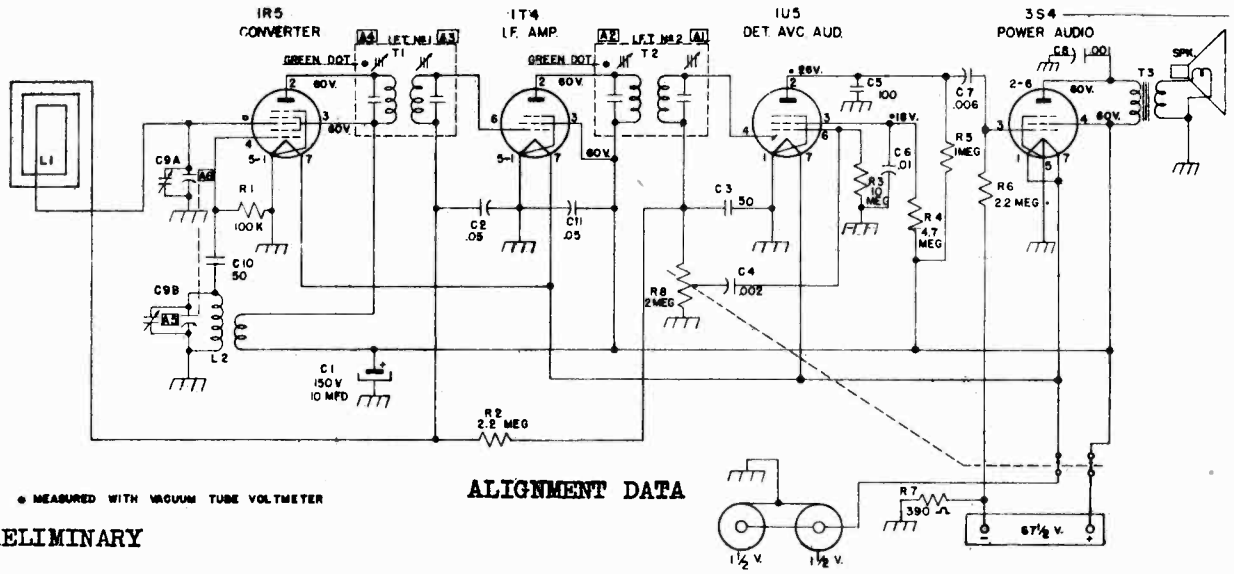
MODEL 210,
Ch. 132.880



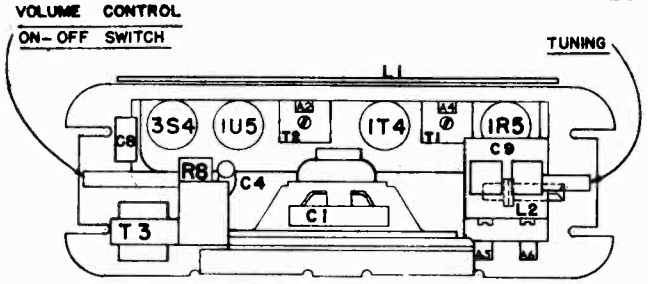
* MEASURED WITH VACUUM TUBE VOLTMETER

ALIGNMENT DATA

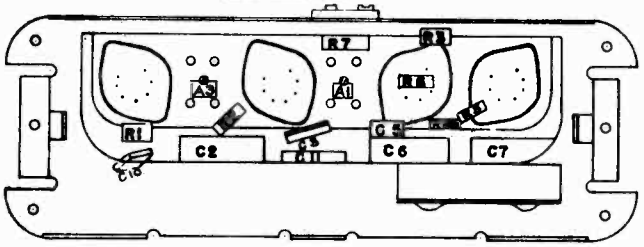
PRELIMINARY

Output meter reading to indicate .05 watt across voice coil . . . . . 0.4 V
Generator ground lead connected . . . . . to metal chassis
Generator modulation . . . . . 30%, 400 cycles
Position of Volume control . . . . . fully on

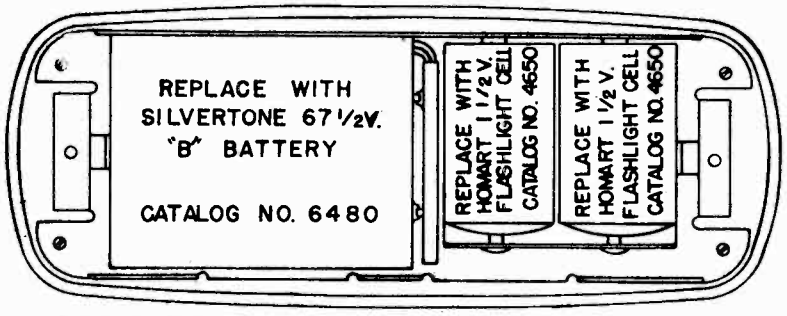
Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Adjust Trimmers (In order shown)	Trimmer Function
Open	455 KC	.05 MFD	Mixer Grid	A1,A2,A3,A4	I.F.
Open	1650 KC		Test Loop	A5	Osc.
1400 KC	1400 KC		Test Loop	A6	Ant.
600 KC	600 KC		Test Loop	Check Point	



TUBE LAYOUT



LOCATIONS OF PARTS UNDER CHASSIS



Specifications

Power Supply - 1½ V. A Battery
67½ V. B Battery
Frequency Range
Broadcast - 540 - 1600 KC
FM
Power Output
Undistorted 65 mw
Maximum 150 mw

Speaker Voice Coil Impedance 3.2 ohms

Schematic Location	Part No.	Description
C7		Condenser, .006 mfd., 600 volt
C8		Condenser, .001 mfd., 600 volt
C9A,B	N22966	Condenser, Variable
	N23137	Insulator, Battery Clip
	N23181	Knob, Tuning
	N23182	Knob, On-Off-Volume
	N23187	Leaflet, Instruction
R1		Resistor, 100,000 ohms, ½ watt
R2,R6		Resistor, 2.2 megohm, ½ watt
R3		Resistor, 10 megohm, ½ watt
R4		Resistor, 4.7 megohm, ½ watt
R5		Resistor, 1 megohm, ½ watt
R7		Resistor, 390 ohm, ½ watt
R8	N23138	Resistor, Volume Control & Switch 2 megohm
SPK	N22972	Speaker, 4" P.M.
T1,T2	N21797-1	Transformer, I.F.
T3	N23140	Transformer, Output
L1	N23141	Antenna Loop Assembly
	N23675	Cabinet Assembly
	N23179	Cabinet, Green Plastic
	N23170-1	Cloth, Grille
	N23260	Handle, Green Plastic
	N21842-1	Cable, "B" Battery & Terminal Strip
	N23136	Clip, "A" Battery
	N23139	Coil, Oscillator Assy.
C1	N21811	Condenser, Electrolytic, 10 mfd., 150 volt
C2,C11		Condenser, .05 mfd., 200 volt
C3,C10		Condenser, .00005 mfd., 500 volt, mica
C4		Condenser, .002 mfd., 600 volt
C5		Condenser, .0001 mfd., 500 volt, mica
C6		Condenser, .01 mfd., 200 volt

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MODEL 220,
Ch. 528.173

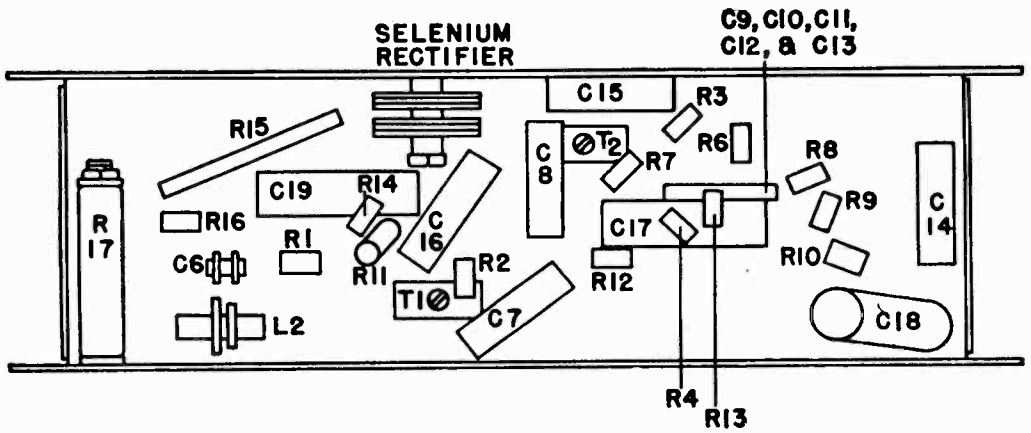
SPECIFICATIONS

Power Supply: ..... 117 Volts, DC or 50-60 Cycles AC, 11 Watts or Catalog No. 6407 Battery Pack.

Power Output:
Undistorted ..... .0.15 Watt
Maximum ..... .0.30 Watt

Frequency Range:
Broadcast ..... 540-1625 KC

Schematic Location	Part Number	DESCRIPTION
		CHASSIS PARTS
	T72-50	Bushing, pointer drive
	T72-51	Bushing, tuning shaft
	T84-437	Cable assembly, battery
C1, C2	T19-210	Capacitor, variable (2 gang)
C3, C4, C5	T13-296	Capacitor, electrolytic
C6	T15-229	Capacitor, 47 mmfd., ceramic
C7, C14	T16-153	Capacitor, .005 mfd., 600 v.
C8, C15	T16-152	Capacitor, .05 mfd. 200 v.
C9, C10, C11, C12, C13	T17-103	Capacitor, ceramic unit
C16	T16-156	Capacitor, .01 mfd. 400 v.
C17	T16-157	Capacitor, .1 mfd. 200 v.
C18, C19	T16-197	Capacitor, .05 mfd. 400 v.
	T83-421	Clip, I.F. transformer mounting
L2	T10-554	Coil, oscillator
R5, S1	T24-188	Control, volume and switch
	T23-162	Cord, power, AC/DC
	T21-158	Cover, bottom
	T47-108	Grammet, variable condenser
	T76-13	Insulator, electrolytic
L1	T82-67	Loop, antenna
	T58-80	Pointer
	T31-160	Plate, dial backing
	T83-642	Rectifier, selenium
R1	T60-727	Resistor, 100,000 ohm, ½ w.
R2, R6	T60-728	Resistor, 10 meg., ½ w.
R3, R8	T60-726	Resistor, 2.2 meg., ½ w.
R4	T60-730	Resistor, 47,000 ohm, ½ w.
R7	T60-669	Resistor, 4.7 meg., ½ w.
R9	T60-770	Resistor, 470 ohm, ½ w. 10%
R10	T60-708	Resistor, 680 ohm, ½ w. 10%
R11	T60-760	Resistor, 10,000 ohm, ½ w. 10%
R12	T60-753	Resistor, 220 ohm, ½ w. 10%
R13	T60-668	Resistor, 1 meg., ½ w.
R14	T60-756	Resistor, 1200 ohm, ½ w., 10%
R15	T60-725	Resistor, 160 ohm, 3 w. 5%
R16	T60-675	Resistor, 1000 ohm, ½ w.
R17	T60-757	Resistor, 2000 ohm, 10 w. 5%
	T83-661	Retainer, tube shield
	T75-81	Shaft, pointer drive
	T75-82	Shaft, condenser drive
	T71-42	Shield, tube
	T68-39	Socket, miniature wafer
	T77-151	Spacer, variable condenser
	T70-103	Spring, pointer drive
	T70-135	Spring, condenser drive
	T79-381	Speaker, 4" x 6" P.M.
S2	T69-186	Switch, Batt./AC/DC
T1, T2	T10-508	Transformer, I.F.
T3	T80-245	Transformer, output
	T86-51	Washer, "C", pointer shaft
	T86-112	Washer, "C", tuning shaft
	T86-136	Washer, compression, tuning shaft
		CABINET PARTS
	T42-467	Cabinet (front case only, less escutcheon and hardware)
	T22-155	Clip (cabinet)
	T64-9	Clip (back cover)
	T42-467	Cover, back (less hardware)
	T53-3	Cover, handle
	T49-4	End caps, handle
	T40-160	Escutcheon
	T52-308	Knob
	T97-112	Screw, self-tapping
	T70-163	Spring, hinge
	T53-2	Strap, handle



LOCATION OF PARTS UNDER CHASSIS

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MODEL 220,
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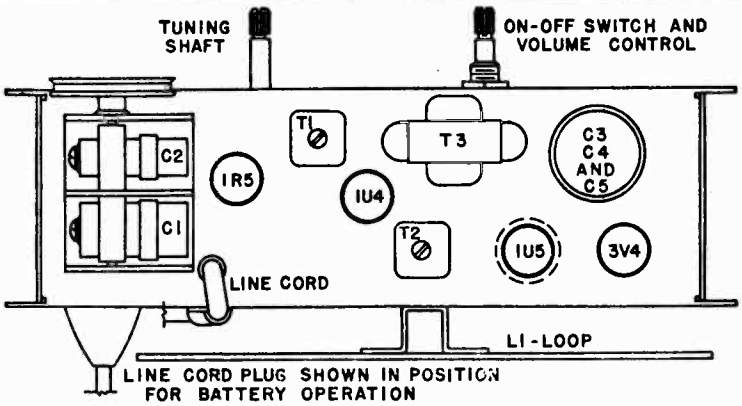
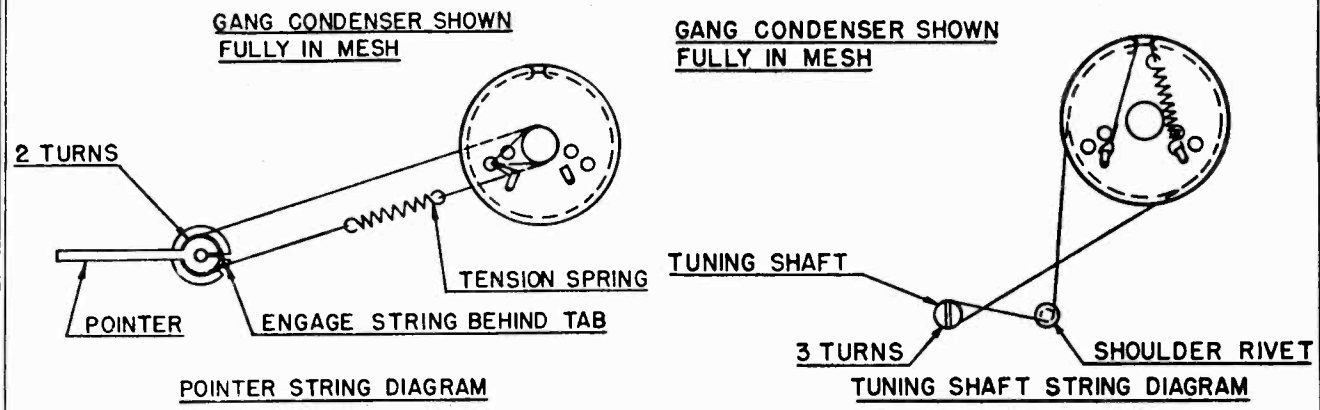


LOCATION OF PARTS ON TOP OF CHASSIS



STRING AND POINTER HOOKUP

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 watt across voice coil ..... 0.4 v.
Generator ground lead connected ..... To B- through 0.1 mfd. capacitor
Generator modulation ..... 30%, 400 cycles
Position of volume control ..... Fully on
Position of pointer with tuner fully closed ..... Pointer should be horizontal, pointing to left (9 o'clock).

Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments (in order shown)	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1625 kc	0.1 mfd.	Stator ant. tuner	C2	Osc.	
1400 kc	1400 kc		Hazeltine Test Loop	C1	Loop	100

ALIGNMENT NOTES:

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

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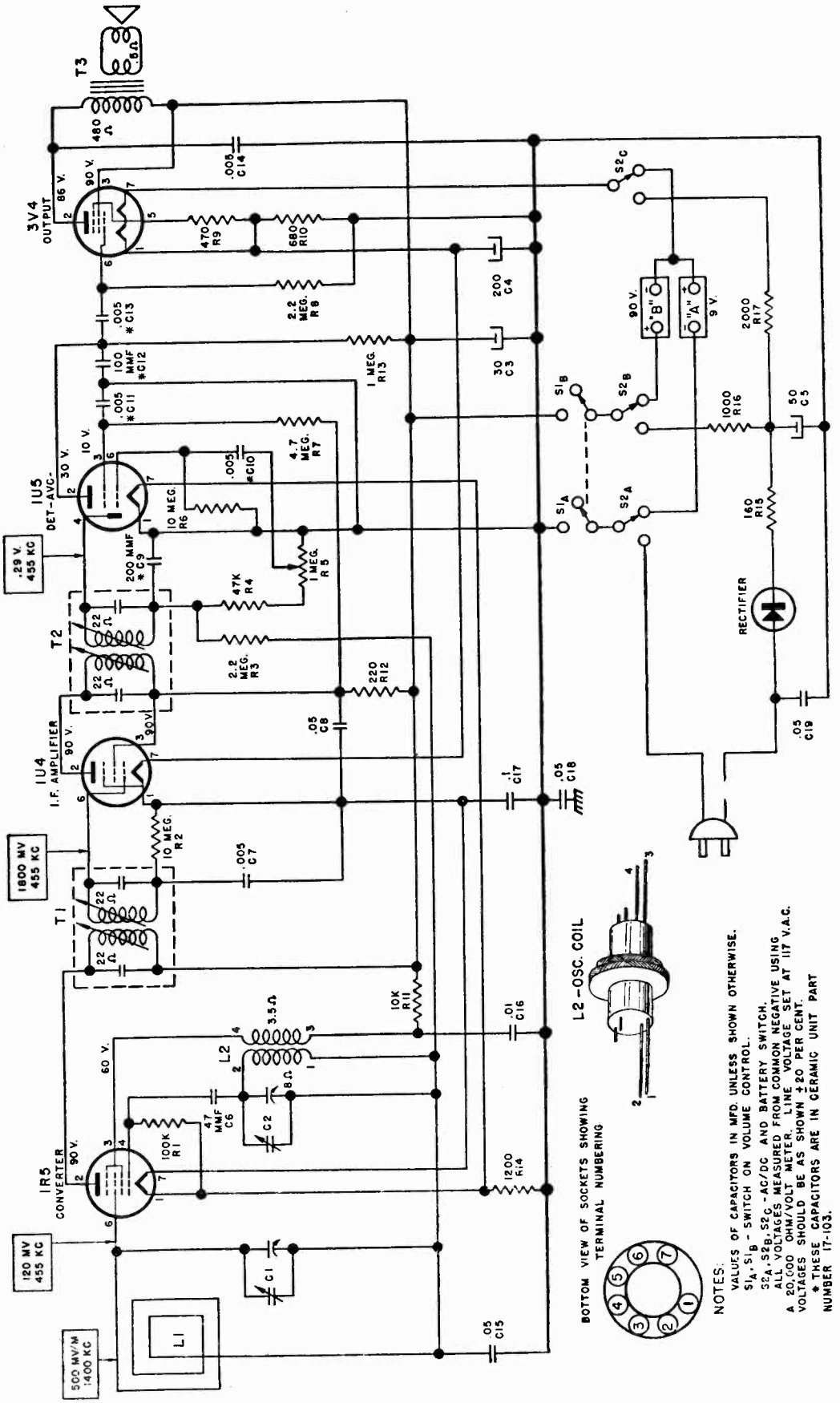

SCHEMATIC DIAGRAM

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MODEL 225,
Ch. 528.171

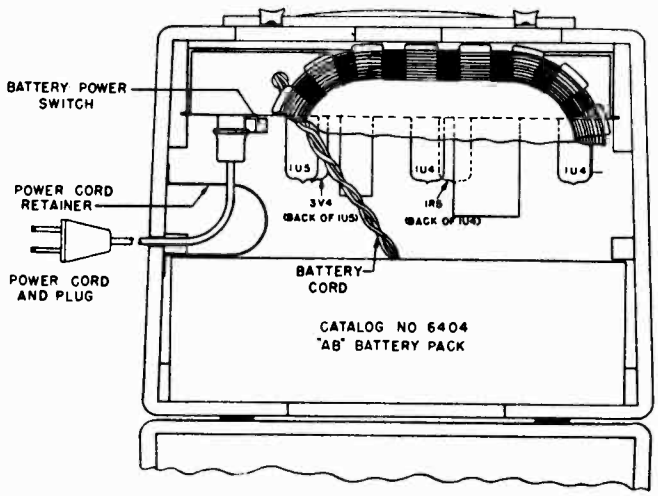
PARTS LIST

CHASSIS

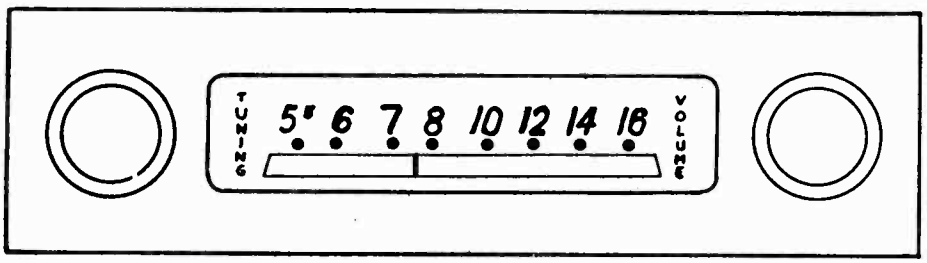
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	T84-391	Cable, assembly, battery
	T83-421	Clip, I.F. transformer mounting
C1, C2, C3	T18-296	Capacitor, electrolytic
C4, C5, C6	T19-208	Capacitor, variable (3 gang)
C8, C11	T16-153	Capacitor, .005 mfd. 600 v.
C9, C10, C20, C21, C22	T17-103	Capacitor, ceramic unit
C12, C17	T16-152	Capacitor, .05 mfd. 200 v.
C13	T15-186	Capacitor, 10 mmfd. mica
C14	T16-150	Capacitor, .02 mfd. 400 v.
C15, C16	T16-157	Capacitor, .1 mfd. 200 v.
C18, C19	T16-179	Capacitor, .05 mfd. 400 v.
L3	T10-553	Coil, oscillator
R11, S1	T24-186	Control, volume, with switch
	T84-77	Cord, power, AC/DC
	T51-105	Cord, pointer travel, 29"
	T47-108	Grommet, variable condenser
	T76-13	Insulator, electrolytic
	T52-196	Knob, AC/DC/Battery switch
L1	T82-66	Loop, antenna
	T45-121	Plug, AC/DC
	T58-78	Pointer
	T39-265	Pulley, dial cord
	T83-642	Rectifier, selenium
R1	T60-744	Resistor, 22,000 ohm, ½ w. 10%
R2, R17	T60-669	Resistor, 4.7 meg., ½ w.
R3, R5	T60-728	Resistor, 10 meg., ½ w.
R4	T60-730	Resistor, 47,000 ohm, ½ w.
R6	T60-704	Resistor, 330 ohm, ½ w. 10%
R7	T60-727	Resistor, 100,000 ohm, ½ w.
R8	T60-676	Resistor, 30,000 ohm, ½ w.
R9	T60-770	Resistor, 470 ohm, ½ w. 10%
R10, R19	T60-726	Resistor, 2.2 meg., ½ w.
R12, R15	T60-729	Resistor, 1500 ohm, ½ w. 10%
R13	T60-708	Resistor, 680 ohm, ½ w. 10%
R14	T60-796	Resistor, 110 ohm, 3 w. 10%
R16	T60-757	Resistor, 2000 ohm, 10 w. 5%
R18	T60-668	Resistor, 1 meg., ½ w.
	T75-69	Shaft, tuning
	T68-39	Socket, miniature, wafer
	T79-380	Speaker, 5" P.M.
	T70-122	Spring, dial cord
S2	T69-173	Switch, AC/DC/Battery
T1, T2	T10-508	Transformer, 1st and 2nd I.F.
T3	T80-228	Transformer, output
L2	T10-535	Transformer, R.F.
	T86-51	Washer, "C", tuning shaft
	T86-80	Washer, compression, tuning shaft

CABINET

PART NUMBER	DESCRIPTION
T44-12	Baffle
T42-466	Cabinet
T67-549	Dial scale
T40-158	Escutcheon
T98-14	Grille cloth
T52-306	Knob



OPERATION



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MODEL 225,
Ch. 528.171

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 watt across voice coil ..... 0.4 v.

Generator ground lead connected.....To B- through 0.1 mfd. capacitor

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

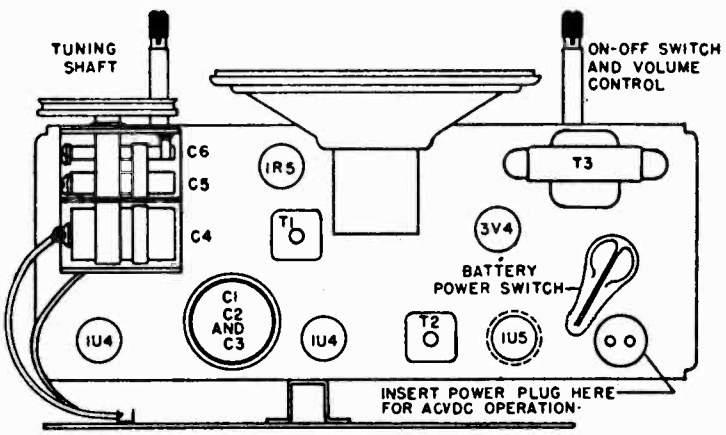
Position of volume control.....Fully on

Position of pointer with tuner fully closed.....Center of pointer lined up with extreme right dot on dial backing plate. (Chassis right side up.)

Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments (in order shown)	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1610 kc	0.1 mfd.	Stator ant. tuner	C6	Osc.	
1400 kc	1400 kc	0.1 mfd.	Stator ant. tuner	C5	R.F.	30
1400 kc	1400 kc		Hazeltine Test Loop	C4	Loop	100

ALIGNMENT NOTES:

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



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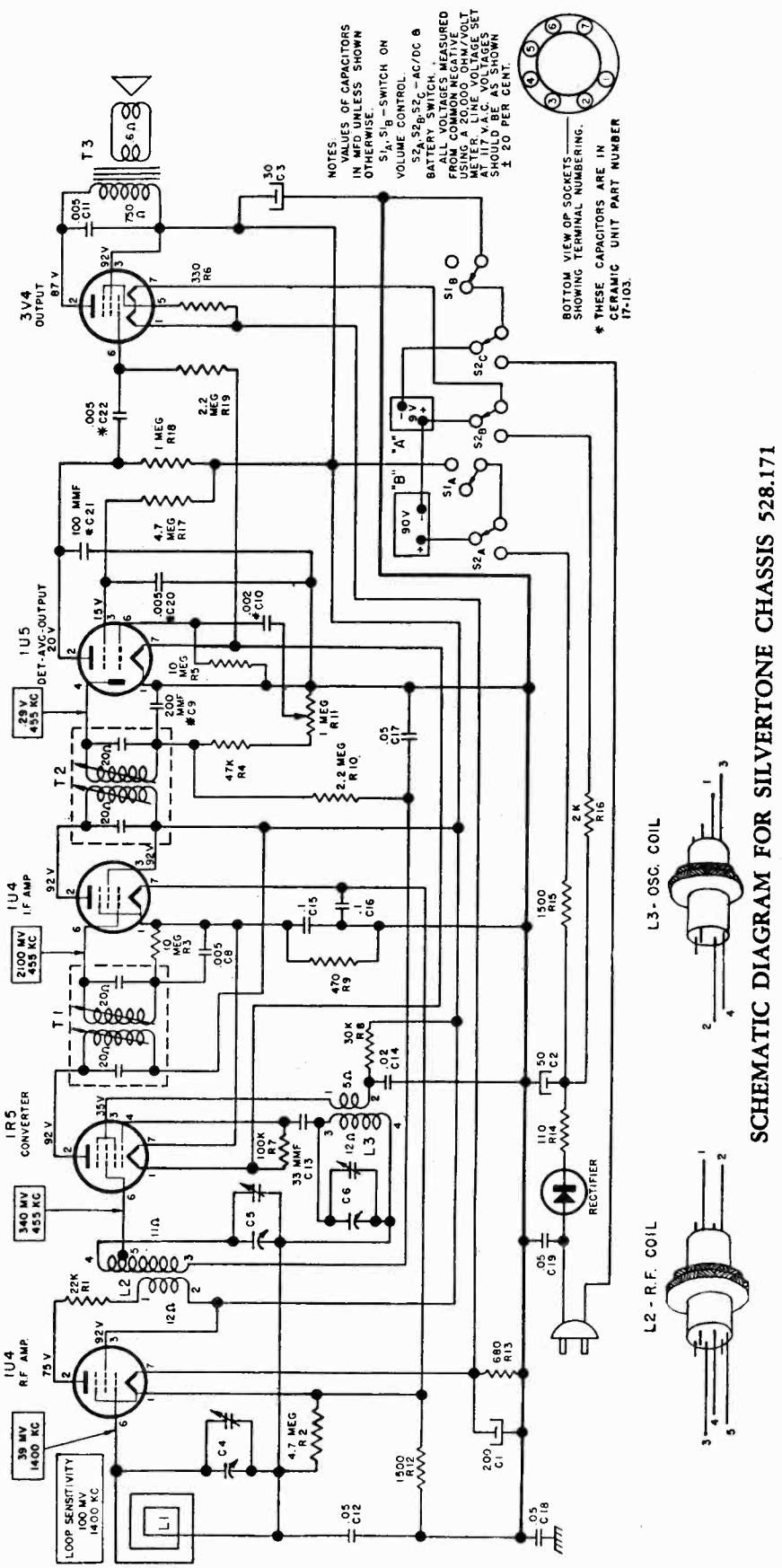

SCHEMATIC DIAGRAM FOR SILVERTONE CHASSIS 528.171

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MODEL 225,
Ch. 528.171-1

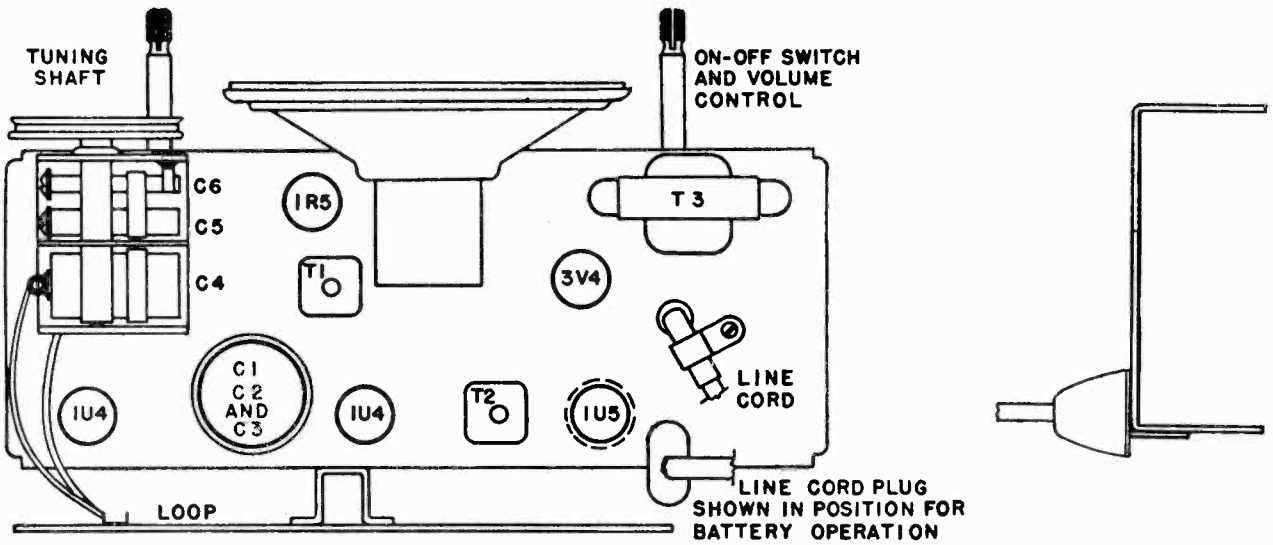
ALIGNMENT PROCEDURE

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

Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments (in order shown)	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1625 kc	0.1 mfd.	Stator ant. tuner	C6	Osc.	
1400 kc	1400 kc	0.1 mfd.	Stator ant. tuner	C5	R.F.	30
1400 kc	1400 kc		Hazeltine Test Loop	C4	Loop	100

ALIGNMENT NOTES:

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



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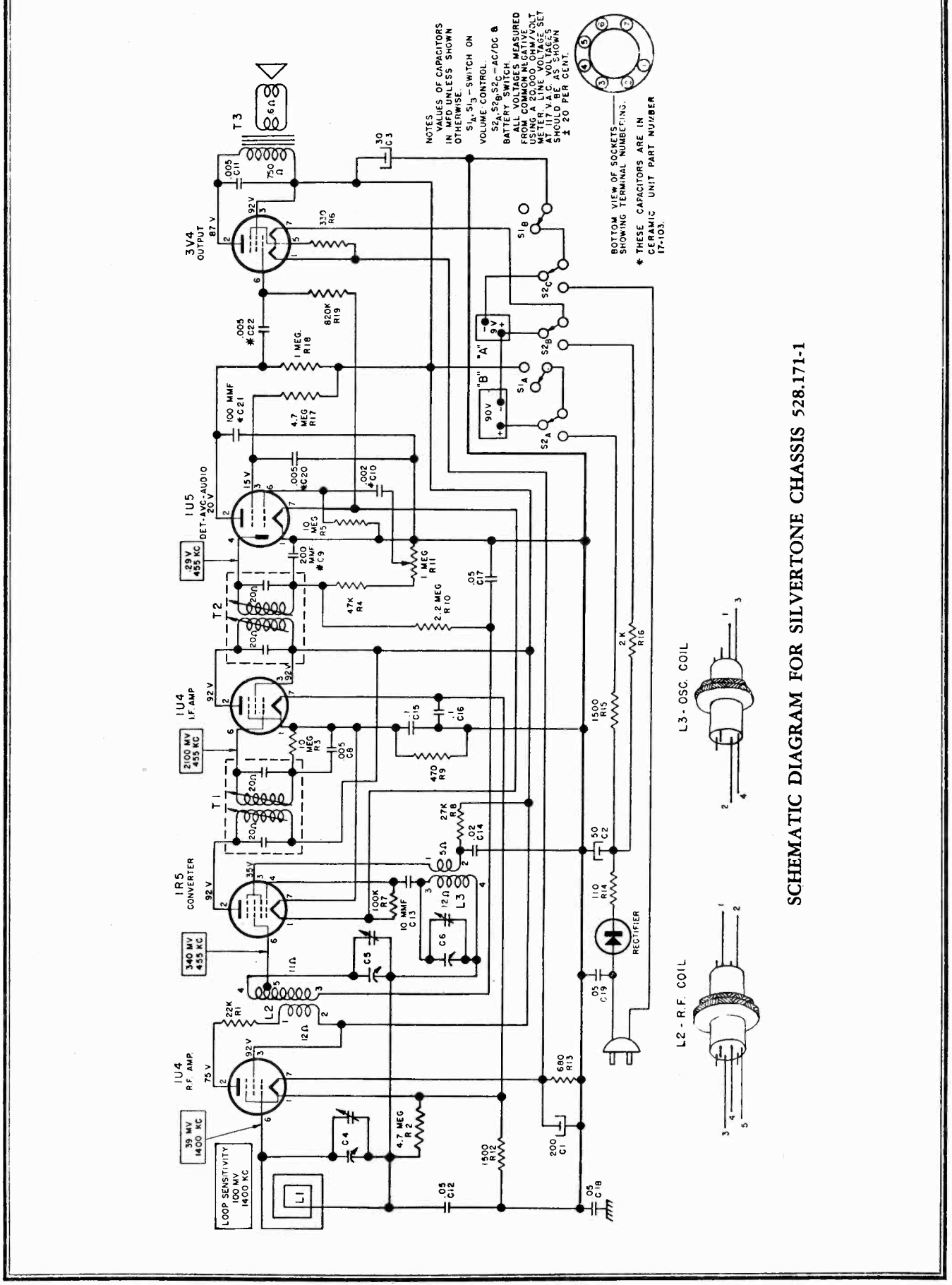

SCHEMATIC DIAGRAM FOR SILVERTONE CHASSIS 528.171-1

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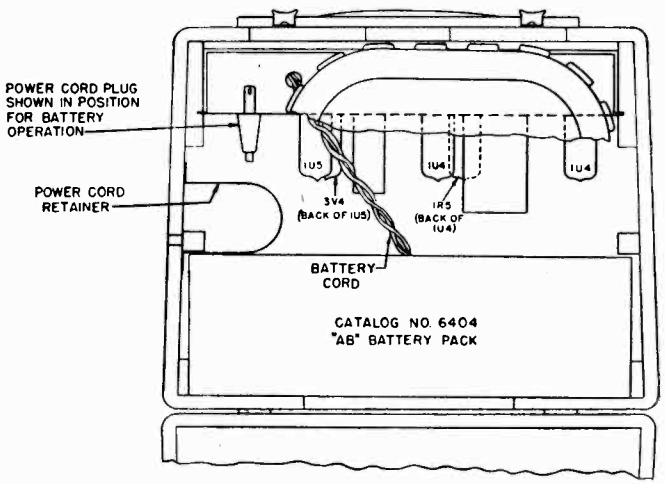
MODEL 225,
Ch. 528.171-1

PARTS LIST

CHASSIS

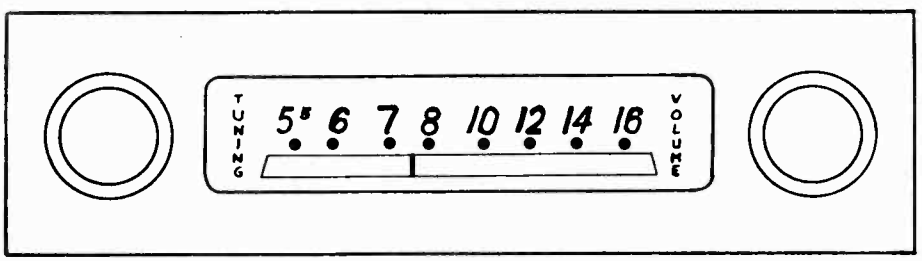
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	T84-391	Cable, ossembly, bottery
	T83-421	Clip, I.F. transformer mounting
C1, C2, C3	T18-296	Capacitor, electrolytic
C4, C5, C6	T19-208	Capacitor, variable (3 gang)
C8, C11	T16-153	Capacitor, .005 mfd. 600 v.
C9, C10, C20, C21, C22	T17-103	Capacitor, ceramic unit
C12, C17	T16-152	Capacitor, .05 mfd. 200 v.
C13	T15-186	Capacitor, 10 mmfd. mica
C14	T16-150	Capacitor, .02 mfd. 400 v.
C15, C16	T16-157	Capacitor, .1 mfd. 200 v.
C18, C19	T16-179	Capacitor, .05 mfd. 400 v.
L3	T10-553	Coil, oscillator
R11, S1	T24-186	Control, volume, with switch
	T23-151	Cord, power, AC/DC
	T51-105	Cord, pointer travel, 29"
	T47-108	Grommet, variable condenser
	T76-13	Insulator, electrolytic
L1	T82-66	Loop, antenna
	T58-78	Pointer
	T39-265	Pulley, dial cord
	T83-642	Rectifier, selenium
R1	T60-744	Resistor, 22,000 ohm, ½ w. 10%
R2, R17	T60-669	Resistor, 4.7 meg., ½ w.
R3, R5	T60-728	Resistor, 10 meg., ½ w.
R4	T60-730	Resistor, 47,000 ohm, ½ w.
R6	T60-704	Resistor, 330 ohm, ½ w. 10%
R7	T60-727	Resistor, 100,000 ohm, ½ w.
R8	T60-745	Resistor, 27,000 ohm, ½ w.
R9	T60-770	Resistor, 470 ohm, ½ w. 10%
R10	T60-726	Resistor, 2.2 meg., ½ w.
R12, R15	T60-729	Resistor, 1500 ohm, ½ w. 10%
R13	T60-708	Resistor, 680 ohm, ½ w. 10%
R14	T60-796	Resistor, 110 ohm, 3 w. 10%
R16	T60-757	Resistor, 2000 ohm, 10 w. 5%
R18	T60-668	Resistor, 1 meg., ½ w.
R19	T60-799	Resistor, 820,000 ohm, ½ w.
	T75-69	Shaft, tuning
	T68-39	Socket, miniature, wafer
	T79-380	Speaker, 5" P.M.
	T70-122	Spring, dial cord
S2	T69-186	Switch, AC/DC/Battery
T1, T2	T10-508	Transformer, 1st and 2nd I.F.
T3	T80-228	Transformer, output
L2	T10-535	Transformer, R.F.
	T86-51	Washer, "C", tuning shaft
	T86-80	Washer, compression, tuning shaft



CABINET

PART NUMBER	DESCRIPTION
T44-12	Baffle
T42-466	Cabinet
T67-549	Dial scale
T40-158	Escutcheon
T98-14	Grille cloth
T52-306	Knob

OPERATION



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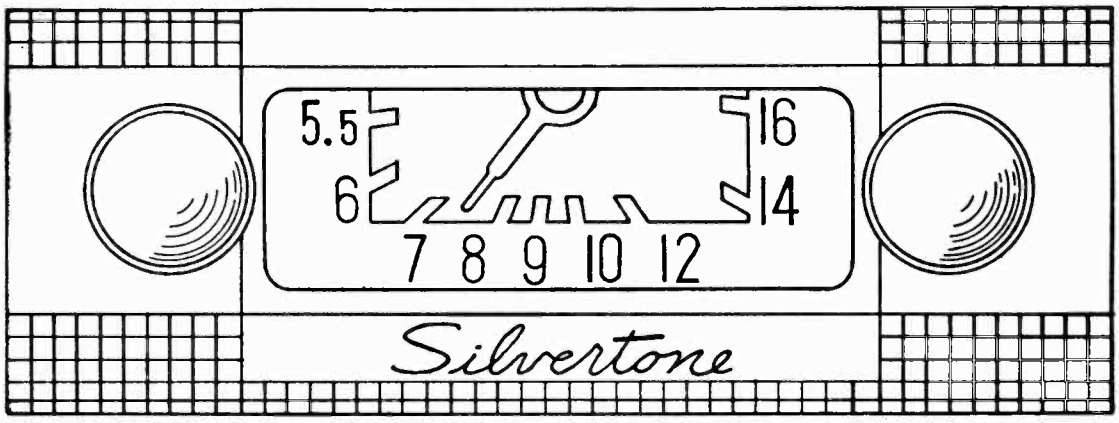


Fig. 1. Front View

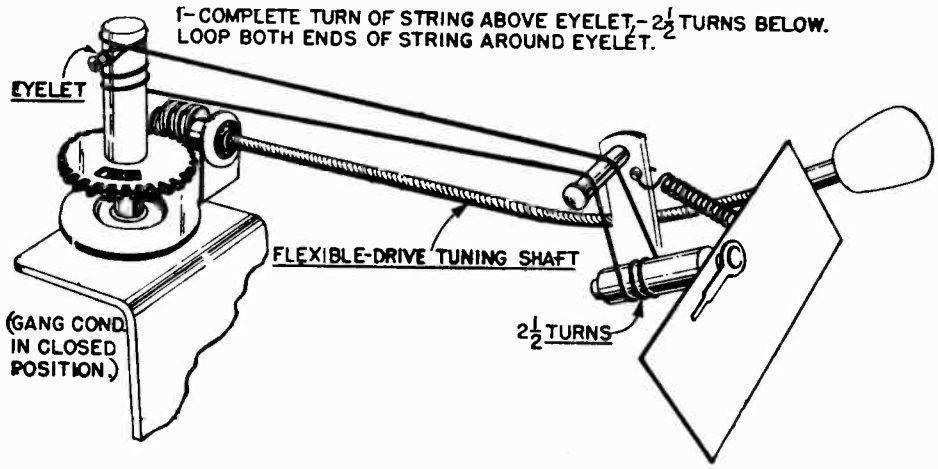
DESCRIPTION

Your new automobile receiver is a 5-tube (plus rectifier) superheterodyne, designed to operate from the 6 volt storage battery in your car. It is a universal type of receiver for mounting underneath the dash panel. It has a self-contained PM speaker, and covers the frequency range 540 to 1600 K.C. Two simple controls are provided for operating the receiver. (see fig. 1).

Special care has been taken in the design of this receiver to insure the finest in sensitivity and selectivity, there-by insuring good reception of even distant or weak stations. The unit is simple to install, the antenna input circuit adjustable to permit the use of any two or three section whip or "fish pole" antenna.

OPERATION

To turn the receiver on, rotate the volume control and switch knob (left hand knob) to the right about half its range. After allowing about 30 seconds for the tubes to warm up, the desired station may be tuned by rotating the tuning control (right hand knob) to the desired frequency. The dial scale is calibrated in kilocycles minus the final two zeros. After the station has been properly tuned, the volume may be adjusted by means of the volume control knob. To increase the volume, turn the control to the right; to decrease the volume, turn it to the left. Turning this control to the left as far as it will go, turns the radio off.



DIAL POINTER DRIVE & STRINGING DIAGRAM

Fig. 2.

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INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, ammeter condenser and generator condenser. By referring to Figures 1, 3 and 9, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 5/8" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed by bending to the correct angles, as illustrated in Figure 3, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

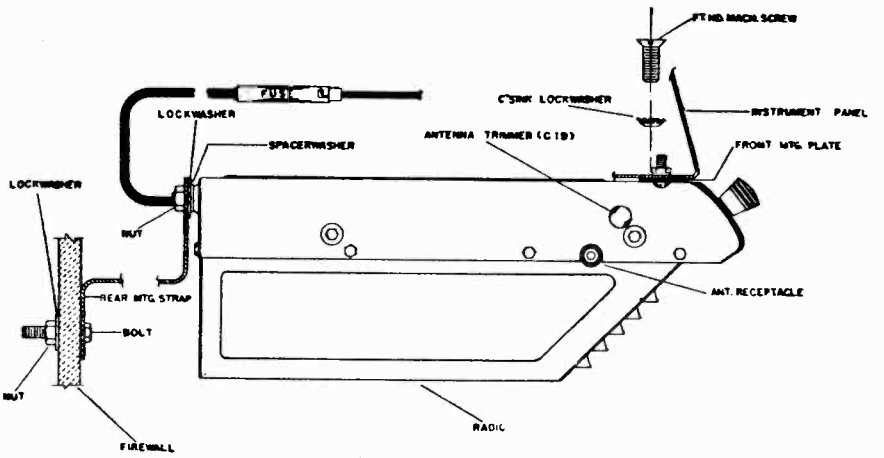

Fig. 3. Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the antenna receptacle provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 1400 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 3) and adjust the trimmer for maximum volume by turning the screw to the left or right with a small screw driver.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S-84-192, and the Suppression and Misc. Parts Kit, part No. S84-232, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-147.

S84-192 MOUNTING PARTS KIT

- 1 1/4" Bolt
- 2 1/4" Lock Washers
- 2 1/4" Hexagon Nuts
- 2 10-32 x 5/8" Screws
- 2 10-32 x 3/8" Screws
- 2 External Tooth Lock Washers
- 2 Internal Tooth Lock Washers
- 2 10-32 Hexagon Nuts
- 1 Washer-Spacer

S84-232 SUPPRESSION KIT & MISC. PARTS

- 1 S84-233 "A" lead assem.
- 1 A43-10 Fuse
- 1 A81-13 Sleeve (for fuse)
- 1 S84-193 Suppression Kit consisting of:
  - 2 .5 MFD Condensers
  - 1 Distributor Suppressor
  - 20" Wire Braid

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ELIMINATING MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

GENERATOR CONDENSER

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove from distributor cap the high tension lead from coil to distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most cases the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF FIRE WALL RODS AND TUBES

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and fods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

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ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	6.2 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	455 KC
Speaker	4" P. M.
Power Output	1.75 watts, undistorted 3 watts, maximum
Sensitivity	1 microvolt average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

The tube compliment of this receiver is as follows:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the schematic diagram (Fig. 7).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.

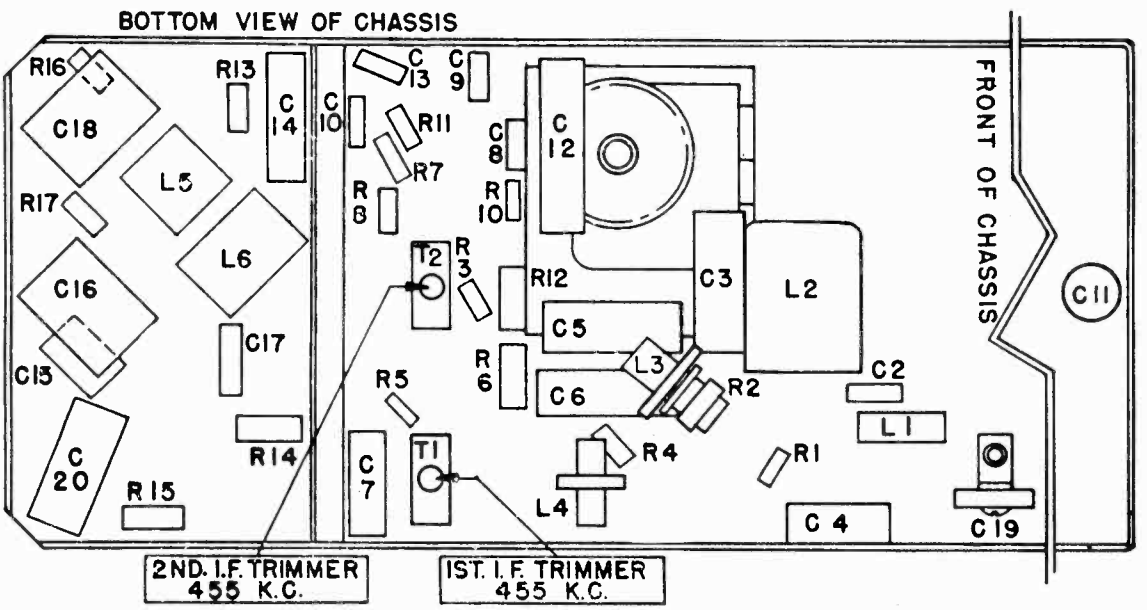

Fig. 4. Bottom View

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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (0.04 volt for 0.05 watt output.)

Dummy antennas—.1 MFD., 75 MMFD.

For alignment points refer to Figures 5 and 6.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	1600 KC	75 MMFD.	Ant. lead	C1C	Maximum	Oscillator
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C1B	Maximum	R.F.
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C19	Maximum	Antenna

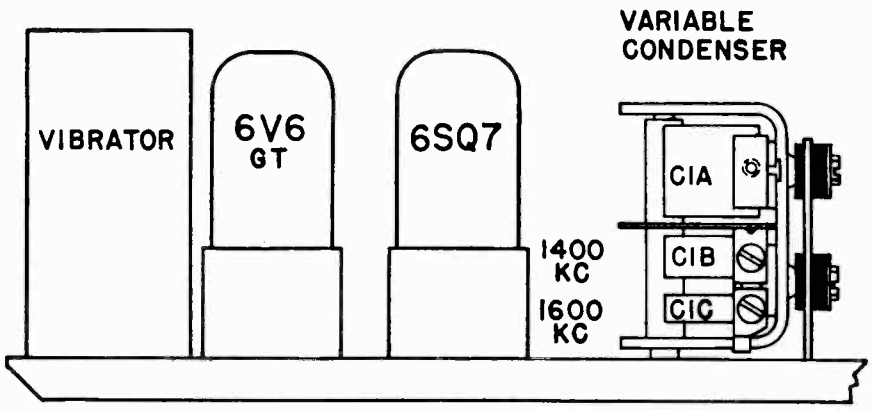

Fig. 5. Trimmer Locations

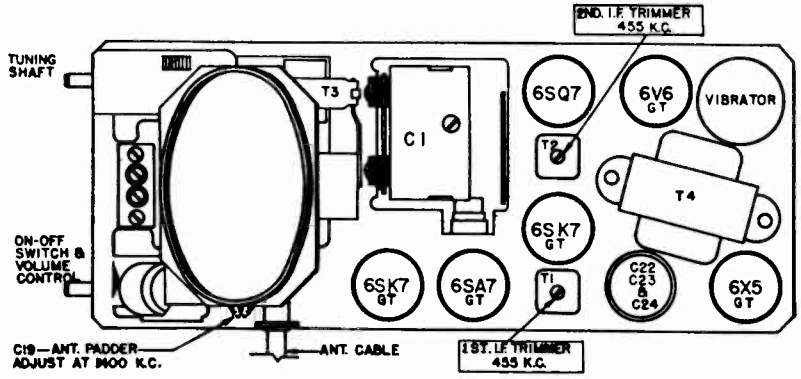

Fig. 6. Tube and Trimmer Locations

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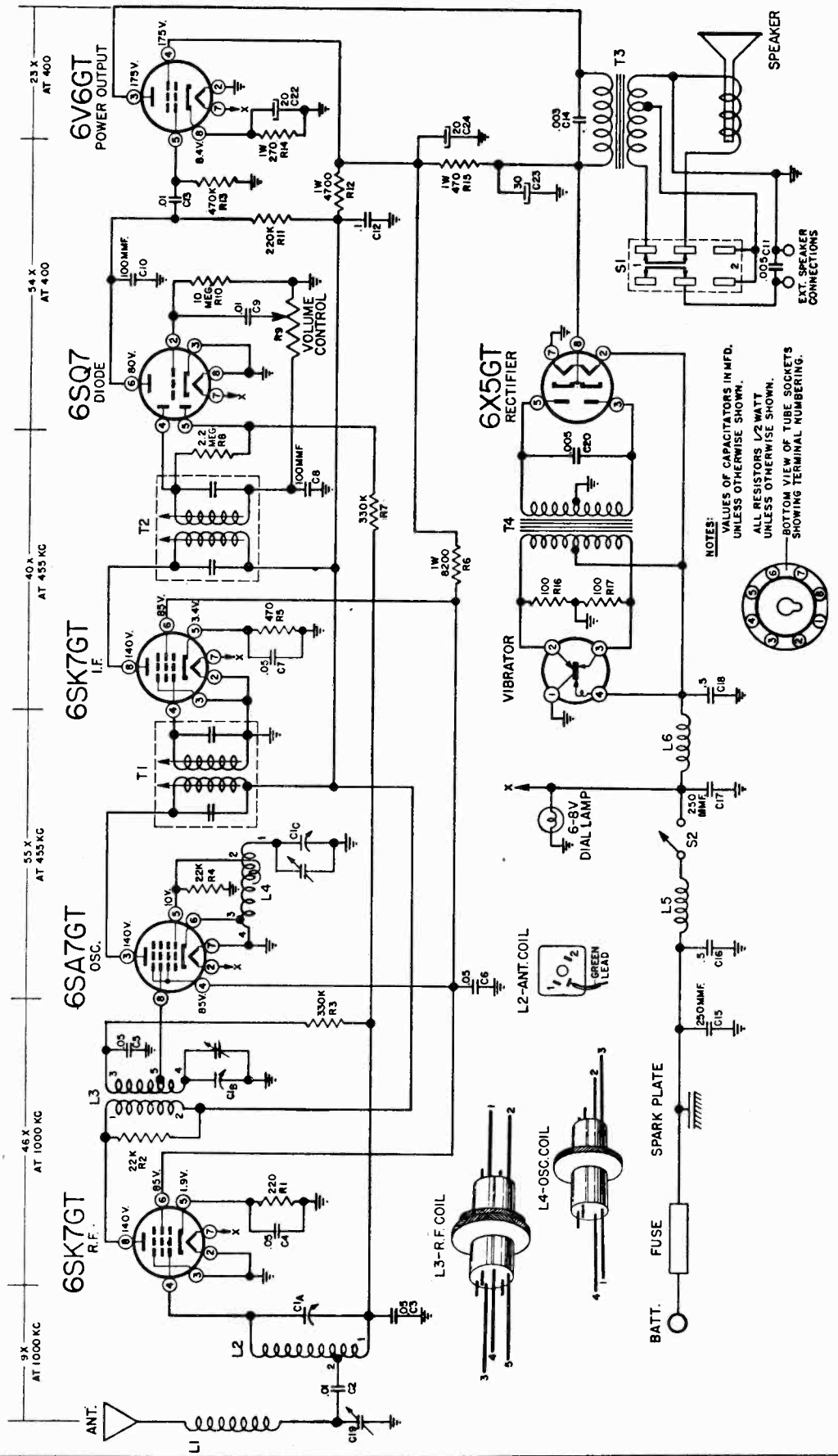

Fig. 7. Schematic Diagram

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INSTRUCTIONS FOR INSTALLATION OF REAR SEAT SPEAKER

Your Silvertone Auto Radio, Chassis Number 528.6293 includes a special feature which makes it simple and easy to install an additional speaker in the rear of the car. A speaker with the proper voice coil impedance (3.2 ohms) for such an installation is available at the Sears store where you bought your Silvertone Auto Radio.

The terminal strip in the illustration below is accessible through an opening in the case. The two wire leads from the rear seat speaker should be connected to these terminals. This completes the electrical installation of the speaker. The switch at the right is for operation of the rear seat speaker. In position 1, only the speaker in the case is connected; in position 2, both speakers are connected.

IMPORTANT: When there is no rear seat speaker installation, ALWAYS keep the switch in position 1.

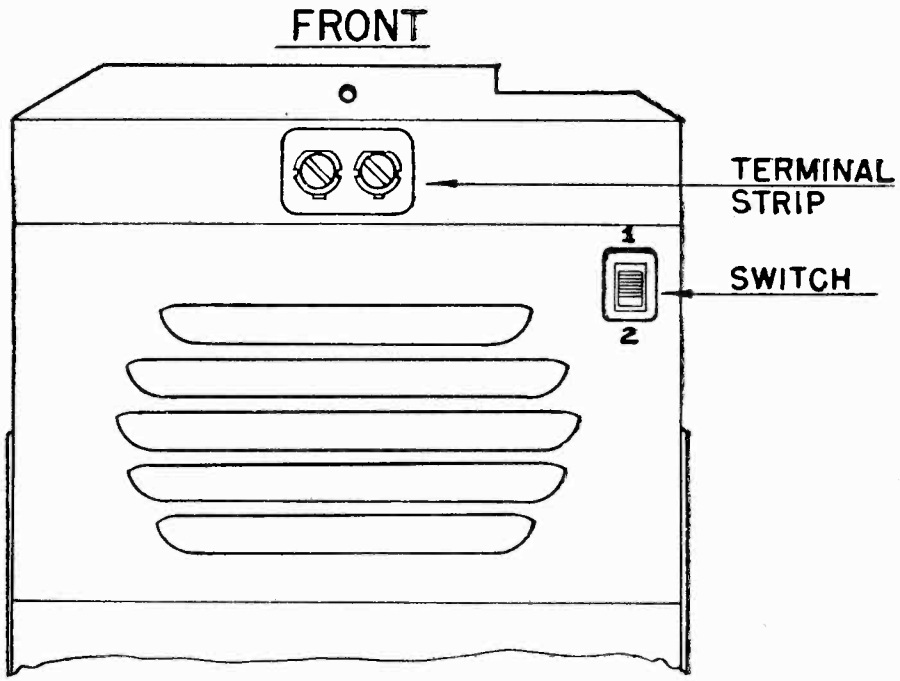

Fig. 8. Bottom View of Case

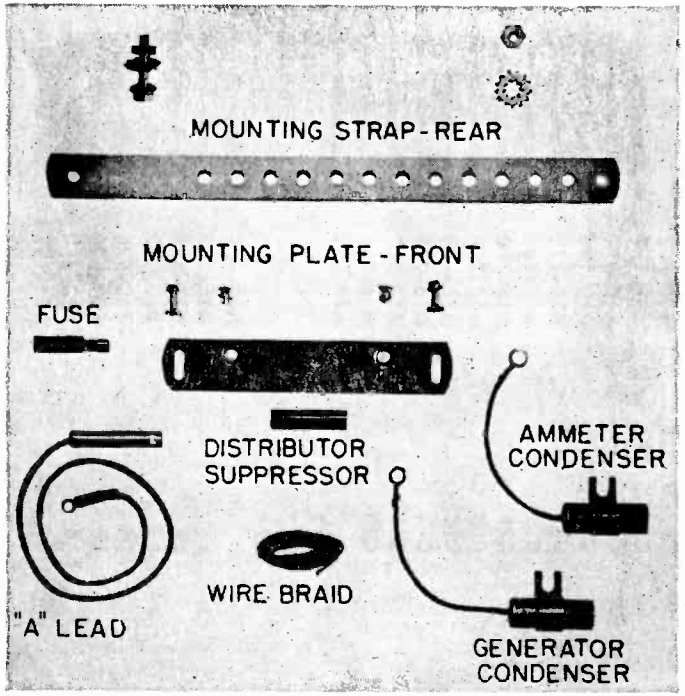

Fig. 9. Mounting Parts

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REPAIR PARTS LIST

Schematic Location	Part No.	Description
C1A, C1B, C1C	B19-203	Capacitor—variable, worm drive
C2, C9, C13	A16-201	Capacitor—.01 mfd.—600 v.
C3, C5, C6	A16-189	Capacitor—.05 mfd.—400 v.
C4, C7	A16-197	Capacitor—.05 mfd.—200 v.
C8, C10	A15-196	Capacitor—mica—100 mmfd.
C11	A16-177	Capacitor—ceramic—.005 mfd.
C12	A16-187	Capacitor—.1 mfd.—400 v.
C14	A16-200	Capacitor—.003 mfd.—600 v.
C15, C17	A15-176	Capacitor—mica—250 mmfd.
C16	A16-184	Capacitor—.5 mfd.—100 v.
C18	A16-202	Capacitor—.5 mfd.—100 v.
C19	A20-145	Capacitor—ceramic—antenna trimmer
C20	A16-185	Capacitor—.005 mfd.—1600 v.
	A18-289	Capacitor—electrolytic
C22		20 mfd.—25 v.
C23		30 mfd.—350 v.
C24		20 mfd.—350 v.
	A83-421	Clip—I.F. transformer mounting
L1	A10-527	Coil—Antenna loading
L2	B10-525	Coil—Antenna
L3	B10-528	Coil—R. F.
L4	B10-526	Coil—Oscillator
L5	A33-229	Coil—"A" line choke
L6	A33-234	Coil—Vibrator hash choke
R9, S2	A24-177	Control—ON-OFF and VOLUME
	A51-105	Cord—Pointer travel, 17"
	B67-541	Dial—Station
	A47-112	Grommet—Speaker and variable capacitor mounting
	A47-114	Grommet—Fibre—Flexible shaft bearing
	S84-233	Kit—"A" lead assembly
	S84-192	Kit—Mounting parts
	S84-193	Kit—Suppression, assembly
	A52-293	Knob—Volume and tuning
	A89-10	Lamp—Dial—G. E. No. 422
	A31-147	Plate—Mounting, front
	A58-76	Pointer—Dial
	A87-38	Receptacle—Antenna cable
R1	A60-753	Resistor—220 ohm—½ w.
R2, R4	A60-744	Resistor—22,000 ohm—½ w.
R3, R7	A60-661	Resistor—330,000 ohm—½ w.
R5	A60-722	Resistor—470 ohm—½ w.
R6	A60-766	Resistor—8200 ohm—1 w.
R8	A60-726	Resistor—2.2 megohm—½ w.
R10	A60-728	Resistor—10 megohm—½ w.
R11	A60-667	Resistor—220,000 ohm—½ w.
R12	A60-765	Resistor—4700 ohm—1 w.
R13	A60-731	Resistor—470,000 ohm—½ w.
R14	A60-754	Resistor—270 ohm—1 w.
R15	A60-694	Resistor—470 ohm—½ w.
R16, R17	A60-752	Resistor—100 ohm—½ w.
	B75-72	Shaft—Tuning drive—flexible
	B79-373	Speaker—4" P.M.
	B31-134	Strap—Mounting, rear
S1	A69-185	Switch—Rear seat speaker
T1	A10-521	Transformer—I.F. No. 1
T2	A10-529	Transformer—I.F. No. 2
T3	B80-249	Transformer—Output (part of speaker)
T4	B80-243	Transformer—Power
	A34-105	Vibrator—Mallory No. 659

IMPORTANT: All tubular condensers must be high temperature (85°C.) wax type.

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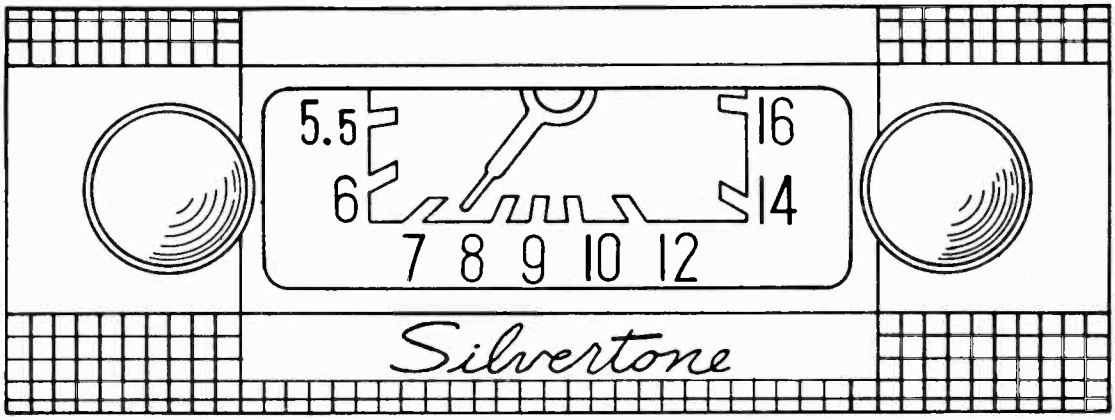


Fig. 1 Front View

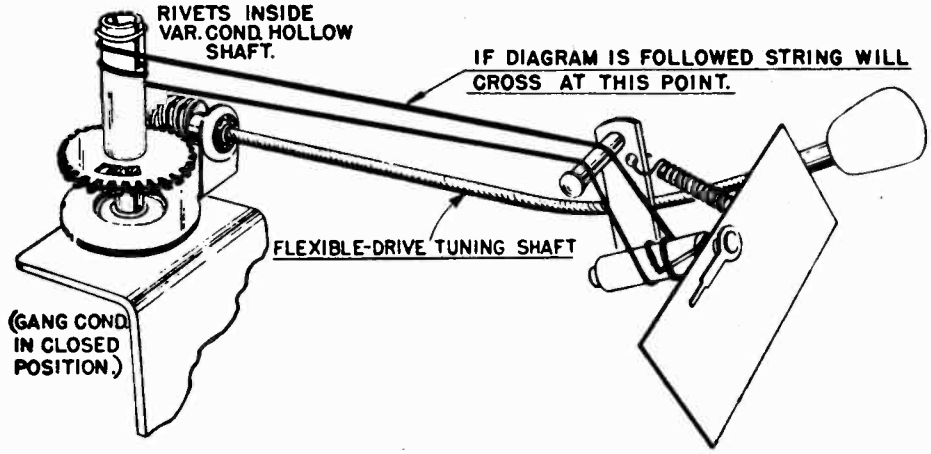
DESCRIPTION

Your new automobile receiver is a 5-tube (plus rectifier) superheterodyne, designed to operate from the 6 volt storage battery in your car. It is a universal type of receiver for mounting underneath the dash panel. It has a self-contained PM speaker, and covers the frequency range 540 to 1600 K.C. Two simple controls are provided for operating the receiver. (see fig. 1).

Special care has been taken in the design of this receiver to insure the finest in sensitivity and selectivity, there-by insuring good reception of even distant or weak stations. The unit is simple to install, the antenna input circuit adjustable to permit the use of any two or three section whip or "fish pole" antenna.

OPERATION

To turn the receiver on, rotate the volume control and switch knob (left hand knob) to the right about half its range. After allowing about 30 seconds for the tubes to warm up, the desired station may be tuned by rotating the tuning control (right hand knob) to the desired frequency. The dial scale is calibrated in kilocycles minus the final two zeros. After the station has been properly tuned, the volume may be adjusted by means of the volume control knob. To increase the volume, turn the control to the right; to decrease the volume, turn it to the left. Turning this control to the left as far as it will go, turns the radio off.



DIAL POINTER DRIVE & STRINGING DIAGRAM

Fig. 2

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INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, ammeter condenser and generator condenser. By referring to Figures 1 and 2, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 7/32" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed by bending to the correct angles, as illustrated in Figure 3, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

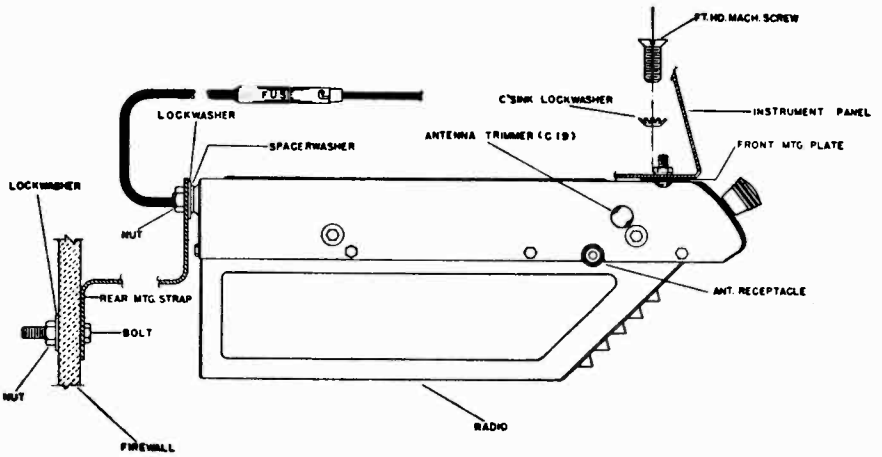

Fig. 2 Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 1100 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 2) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression and Misc. Parts Kit, part No. S84-232 as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-147.

S84-192 MOUNTING PARTS KIT

- 1 1/4" Bolt
- 2 1/4" Lock Washers
- 2 1/4" Hexagon Nuts
- 2 10-32 x 5/8" Screws
- 2 10-32 x 3/8" Screws
- 2 External Tooth Lock Washers
- 2 Internal Tooth Lock Washers
- 2 10-32 Hexagon Nuts
- 1 Washer-Spacer

S84-232 SUPPRESSION KIT & MISC. PARTS

- 1 S84-233 "A" lead assem.
- 1 A43-10 Fuse
- 1 A81-13 Sleeve (for fuse)
- 1 S84-193 Suppression Kit consisting of:
  - 2 .5 MFD Condensers
  - 1 Distributor Suppressor
  - 20" Wire Braid

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ELIMINATING MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise. (The following steps may not be necessary in all cases. Install your radio and operate it before making changes.)

GENERATOR CONDENSER

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove from distributor cap the high tension lead from coil to distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most cases the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION WIRES

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These wires will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF FIRE WALL RODS AND TUBES

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

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ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	6.2 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	455 KC
Speaker	4" P. M.
Power Output	1.75 watts, undistorted 3 watts, maximum
Sensitivity	3 microvolt average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

A 6X5GT Rectifier is used.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes and the rectifier in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage diagram (Fig. 7).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.

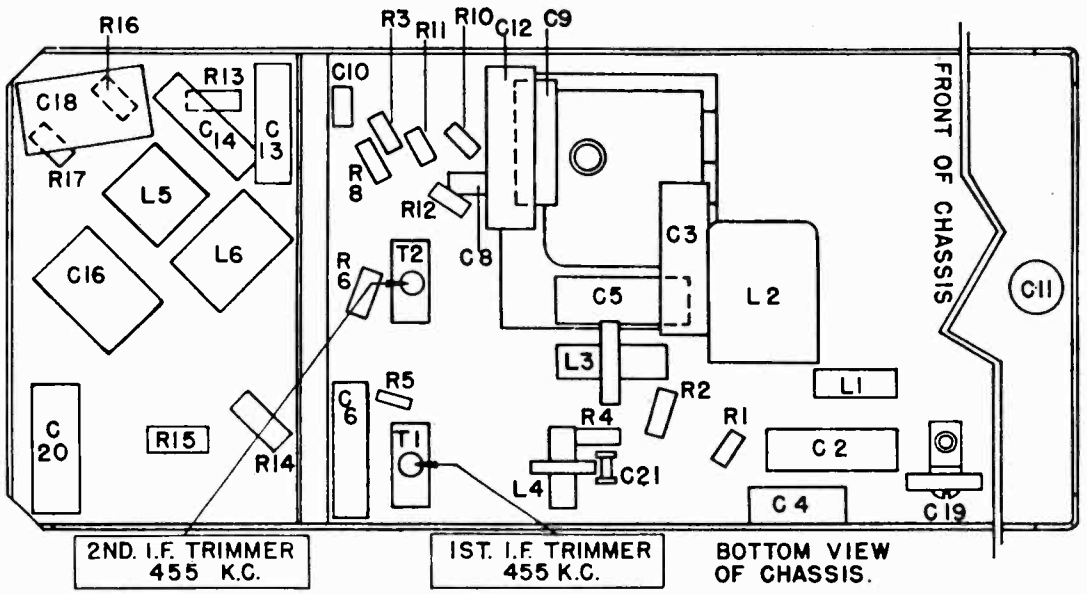

Fig. 4. Bottom View

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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD.

For alignment points refer to Figures 5 and 6.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	1600 KC	75 MMFD.	Ant. lead	C1C	Maximum	Oscillator
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C1B	Maximum	R.F.
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C19	Maximum	Antenna

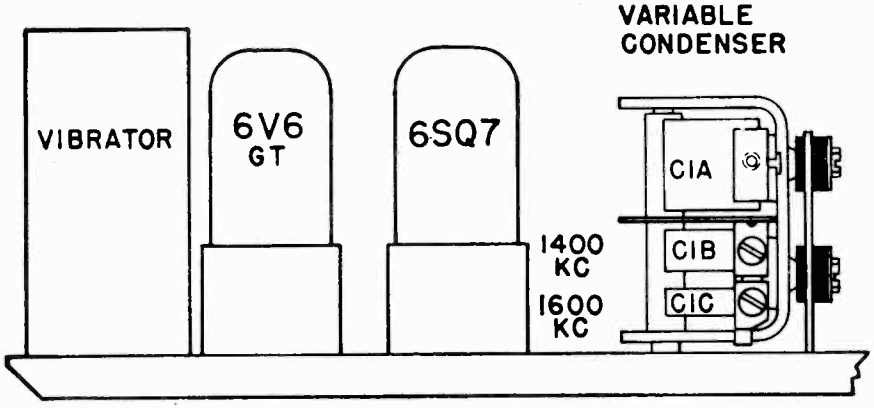

Fig. 5. Trimmer Locations

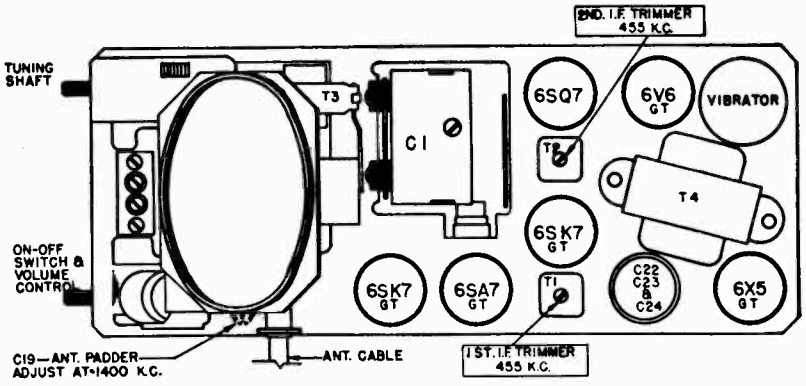

Fig. 6. Tube, Rectifier and Trimmer Locations

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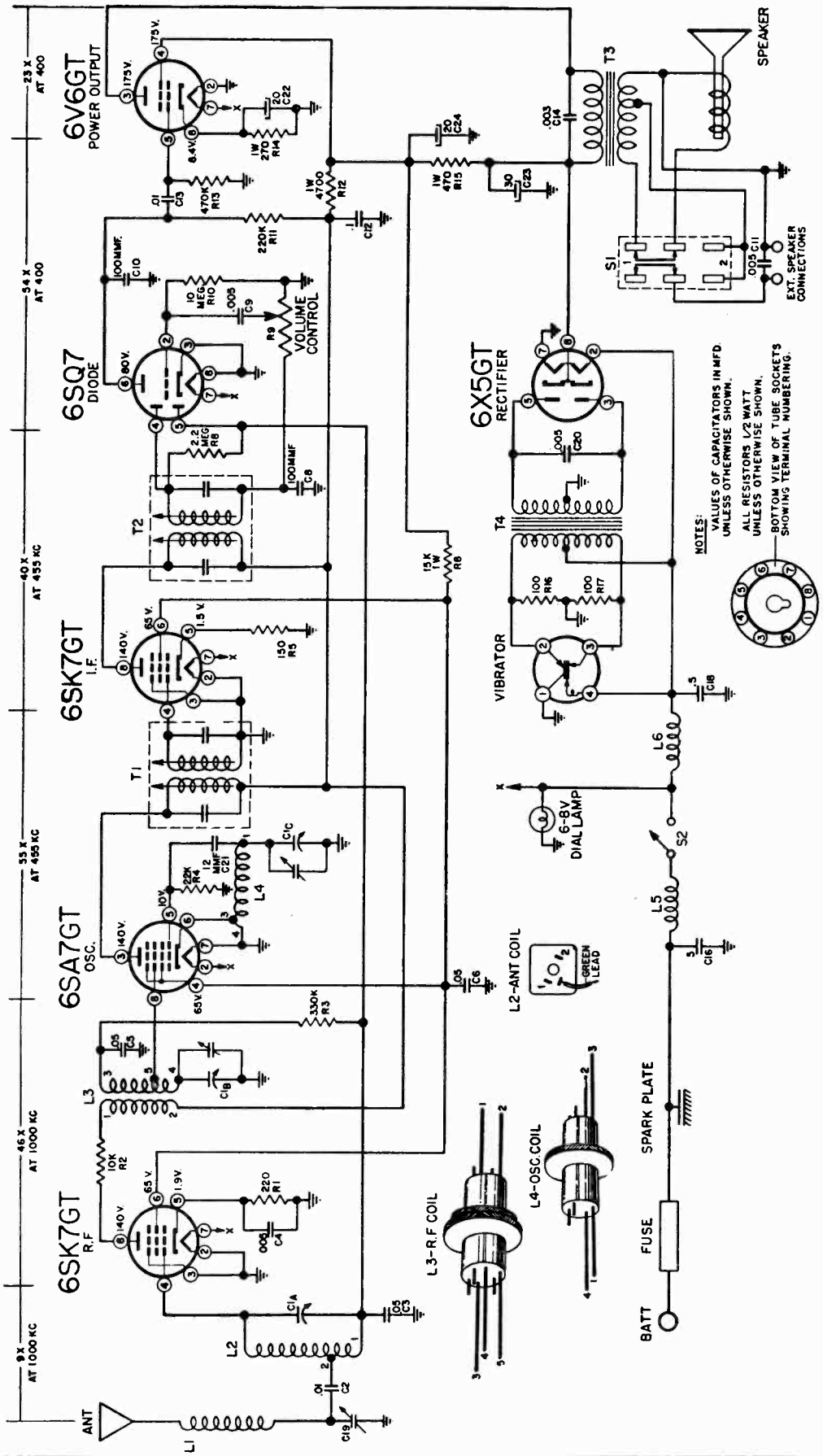

Fig. 7. Schematic Diagram

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INSTRUCTIONS FOR INSTALLATION OF REAR SEAT SPEAKER

Your Silvertone Auto Radio, Chassis No. 528.6293-2 includes a special feature which makes it simple and easy to install an additional speaker in the rear of the car. A speaker with the proper voice coil impedance (3.2 ohms) for such an installation is available at the Sears store where you bought your Silvertone Auto Radio.

The terminal strip in the illustration below is accessible through an opening in the case. The two wire leads from the rear seat speaker should be connected to these terminals. This completes the electrical installation of the speaker. The switch at the right is for operation of the rear seat speaker. In position 1, only the speaker in the case is connected; in position 2, both speakers are connected.

IMPORTANT: When there is no rear seat speaker installation, ALWAYS keep the switch in position 1.

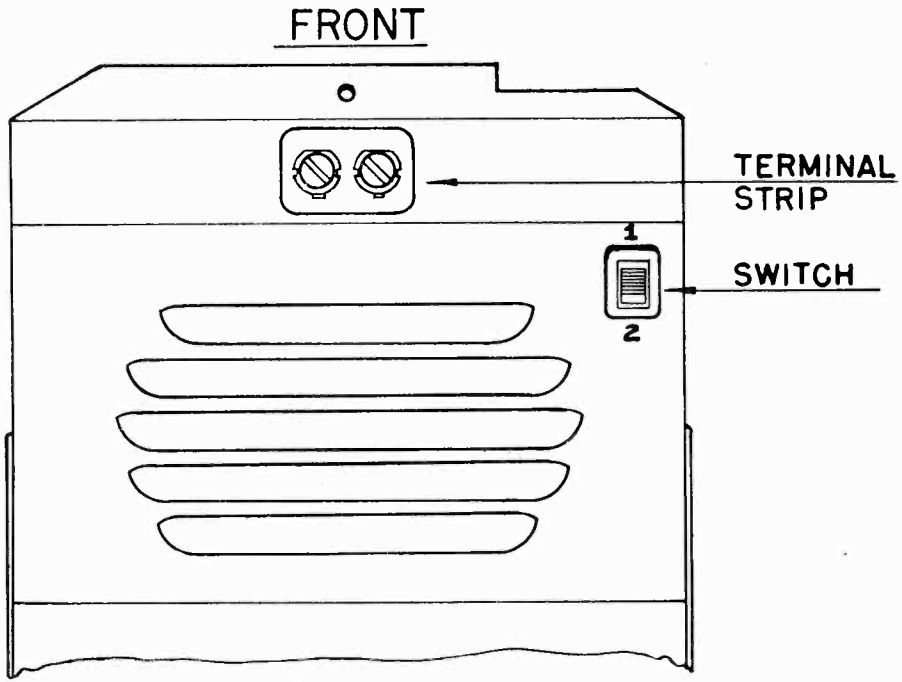

Fig. 8. Bottom View of Case

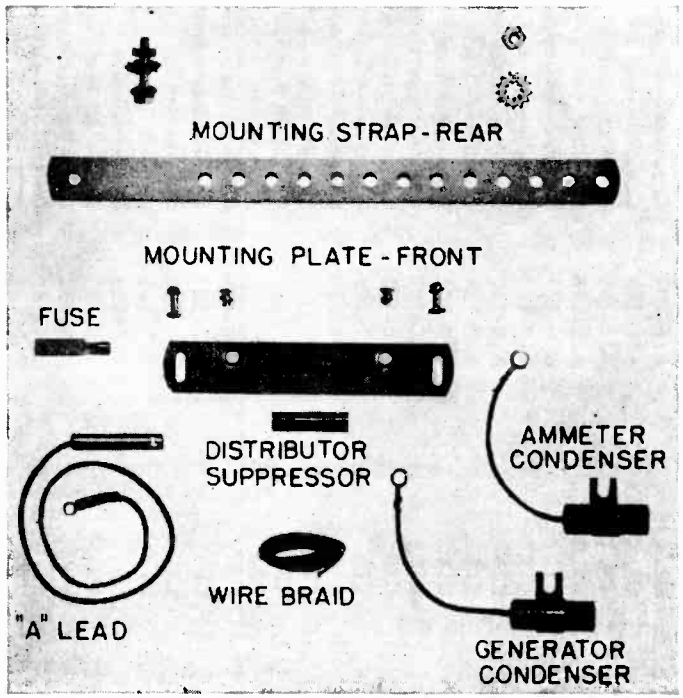

Fig. 9. Mounting Parts

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REPAIR PARTS LIST

Schematic Location	Part No.	Description
C1A, C1B, C1C	B19-205	Capacitor—variable—worm drive
C2, C13	A16-201	Capacitor—.01 mfd.—600 v.
C3, C5, C6	A16-189	Capacitor—.05 mfd.—400 v.
C4, C9	A16-190	Capacitor—.005mfd.—600 v.
C8, C10	A15-196	Capacitor—mica—100 mmfd.
C11	A16-177	Capacitor—ceramic—.005 mfd.
C12	A16-187	Capacitor—.1 mfd.—400 v.
C14	A16-200	Capacitor—.003 mfd.—600 v.
C16	A16-184	Capacitor—.5 mfd.—100 v.
C18	A16-202	Capacitor—.5 mfd.—100 v.
C19	A20-145	Capacitor—ceramic—antenna trimmer
C20	A16-185	Capacitor—.005 mfd.—1600 v.
C21	A15-205	Capacitor—ceramic—12 MMFD. (temp. comp.)
	A18-289	Capacitor—electrolytic
C22		20 mfd.—25 v.
C23		30 mfd.—350 v.
C24		20 mfd.—350 v.
	A83-421	Clip—I.F. transformer mounting
L1	A10-527	Coil—Antenna loading
L2	B10-525	Coil—Antenna
L3	B10-535	Coil—R. F.
L4	B10-536	Coil—Oscillator
L5	A33-229	Coil—"A" line choke
L6	A33-234	Coil—Vibrator hash choke
R9, S2	A24-182	Control—ON-OFF and VOLUME, 500,000 ohm
	A51-105	Cord—Pointer travel, 17"
	B67-541	Dial—Station
	A47-112	Grommet—Speaker and variable capacitor mounting
	A47-114	Grommet—Fibre—Flexible shaft bearing
	S84-233	Kit—"A" lead assembly
	S84-192	Kit—Mounting parts
	S84-193	Kit—Suppression, assembly
	A52-294	Knob—Volume and tuning
	A89-10	Lamp—Dial—G.E. No. 422
	A31-147	Plate—Mounting, front
	A58-76	Pointer—Dial
	A87-38	Receptacle—Antenna cable
R1	A60-753	Resistor—220 ohm—½ watt
R2	A60-760	Resistor—10,000 ohm— ½ watt
R3	A60-661	Resistor—330,000 ohm—½ watt
R4	A60-744	Resistor—22,000 ohm—½ watt
R5	A60-767	Resistor—150 ohm—½ watt
R6	A60-716	Resistor—15,000 ohm—1 watt
R8	A60-726	Resistor—2.2 megohm—½ watt
R10	A60-728	Resistor—10 megohm—½ watt
R11	A60-667	Resistor—220,000 ohm—½ watt
R12	A60-765	Resistor—4700 ohm—1 watt
R13	A60-731	Resistor—470,000 ohm—½ watt
R14	A60-754	Resistor—270 ohm—1 watt
R15	A60-694	Resistor—470 ohm—1 watt
R16, R17	A60-752	Resistor—100 ohm—½ watt
	A75-74	Shaft—Pointer
	B75-73	Shaft—Tuning drive—flexible
	B79-373	Speaker—4" P.M.
	B31-134	Strap—Mounting, rear
S1	A69-185	Switch—Rear seat speaker
T1	A10-521	Transformer—I.F. No. 1
T2	A10-529	Transformer—I.F. No. 2
T3	B80-249	Transformer—Output (part of speaker)
T4	B80-243	Transformer—Power
	A34-105	Vibrator—Mallory No. 659

IMPORTANT: All tubular condensers must be high temperature (85°C.) wax type.

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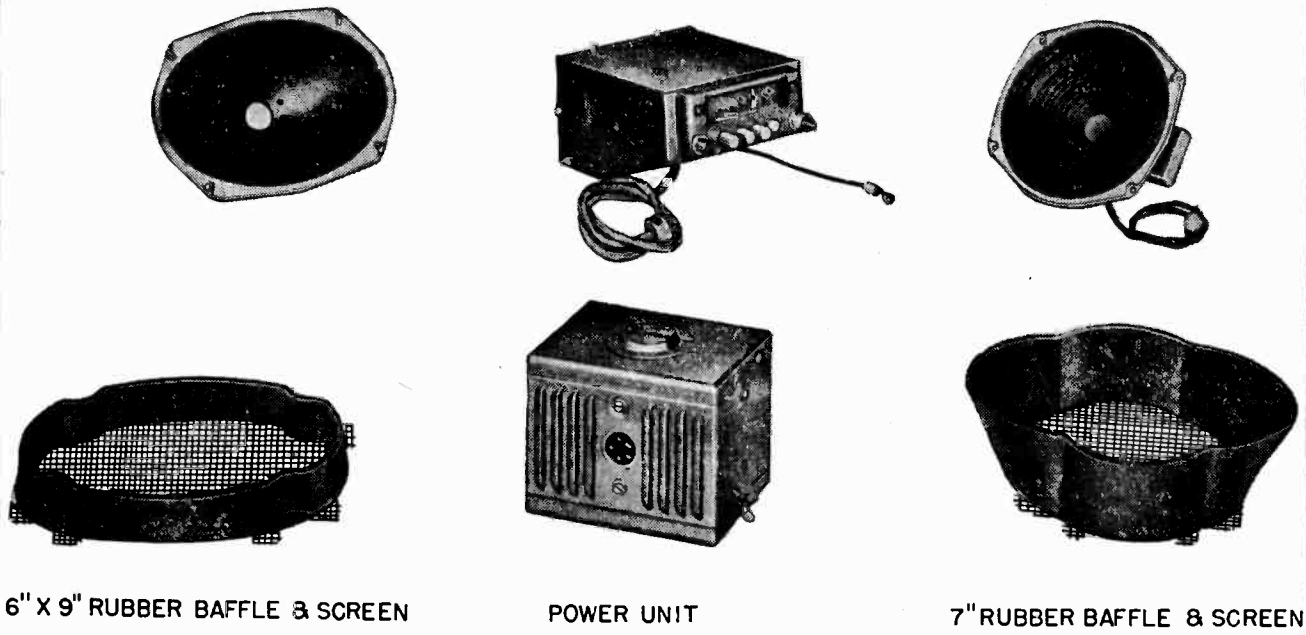

Fig. 1. Parts in Master Package

Only one of the speakers illustrated is supplied with each radio; the type of speaker you receive will be determined by the make of car for which the radio is ordered.

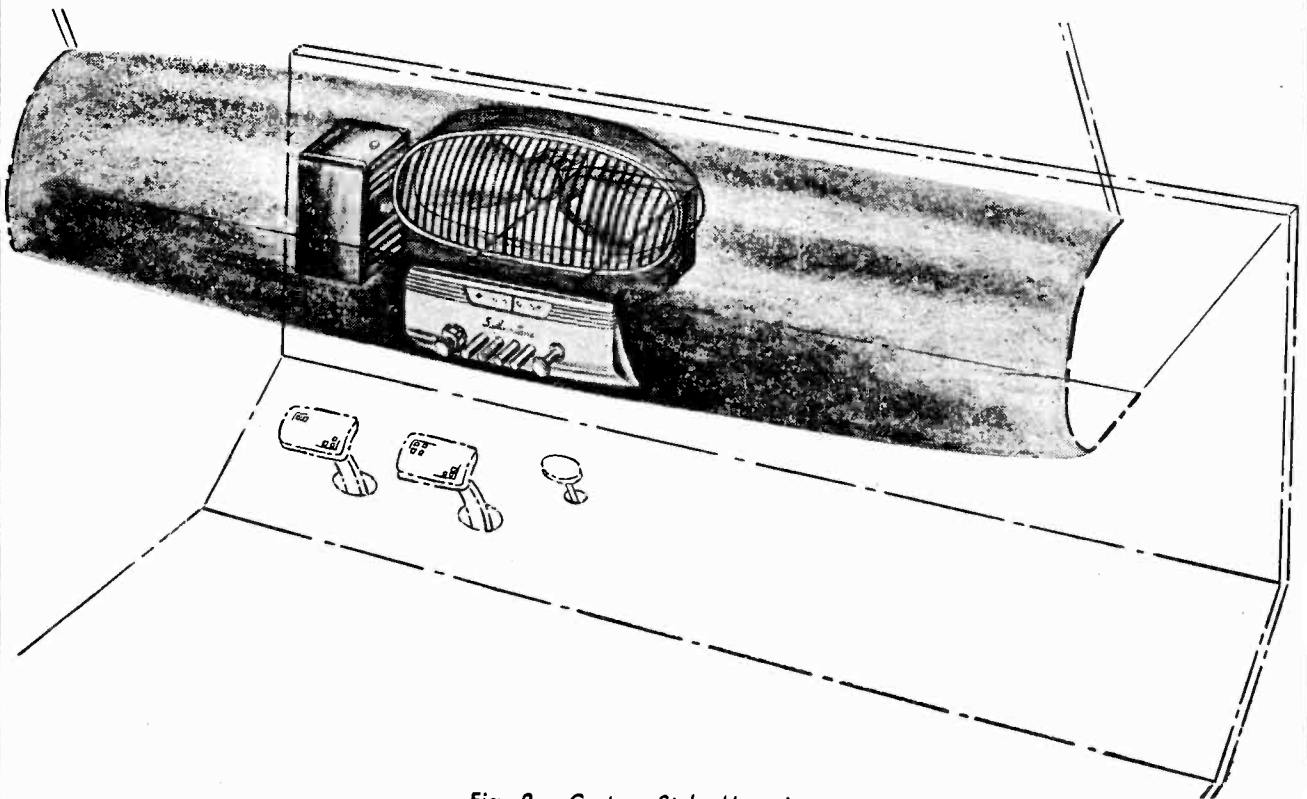

Fig. 2. Custom Style Mounting

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MODEL 6295,
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DESCRIPTION

Your SILVERTONE radio is a newly designed DE LUXE PUSHBUTTON TUNING AUTOMOBILE RECEIVER of advance superheterodyne circuit design, for operation on the six volt storage battery in your car. It covers the frequency range from 540 KC to 1600 KC. In addition to PUSHBUTTON TUNING it features BASS-COMPENSATED VOLUME CONTROL supplemented by a MANUAL TONE CONTROL. It consists of three principal parts—the Control Unit, the Power Unit and the Speaker (See Fig. 1)—and is supplied with mounting parts to accommodate either custom instaliation in the instrument panel or underdash mounting. (See Figs. 2 and 3.)

Special care has been taken in the design of this receiver to insure the finest in sensitivity and selectivity, thereby insuring good reception of even distant or very weak stations. It is simple to install. The antenna input circuit is adjustable to permit the use of any two, three or four section telescopic, whip or "fishpole" type antenna.

Each complete radio, with accessories, is made up in two separate packages, one carton containing the Escutcheon Kit and speaker mounting hardware, the other carton containing the Control Unit, the Power Unit and either a 7" round speaker or a 6"x9" oval speaker, depending on the make and and model of the car for which the radio was ordered. This second carton will be stamped with the letter "A" to indicate that it contains a 7" round speaker, or the letter "B" to indicate the 6"x9" oval speaker.

Control Unit Escutcheon Kits (instrument panel matching or universal) are supplied as a separate item, thus permitting you to transfer the radio from one car to another with only the small expense of replacing the Escutcheon Kit and speaker if you desire to match the instrument panel of your new or different car. Instrument panel matching Escutcheon Kits for most popular late model cars are available at your nearest Sears retail store or Mail Order House. If your Silvertone radio is equipped with a universal underdash tuning panel it may be transferred as is to a different car without changing the Escutcheon Kit. However, if you wish to change from an underdash mounting to a custom style instrument panel mounting, this can be accomplished by discarding the universal Escutcheon Kit and replacing it with an instrument panel matching Escutcheon Kit and 6"x9" oval speaker, if necessary), as outlined above.

INSTALLATION

THE SPEAKER

The speakers (7" round or 6"x9" oval) are supplied with sponge rubber baffles for mounting on flat or curved instrument panels. The rubber baffle for the 7" round speaker has flared sides so that it will cover an oval opening in the car's speaker grill as well as a round opening.

Speaker mounting hardware is supplied with each Escutcheon Kit for mounting the speaker in your car. This includes a "U-shaped" bracket for mounting the round speaker in cars on which it is not possible to mount the speaker on existing bolts.

SPECIFIC INSTRUCTIONS PERTAINING TO THE MOUNTING OF THE SPEAKER AND CONTROL UNIT IN THE CAR FOR WHICH YOU ORDERED YOUR RADIO ARE CONTAINED IN THE LEAFLET PACKED IN THE ESCUTCHEON KIT.

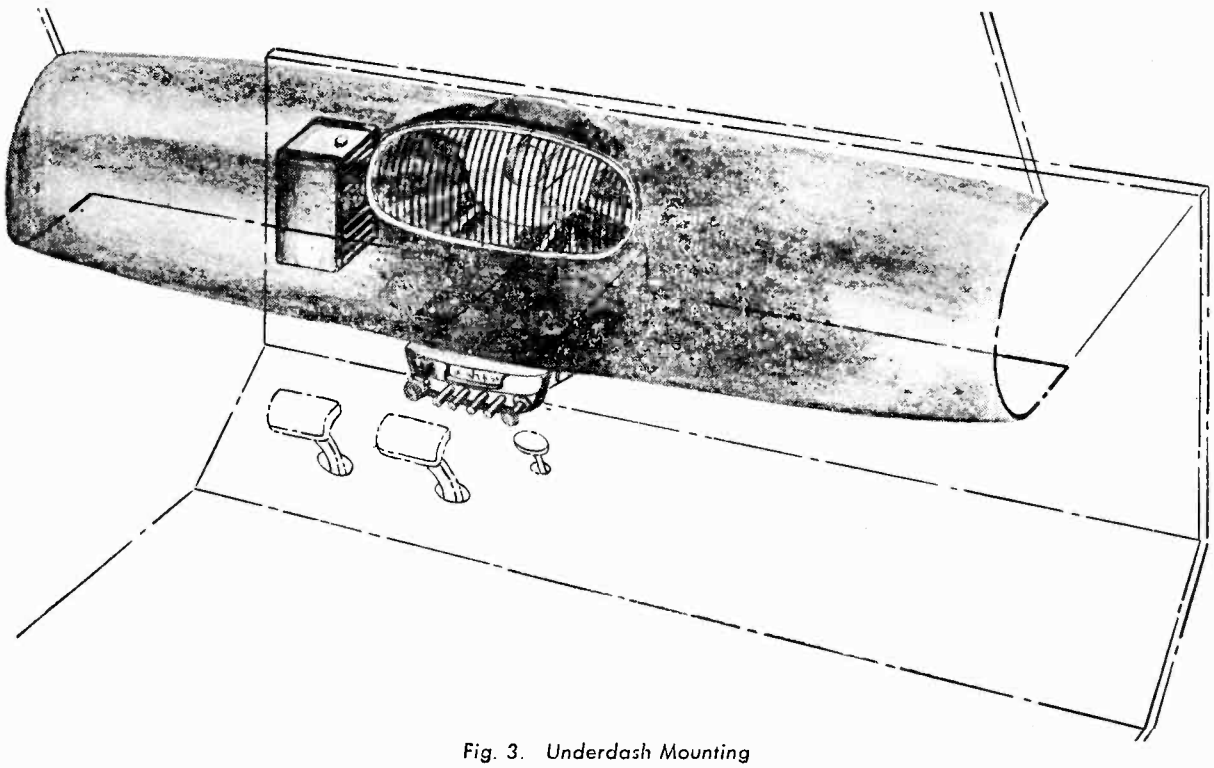

Fig. 3. Underdash Mounting

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MOUNTING THE POWER UNIT

The power unit mounts on the firewall (see Fig. 3). Determine a suitable position for mounting it by holding the case in your hands against the firewall. When a suitable position has been determined, then check the underhood side of the wall, to make sure there is no obstruction to prevent drilling a hole and inserting the mounting bolt. Having located a suitable position that will permit drilling, mark and drill a 5/16" hole. Insert the 1/4 inch diameter by 3 inch long, carriage type mounting bolt into the hole from the underdash side and attach the lockwasher and nut on the underhood side, but do not tighten. Now holding the case in a vertical position (with wingnut on the bottom), bring the case up to the bolt and slide the channel in the mounting plate down over the head of the bolt. The lockwasher and nut on the underhood side should then be tightened down securely.

If, because of limited space, you find it necessary to mount the power unit in a horizontal or angle position, this type of mounting is entirely satisfactory and has no ill effect on the operation of the radio.

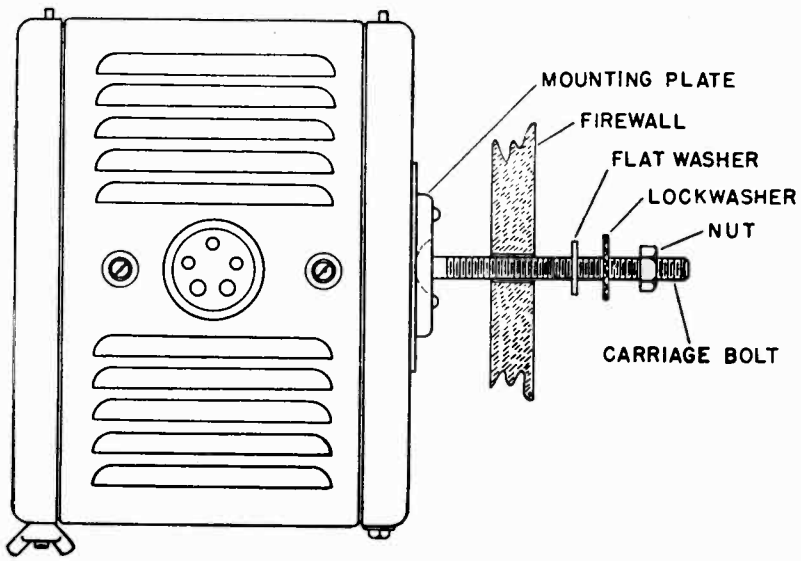

Fig. 3. Power Unit Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the plug into the antenna receptacle on the side of the control unit (see Fig. 4). Plug the speaker and power cables into the sockets provided on the sides of the Power Unit. Connect the "A" lead to the battery side of the ammeter behind the instrument panel. The fuse should then be inserted into the holder in the "A' lead. These connections are illustrated in Fig. 4.

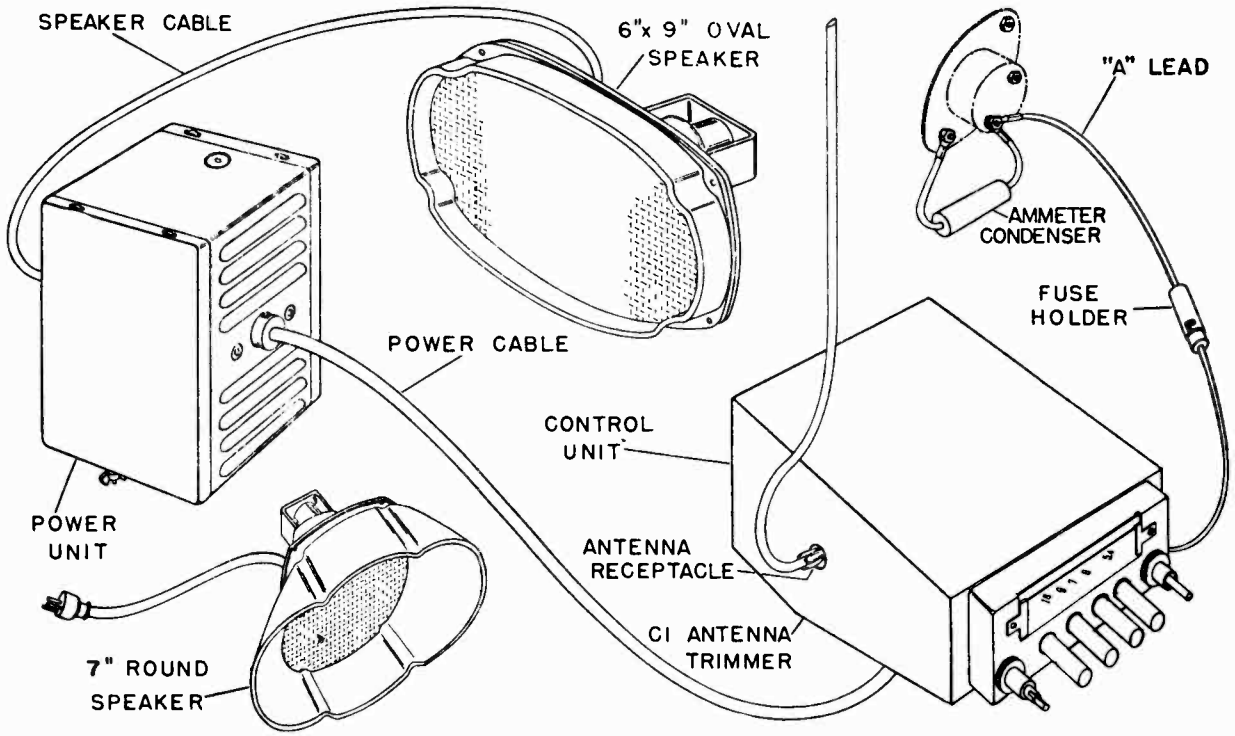

Fig. 4. Connecting the Radio

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CONTROLS

There are six operating controls on the front of the Control Unit, (see Fig. 5). The two outside knobs are dual purpose controls, the other four are PUSHBUTTON STATION SELECTORS. The left-hand control consists of two knobs mounted on concentric shafts; the front knob (round) is the ON-OFF-SWITCH and VOLUME CONTROL; the rear knob (with four points) is the MANUAL TONE CONTROL. The knob on the right is the MANUAL TUNING CONTROL and it also serves as a fifth PUSHBUTTON STATION SELECTOR. The use of these controls is explained below.

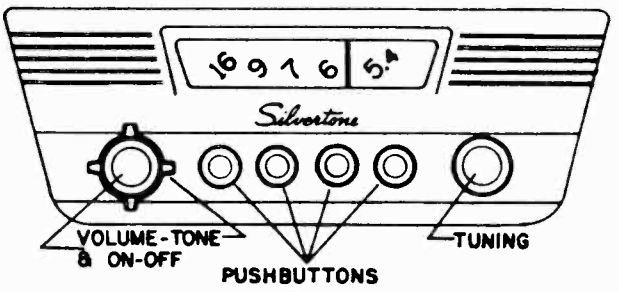

Fig. 5. Control Unit Panel

THE ON-OFF-SWITCH AND VOLUME CONTROL

When the outer left knob is turned all the way to the left the receiver is switched off and there is no drain from the car's battery. Rotating the knob part of a turn toward the right switches the receiver on and illuminates the dial. Further rotation of the knob increases the volume. After a station has been tuned in properly the volume control knob should be adjusted to give the desired volume.

MANUAL TUNING

Use the right-hand knob to tune in stations manually. To select a station, push in the knob and tune the radio by turning the knob until the desired station is heard. The dial pointer will indicate the frequency to which you are tuned.

The dial is marked in Kilocycles minus the final two zeroes. Always tune carefully for the clearest sound and minimum background noise.

PUSHBUTTON TUNING

Adjusting the pushbutton station selectors is simple and quick. No tools are required and a button may be set up for a new station in a few seconds. Each button can be tuned to any station in the broadcast band; thus you can arrange the tuning in any order to suit your convenience.

Before making the following adjustments, turn the radio on and let it warm up for 15 minutes.

Choose the PUSHBUTTON STATION SELECTOR you wish to adjust, and push the button all the way in; it will lock in this position. Now tune in the station to which you wish to pre-tune by turning the button to right or left until the desired station is heard. The dial pointer will indicate the frequency to which you are tuned, but to insure the accuracy of the setting, keep the volume control turned low and adjust the button for sharpest tuning. This will be indicated when the sound is clearest and noise at a minimum. The button is now properly adjusted and should not be turned again until it is desired to set it for a different station.

Follow the above procedure to adjust the remaining PUSHBUTTON STATION SELECTORS.

As was mentioned under the heading *CONTROLS*, the MANUAL TUNING CONTROL has been designed to serve as a fifth PUSHBUTTON STATION SELECTOR. If you wish to use this control as a PUSHBUTTON STATION SELEC-

S84--382 SUPPRESSION KIT AND MISCELLANEOUS PARTS

1 S84-233—"A" lead assembly
1 A43-10—Fuse
1 A81-13—Sleeve (for fuse)
2 A16-183—.5 MFD condensers
1 A96-4—Distributor Suppressor
20" wire braid
1 bolt—¼" diameter by 3" long
1 lockwasher
1 flat washer
1 nut

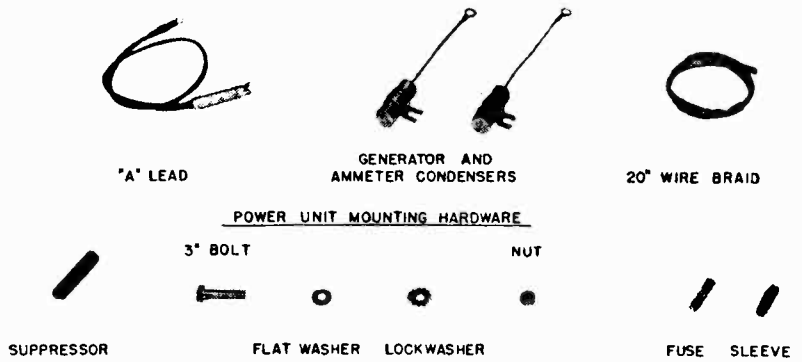

Fig. 6. Suppression Kit and Miscellaneous Parts

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TOR, simply follow the procedure given above for adjusting the other PUSHBUTTON STATION SELECTORS. However, remember that if you use this control for MANUAL TUNING at any time, it will have to be re-set to the desired station if you wish to use it again as a PUSHBUTTON STATION SELECTOR.

THE TONE CONTROL

The inner left knob (with four points) is the TONE CONTROL, which permits you to select the most pleasing tonal range. When it is turned all the way to the right (clockwise) the tone is treble or brilliant. This position is best for the most distinct reproduction, especially of speech. Turning the knob to the left (counterclockwise) makes the tone more mellow. This is often desirable for certain types of music and is also useful to lessen the effects of static and electrical noise. Turn the knob to the position that gives the tone most pleasing to you.

MATCHING THE ANTENNA

An adjusting screw for matching the receiver to the particular antenna used is accessible through a hole in the bottom side of the Control Unit. (See Fig. 4.) Set the dial pointer between 1400 KC and 1500 KC, where no station is heard with the volume control fully on. Then use a small screw driver to turn the adjusting screw to the point giving the most hiss or noise. The set is now ready for operation.

ELIMINATING MOTOR NOISE

Every precaution was taken in the design of this radio to eliminate motor noise interference. However, in the remote instance that it may be found desirable to take further steps, the following notes are added for your guidance.

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

GENERATOR CONDENSER

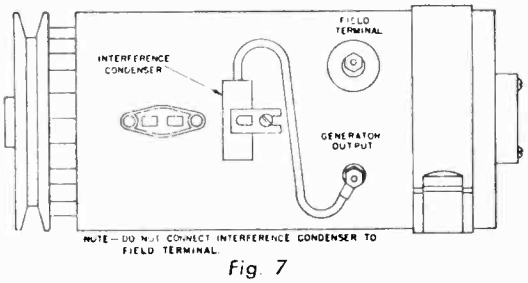

Fig. 7

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove from distributor cap the high tension lead from coil to distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.

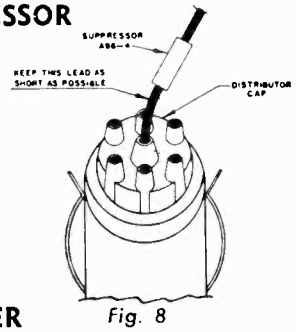

Fig. 8

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most case the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF STEERING COLUMN TO BODY

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

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ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	6.5 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	262 KC
Speaker	7" round or 6"x9" oval
Power Output	3 watts, undistorted 5.5 watts, maximum
Sensitivity	3 microvolt average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

The set contains the following:

1—6BA6—R. F. Amplifier.
1—6BE6—Converter.
1—6BA6—I. F. Amplifier.
1—6AT6—Detector—AVC—1st audio.
1—6V6GT—Power output.

1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with the volume and tone controls in maximum position, all tubes and the rectifier in their sockets, no signal applied, and with a voltmeter having a resistance of 20,000 ohm per volt. These voltages are clearly shown on the schematic diagram (Figs. 11 and 12). All voltages should be measured with an input voltage of 6.3 volts DC.

The tubes and rectifier are accessible for servicing without removing the chassis. Loosen the wing-nut on the cover of the power supply case and lift off the cover. On the RF Tuning Unit, loosen the wing nuts on the two stud bolts protruding from the side of the case at the top, rear, and remove the plate over the tubes. CAUTION: Be sure to replace the tubes and the rectifier in the proper sockets. Refer to Tube and Rectifier Location Pictorials, Fig. 10 and 14.

WARNING: The dash pot (brass cylinder on the mechanical tuner) should never be oiled. If it is ever necessary to make adjustments on the mechanical tuner, the dash pot may be cleaned with ordinary cleaning solvents.

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace the coils or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, the rectifier, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE." After realignment has been completed repeat the procedure as a final check.

INSTRUCTIONS FOR REMOVING THE CHASSIS FROM THE CASE

RF TUNING UNIT: Remove the knobs and nuts from the two control shafts. Take out the six self-tapping screws around the back edge of the case and remove the back cover. Remove the plate over the tubes (see service notes). Loosen the screw securing the cable clamp, slip the cable out from under the clamp and out of the notch. Remove the lead from the plug-in terminal on the spark plate attached to the inside top of case. Slide the "A" lead out of the notch. Now tilt the front of the case up so that the chassis can slide out. Grasp the chassis at the rear with the fingers against the chassis plate and with the thumb hooked over the IF transformer. Pull the chassis straight back, being careful that the pointer bracket does not get caught against the spark plate components. Handle the chassis carefully and set down gently so that the mechanical tuning parts may not be damaged or the settings of the coil cores upset by jarring.

POWER SUPPLY: Loosen the wing-nut and lift the top cover off. Remove the 6-32x1/2 screw securing the high voltage cable socket to the case. Remove the four screws (one on each side) near the bottom outside of the case. Now take the case in one hand and grasp the output transformer with the other hand and lift the chassis straight up.

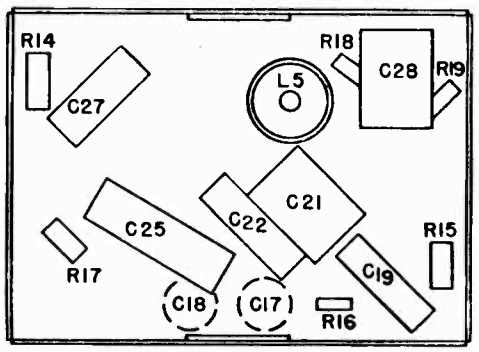

Fig. 9. Power Unit—Bottom View

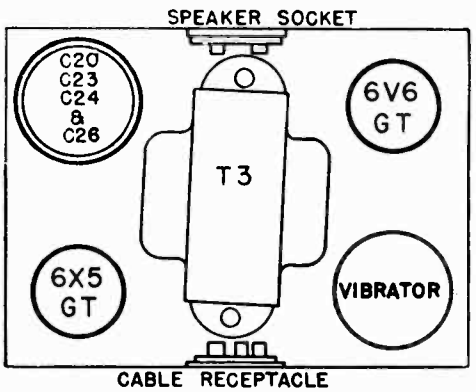

Fig. 10. Power Unit—Top View

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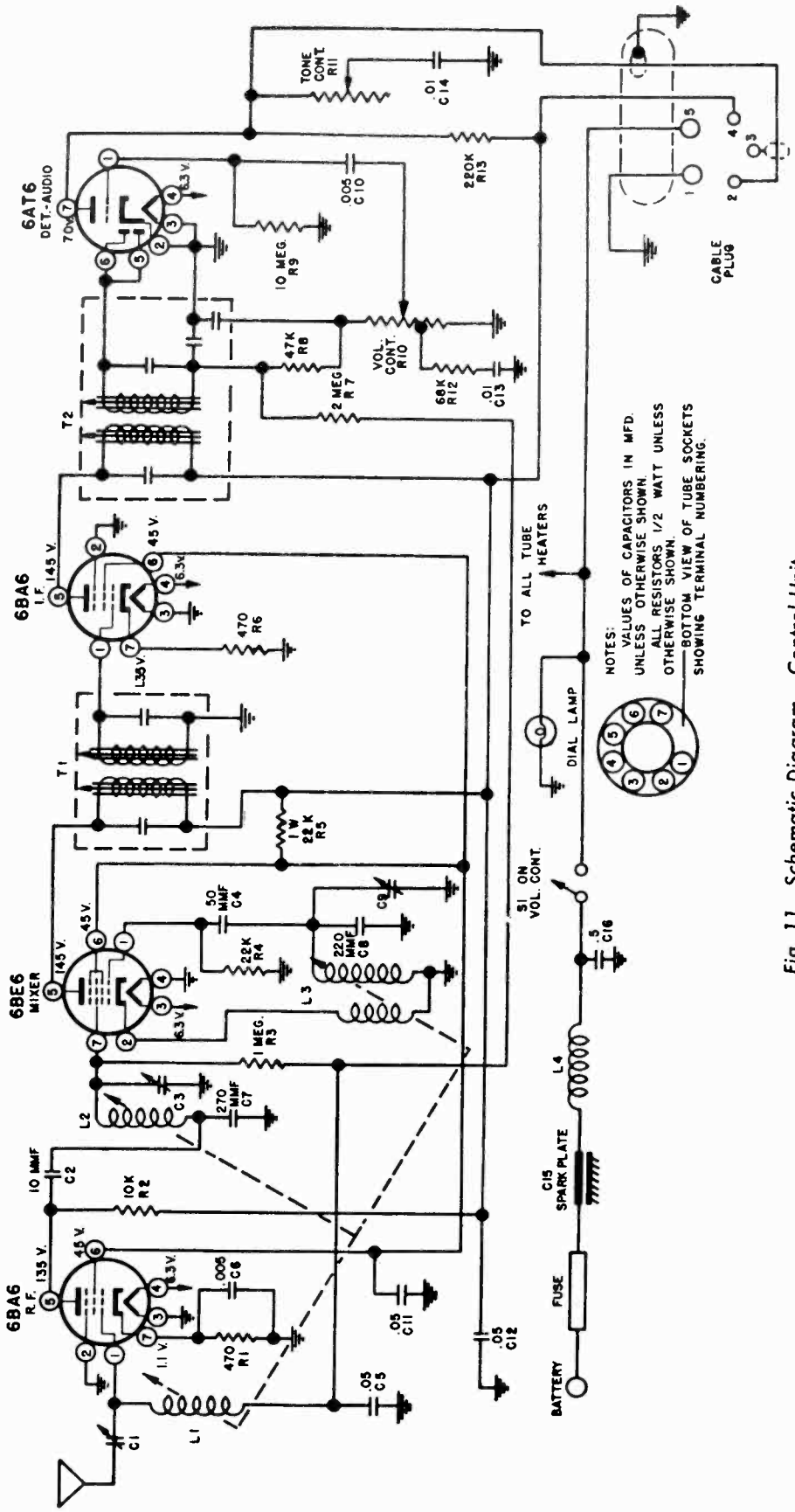

Fig. 11. Schematic Diagram—Control Unit

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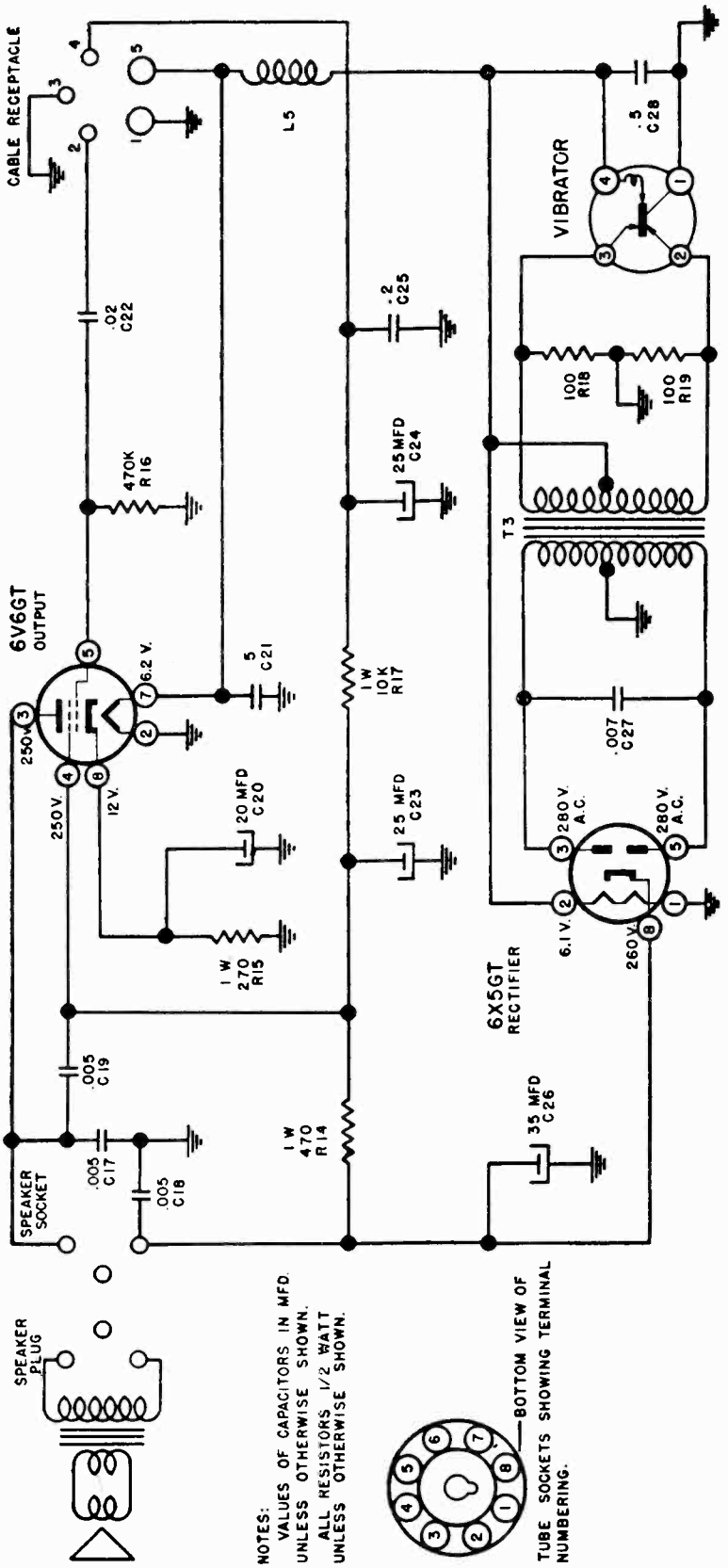

Fig. 12. Schematic Diagram—Power Unit

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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD., 30 MMFD.

For alignment points refer to Figures 13 and 14.

Slug Position	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Out	262 KC	.1 MFD.	6BE6 Grid	T2	Maximum	Output I.F.
Fully Out	262 KC	.1 MFD.	6BE6 Grid	T1	Maximum	Input I.F.
Fully Out	1610 KC	*	Ant. lead	C9	Maximum	Oscillator
Tune in signal from generator	1400 KC	*	Ant. lead	C3	Maximum	R.F.
Tune in signal from generator	1400 KC	*	Ant. lead	C1	Maximum	Antenna

*30 MMFD across input terminals and 75 MMFD in series with "hot" side of signal generator leads.

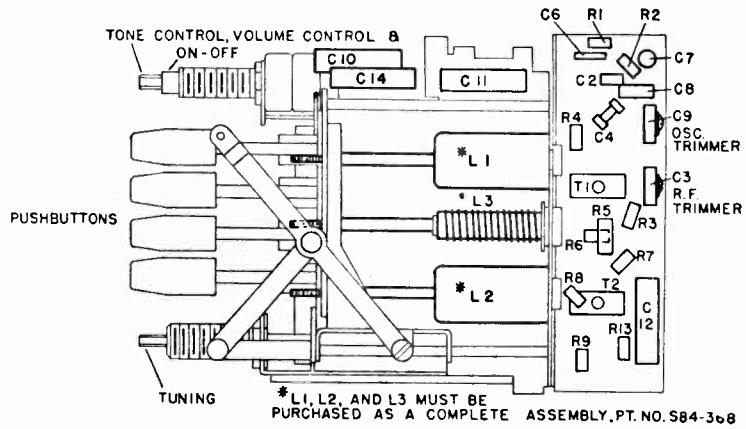

Fig. 13. Control Unit—Bottom View

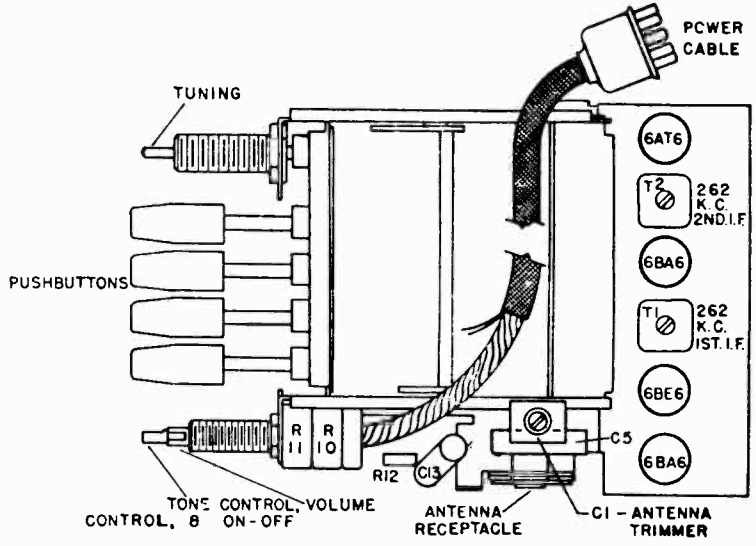

Fig. 14. Control Unit—Top View

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Schematic Location	Part No.	Description
C1	A20-148	Capacitor—antenna trimmer
C2	A15-197	Capacitor—ceramic—10 mmfd.
C3, C9	A20-147	Capacitor—dual trimmer—R.F. and Oscillator
C4	A15-194	Capacitor—ceramic—50 mmfd.
C5	A16-197	Capacitor—.05 mfd.—200 v.
C6, C17, C18	A16-177	Capacitor—ceramic—.005 mfd.
C7	A15-215	Capacitor—ceramic—270 mmfd.
C8	A15-218	Capacitor—silver mica—220 mmfd.
C10, C19	A16-190	Capacitor—.005 mfd.—600 v.
C11, C12	A16-189	Capacitor—.05 mfd.—400 v.
C13, C14	A16-192	Capacitor—.01 mfd.—400 v.
C15		Capacitor—spark plate
C16, C21, C28	A16-184	Capacitor—.5 mfd.—100 v.
	A18-294	Capacitor—electrolytic
C20		20 mfd.—25 v.
C23, C24		25 mfd.—350 v.
C26		35 mfd.—400 v.
C22	A16-206	Capacitor—.02 mfd.—600 v.
C25	A16-188	Capacitor—.2 mfd.—400 v.
C27	A16-207	Capacitor—.007 mfd.—1600 v.—oil filled
	B23-157	Cable—power
L1, L2, L3	S84-368	Coil—assembly—including carriage and slugs, etc.
L4	A33-229	Coil—"A" line choke
L5	A33-228	Coil—vibrator hash choke
	A83-421	Clip—I.F. transformer mounting
R10, R11, S1	A24-183	Control—dual—ON-OFF-VOLUME and TONE
	B67-547	Dial scale
	A43-10	Fuse—15 amp.—3AG
	A47-115	Grommet—rubber—power cable
	S84-233	Kit—"A" lead assembly
	B52-296	Knob—Tuning
	B52-297	Knob—Volume
	B52-298	Knob—Tone
	A89-7	Lamp—pilot—No. 47 Bayonet
R1, R6	A60-770	Resistor—470 ohm—½ watt
R2	A60-760	Resistor—10K ohm—½ watt
R3	A60-668	Resistor—1 megohm—½ watt
R4	A60-744	Resistor—22K ohm—½ watt
R5	A60-773	Resistor—22K ohm—1 watt
R7	A60-726	Resistor—2.2 megohm—½ watt
R8	A60-730	Resistor—47K ohm—½ watt
R9	A60-728	Resistor—10 megohm—½ watt
R12	A60-775	Resistor—68K ohm—½ watt
R13	A60-672	Resistor—220K ohm—½ watt
R14	A60-694	Resistor—470 ohm—1 watt
R15	A60-754	Resistor—270 ohm—1 watt
R16	A60-731	Resistor—470K ohm—½ watt
R17	A60-698	Resistor—10K ohm—1 watt
R18, R19	A60-752	Resistor—100 ohm—½ watt
	A83-646	Retainer—dial scale—left
	A83-647	Retainer—dial scale—right
	C79-375	*Speaker—7" round
	C79-376	*Speaker—6"x9" oval
	S84-383	Transformer—output—with cable and plug
T1	A10-537	Transformer—I.F. No. 1
T2	A10-540	Transformer—I.F. No. 2
T3	C80-250	Transformer—power
	A34-105	Vibrator—Mallory No. 659

*When ordering a replacement speaker, order the same type, 7" round or 6"x9" oval, as the old one that was installed in your car.

Mechanical Tuner Parts

A56-141	Pusher nut—manual tuning
A56-142	Pusher nut—pushbutton tuning
A75-75	Pusher rod—manual tuning
S84-355	Pushbutton and rod assembly

IMPORTANT: All tubular condensers must be high temperature (85°C.) wax type.

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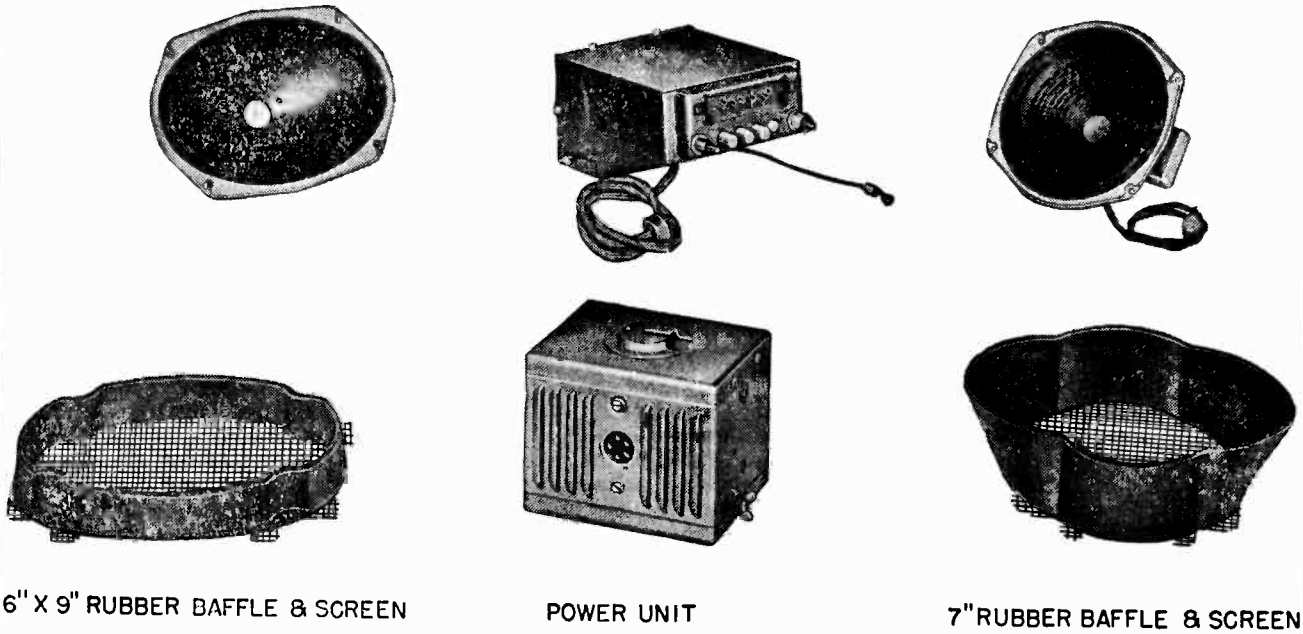

Fig. 1. Parts in Master Package

Only one of the speakers illustrated is supplied with each radio; the type of speaker you receive will be determined by the make of car for which the radio is ordered.

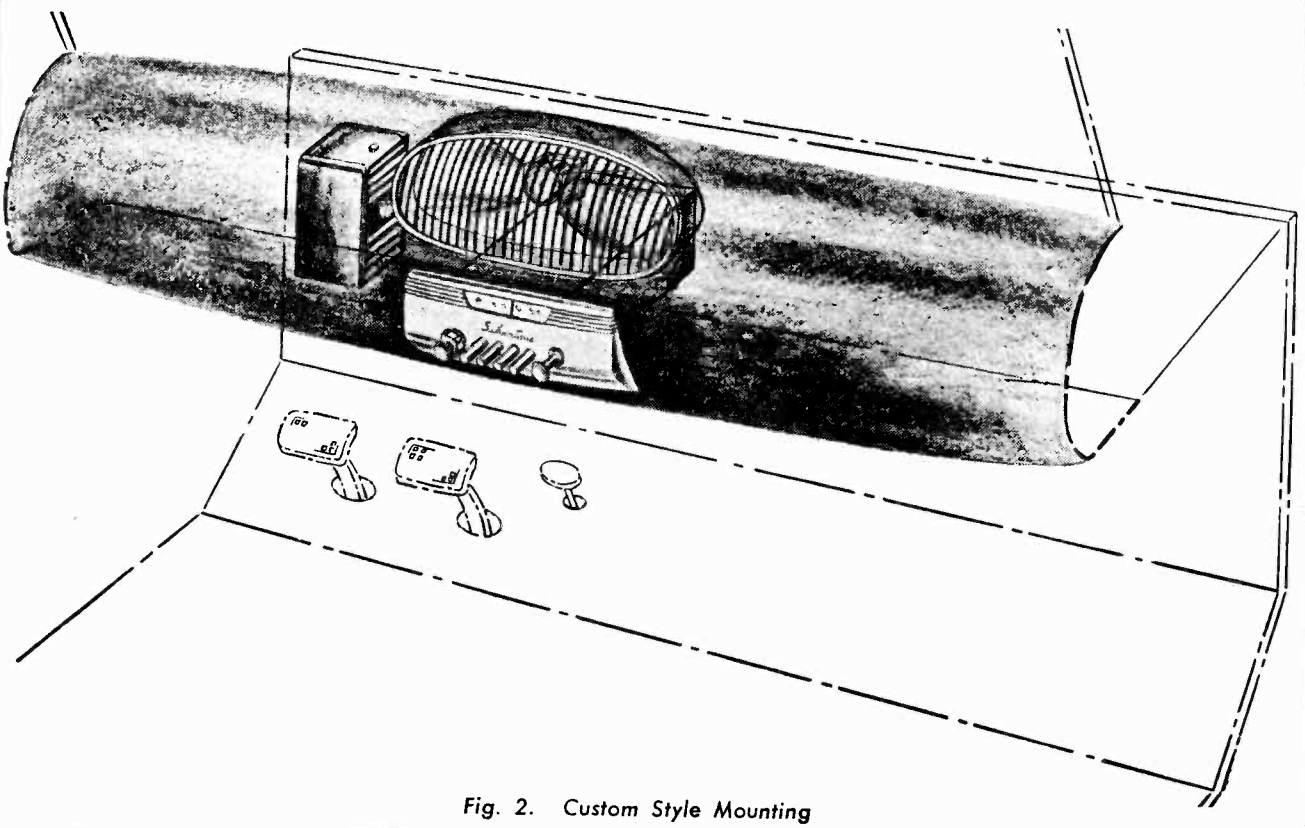

Fig. 2. Custom Style Mounting

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MODEL 6295-1,
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DESCRIPTION

Your SILVERTONE radio is a newly designed DE LUXE PUSHBUTTON TUNING AUTOMOBILE RECEIVER of advance superheterodyne circuit design, for operation on the six volt storage battery in your car. It covers the frequency range from 540 KC to 1600 KC. In addition to PUSHBUTTON TUNING it features BASS-COMPENSATED VOLUME CONTROL supplemented by a MANUAL TONE CONTROL. It consists of three principal parts—the Control Unit, the Power Unit and the Speaker (See Fig. 1)—and is supplied with mounting parts to accommodate either custom installation in the instrument panel or underdash mounting. (See Figs. 2 and 3.)

Special care has been taken in the design of this receiver to insure the finest in sensitivity and selectivity, thereby insuring good reception of even distant or very weak stations. It is simple to install. The antenna input circuit is adjustable to permit the use of any two, three or four section telescopic, whip or "fishpole" type antenna.

Each complete radio, with accessories, is made up in two separate packages, one carton containing the Escutcheon Kit and speaker mounting hardware, the other carton containing the Control Unit, the Power Unit and either a 7" round speaker or a 6"x9" oval speaker, depending on the make and and model of the car for which the radio was ordered. This second carton will be stamped with the letter "A" to indicate that it contains a 7" round speaker, or the letter "B" to indicate the 6"x9" oval speaker.

Control Unit Escutcheon Kits (instrument panel matching or universal) are supplied as a separate item, thus permitting you to transfer the radio from one car to another with only the small expense of replacing the Escutcheon Kit and speaker if you desire to match the instrument panel of your new or different car. Instrument panel matching Escutcheon Kits for most popular late model cars are available at your nearest Sears retail store or Mail Order House. If your Silvertone radio is equipped with a universal underdash tuning panel it may be transferred as is to a different car without changing the Escutcheon Kit. However, if you wish to change from an underdash mounting to a custom style instrument panel mounting, this can be accomplished by discarding the universal Escutcheon Kit and replacing it with an instrument panel matching Escutcheon Kit (and 6"x9" oval speaker, if necessary), as outlined above.

INSTALLATION

THE SPEAKER

The speakers (7" round or 6"x9" oval) are supplied with sponge rubber baffles for mounting on flat or curved instrument panels. The rubber baffle for the 7" round speaker has flared sides so that it will cover an oval opening in the car's speaker grill as well as a round opening.

Speaker mounting hardware is supplied with each Escutcheon Kit for mounting the speaker in your car. This includes a "U-shaped" bracket for mounting the round speaker in cars on which it is not possible to mount the speaker on existing bolts.

SPECIFIC INSTRUCTIONS PERTAINING TO THE MOUNTING OF THE SPEAKER AND CONTROL UNIT IN THE CAR FOR WHICH YOU ORDERED YOUR RADIO ARE CONTAINED IN THE LEAFLET PACKED IN THE ESCUTCHEON KIT.

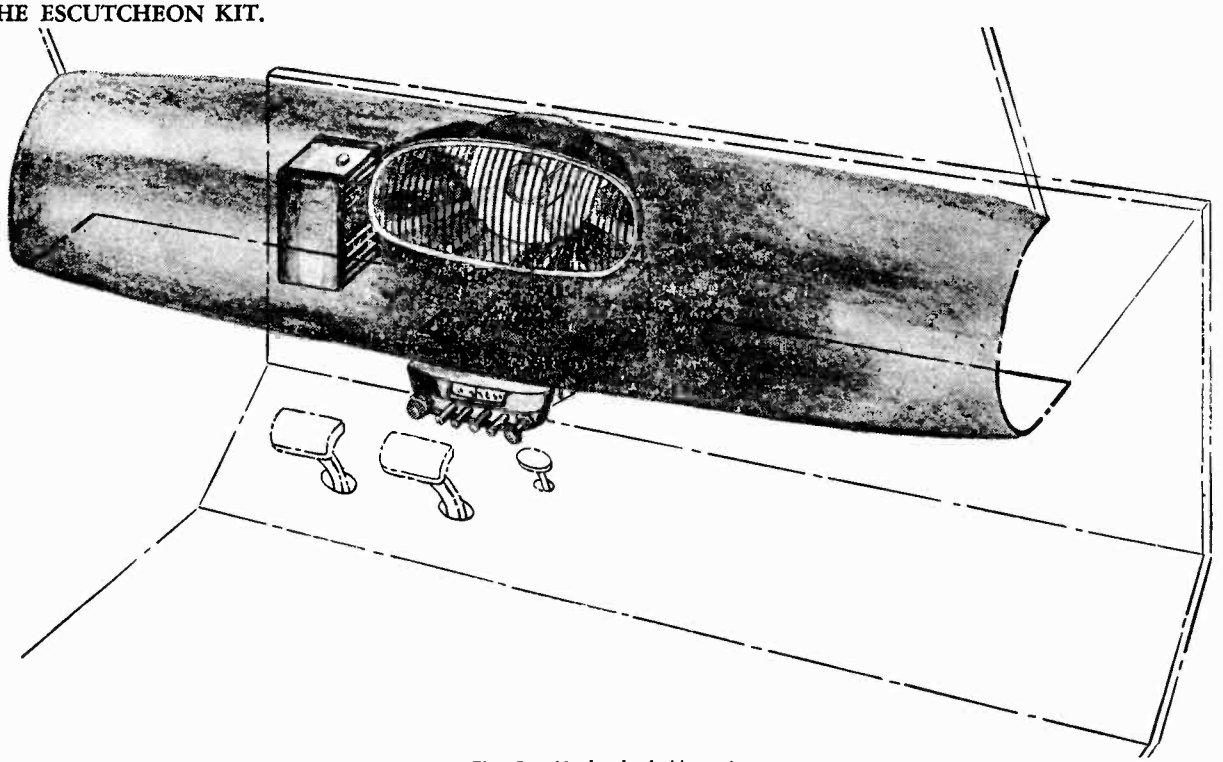

Fig. 3. Underdash Mounting

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MOUNTING THE POWER UNIT

The power unit mounts on the firewall (see Fig. 3). Determine a suitable position for mounting it by holding the case in your hands against the firewall. When a suitable position has been determined, then check the underhood side of the wall, to make sure there is no obstruction to prevent drilling a hole and inserting the mounting bolt. Having located a suitable position that will permit drilling, mark and drill a 5/16" hole. Insert the 1/4 inch diameter by 3 inch long, carriage type mounting bolt into the hole from the underdash side and attach the lockwasher and nut on the underhood side, but do not tighten. Now holding the case in a vertical position (with wingnut on the bottom), bring the case up to the bolt and slide the channel in the mounting plate down over the head of the bolt. The lockwasher and nut on the underhood side should then be tightened down securely.

If, because of limited space, you find it necessary to mount the power unit in a horizontal or angle position, this type of mounting is entirely satisfactory and has no ill effect on the operation of the radio.

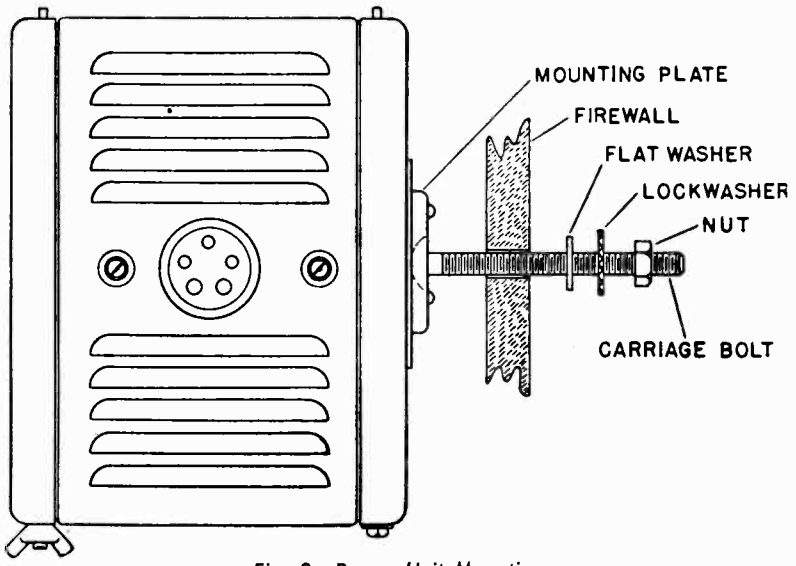

Fig. 3. Power Unit Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the plug into the antenna receptacle on the side of the control unit (see Fig. 4). Plug the speaker and power cables into the sockets provided on the sides of the Power Unit. Connect the "A" lead to the battery side of the ammeter behind the instrument panel. The fuse should then be inserted into the holder in the "A' lead. These connections are illustrated in Fig. 4.

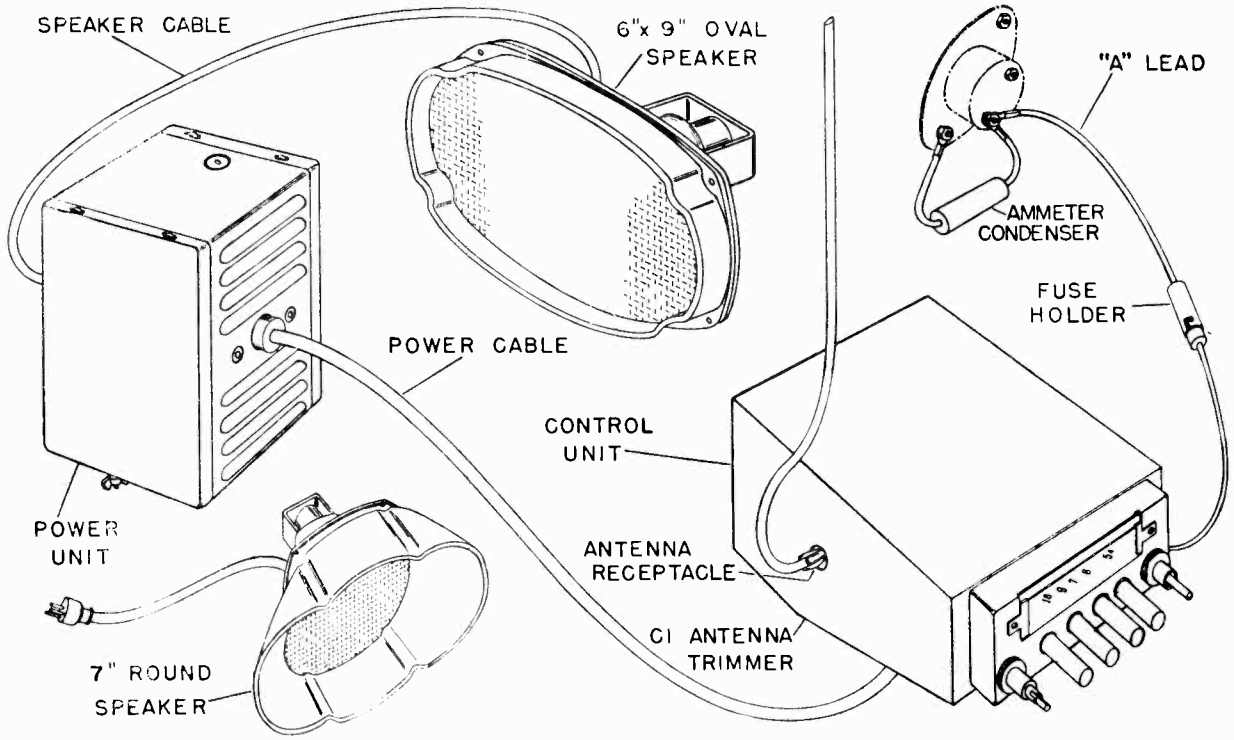

Fig. 4. Connecting the Radio

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CONTROLS

There are six operating controls on the front of the Control Unit, (see Fig. 5). The two outside knobs are dual purpose controls, the other four are PUSHBUTTON STATION SELECTORS. The left-hand control consists of two knobs mounted on concentric shafts; the front knob (round) is the ON-OFF-SWITCH and VOLUME CONTROL; the rear knob (with four points) is the MANUAL TONE CONTROL. The knob on the right is the MANUAL TUNING CONTROL and it also serves as a fifth PUSHBUTTON STATION SELECTOR. The use of these controls is explained below.

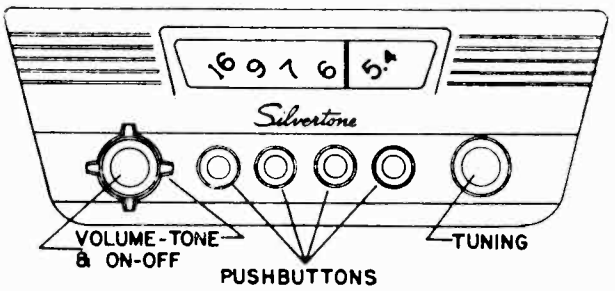

Fig. 5. Control Unit Panel

THE ON-OFF-SWITCH AND VOLUME CONTROL

When the outer left knob is turned all the way to the left the receiver is switched off and there is no drain from the car's battery. Rotating the knob part of a turn toward the right switches the receiver on and illuminates the dial. Further rotation of the knob increases the volume. After a station has been tuned in properly the volume control knob should be adjusted to give the desired volume.

MANUAL TUNING

Use the right-hand knob to tune in stations manually. To select a station, push in the knob and tune the radio by turning the knob until the desired station is heard. The dial pointer will indicate the frequency to which you are tuned.

The dial is marked in Kilocycles minus the final two zeroes. Always tune carefully for the clearest sound and minimum background noise.

PUSHBUTTON TUNING

Adjusting the pushbutton station selectors is simple and quick. No tools are required and a button may be set up for a new station in a few seconds. Each button can be tuned to any station in the broadcast band; thus you can arrange the tuning in any order to suit your convenience.

Before making the following adjustments, turn the radio on and let it warm up for 15 minutes.

Choose the PUSHBUTTON STATION SELECTOR you wish to adjust, and push the button all the way in; it will lock in this position. Now tune in the station to which you wish to pre-tune by turning the button to right or left until the desired station is heard. The dial pointer will indicate the frequency to which you are tuned, but to insure the accuracy of the setting, keep the volume control turned low and adjust the button for sharpest tuning. This will be indicated when the sound is clearest and noise at a minimum. The button is now properly adjusted and should not be turned again until it is desired to set it for a different station.

Follow the above procedure to adjust the remaining PUSHBUTTON STATION SELECTORS.

As was mentioned under the heading *CONTROLS,* the MANUAL TUNING CONTROL has been designed to serve as a fifth PUSHBUTTON STATION SELECTOR. If you wish to use this control as a PUSHBUTTON STATION SELECTOR, simply follow the procedure given above for adjusting the other PUSHBUTTON STATION SELECTORS. However, remember that if you use this control for MANUAL TUNING at any time, it will have to be re-set to the desired station if you wish to use it again as a PUSHBUTTON STATION SELECTOR.

S84--382 SUPPRESSION KIT AND MISCELLANEOUS PARTS

1 S84-233—"A" lead assembly
1 A43-10—Fuse
1 A81-13—Sleeve (for fuse)
2 A16-183—.5 MFD condensers
1 A96-4—Distributor Suppressor
20" wire braid
1 bolt—¼" diameter by 3" long
1 lockwasher
1 flat washer
1 nut

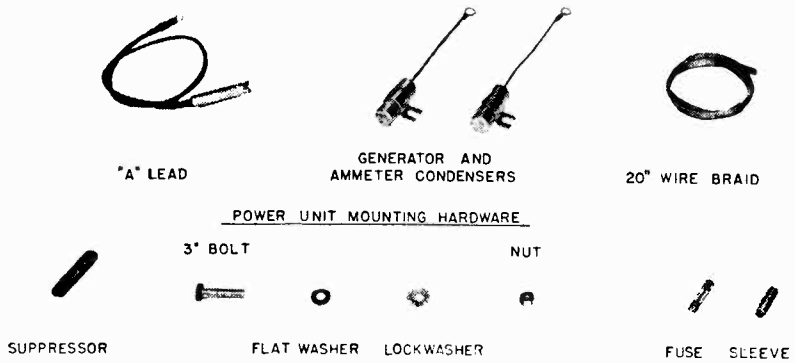

Fig. 6. Suppression Kit and Miscellaneous Parts

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THE TONE CONTROL

The inner left knob (with four points) is the TONE CONTROL, which permits you to select the most pleasing tonal range. When it is turned all the way to the right (clockwise) the tone is treble or brilliant. This position is best for the most distinct reproduction, especially of speech. Turning the knob to the left (counterclockwise) makes the tone more mellow. This is often desirable for certain types of music and is also useful to lessen the effects of static and electrical noise. Turn the knob to the position that gives the tone most pleasing to you.

MATCHING THE ANTENNA

An adjusting screw for matching the receiver to the particular antenna used is accessible through a hole in the bottom side of the Control Unit. (See Fig. 4.) Set the dial pointer between 1400 KC and 1500 KC, where no station is heard with the volume control fully on. Then use a small screw driver to turn the adjusting screw to the point giving the most hiss or noise. The set is now ready for operation.

ELIMINATING MOTOR NOISE

Every precaution was taken in the design of this radio to eliminate motor noise interference. However, in the remote instance that it may be found desirable to take further steps, the following notes are added for your guidance.

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

GENERATOR CONDENSER

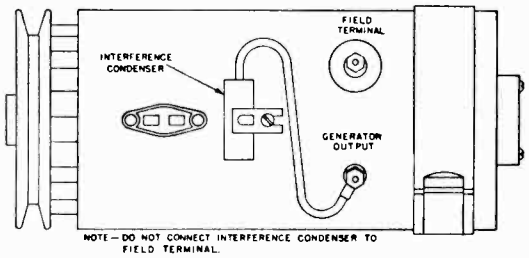

Fig. 7

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove from distributor cap the high tension lead from coil to distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.

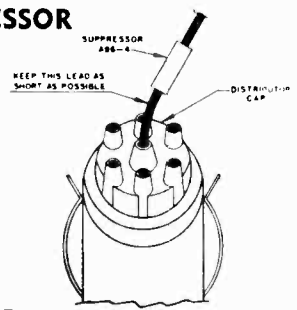

Fig. 8

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most case the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

GROUNDING THE POWER CABLE

In some cases motor noise is reduced by grounding the power cable to the power unit case. See Fig. 4. Loosen one of the two screws located on either side of the power cable socket on the power unit. Cut a six inch length off the wire braid supplied in the Suppression Kit. Fasten one end under the screw and tighten down the screw again. Wrap the remainder of the braid around the cable and solder or tape it securely in place.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF STEERING COLUMN TO BODY

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A ¼" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

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MODEL 6295-1,
Ch. 528.6295-1

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	6.5 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	262 KC
Speaker	7" round or 6"x9" oval
Power Output	2.5 watts, undistorted 5 watts, maximum
Sensitivity	3 microvolt average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

The set contains the following:

1—6BA6—R. F. Amplifier.
1—6BE6—Converter.
1—6BA6—I. F. Amplifier.
1—6AT6—Detector—AVC—1st audio.
1—6V6GT—Power output.
1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with the volume and tone controls in maximum position, all tubes and the rectifier in their sockets, no signal applied, and with a voltmeter having a resistance of 20,000 ohm per volt. These voltages are clearly shown on the schematic diagram (Figs. 11 and 12). All voltages should be measured with an input voltage of 6.3 volts DC.

The tubes and rectifier are accessible for servicing without removing the chassis. Loosen the wing-nut on the cover of the power supply case and lift off the cover. On the RF Tuning Unit, loosen the wing nuts on the two stud bolts protruding from the side of the case at the top, rear, and remove the plate over the tubes. CAUTION: Be sure to replace the tubes and the rectifier in the proper sockets. Refer to Tube and Rectifier Location Pictorials, Fig. 10 and 14.

WARNING: The dash pot (brass cylinder on the mechanical tuner) should never be oiled. If it is ever necessary to make adjustments on the mechanical tuner, the dash pot may be cleaned with ordinary cleaning solvents.

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace the coils or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, the rectifier, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE." After realignment has been completed repeat the procedure as a final check.

INSTRUCTIONS FOR REMOVING THE CHASSIS FROM THE CASE

RF TUNING UNIT: Remove the knobs and nuts from the two control shafts. Take out the six self-tapping screws around the back edge of the case and remove the back cover. Remove the plate over the tubes (see service notes). Loosen the screw securing the cable clamp, slip the cable out from under the clamp and out of the notch. Remove the lead from the plug-in terminal on the spark plate attached to the inside top of case. Slide the "A" lead out of the notch. Now tilt the front of the case up so that the chassis can slide out. Grasp the chassis at the rear with the fingers against the chassis plate and with the thumb hooked over the IF transformer. Pull the chassis straight back, being careful that the pointer bracket does not get caught against the spark plate components. Handle the chassis carefully and set down gently so that the mechanical tuning parts may not be damaged or the settings of the coil cores upset by jarring.

POWER SUPPLY: Loosen the wing-nut and lift the top cover off. Remove the 6-32x½ screw securing the high voltage cable socket to the case. Remove the four screws (one on each side) near the bottom outside of the case. Now take the case in one hand and grasp the output transformer with the other hand and lift the chassis straight up.

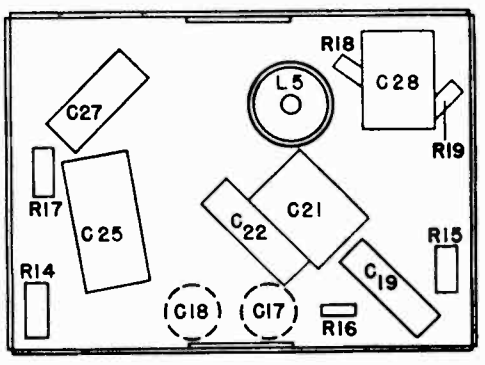

Fig. 9. Power Unit—Bottom View

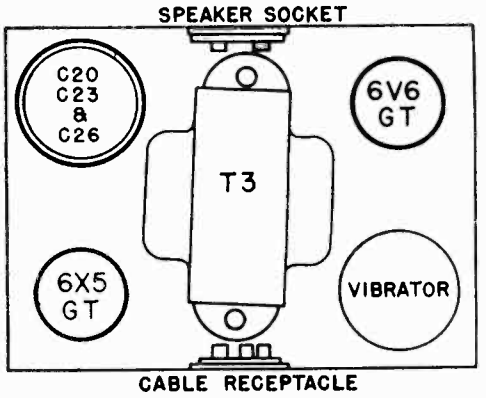

Fig. 10. Power Unit—Top View

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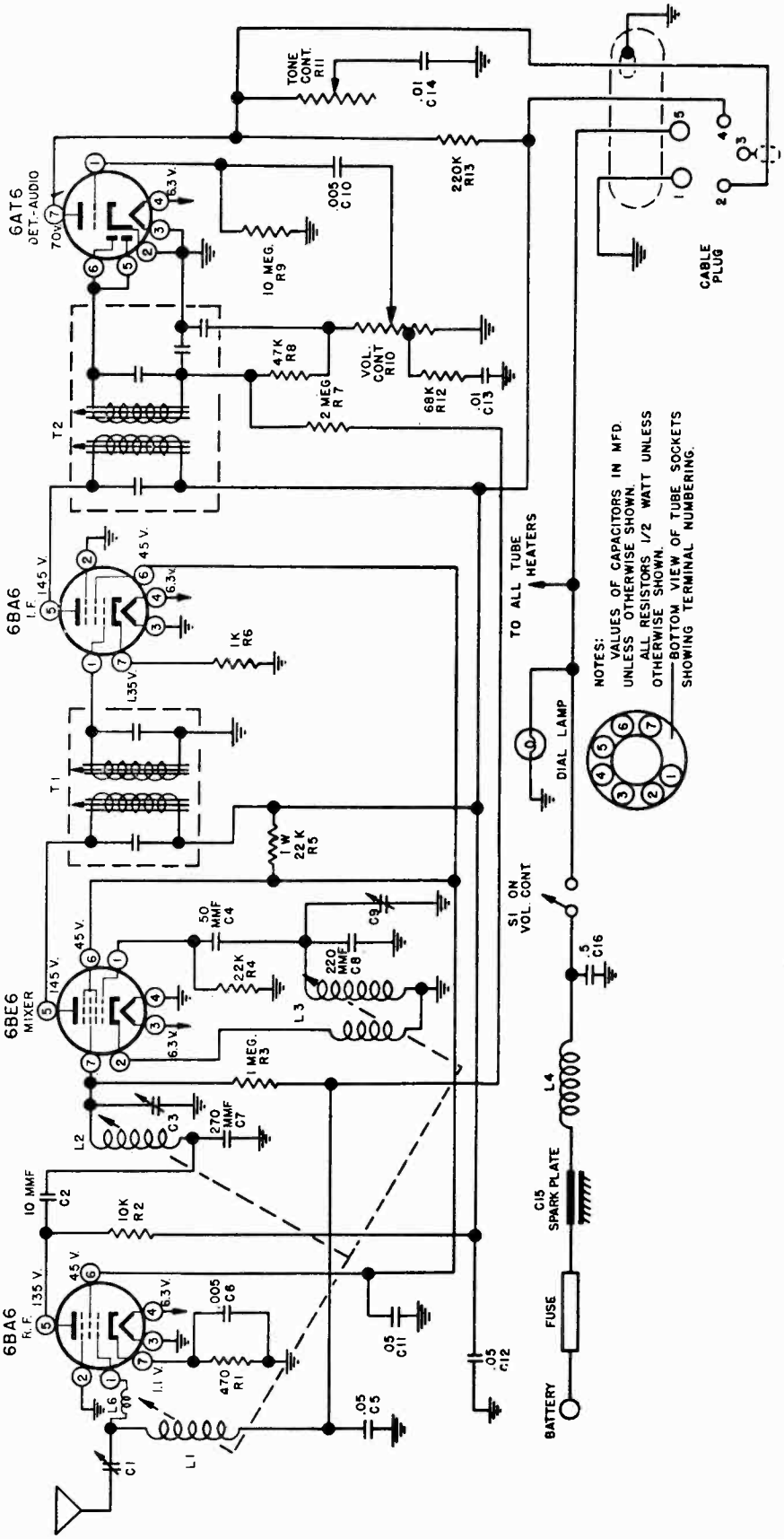

Fig. 11. Schematic Diagram—Control Unit

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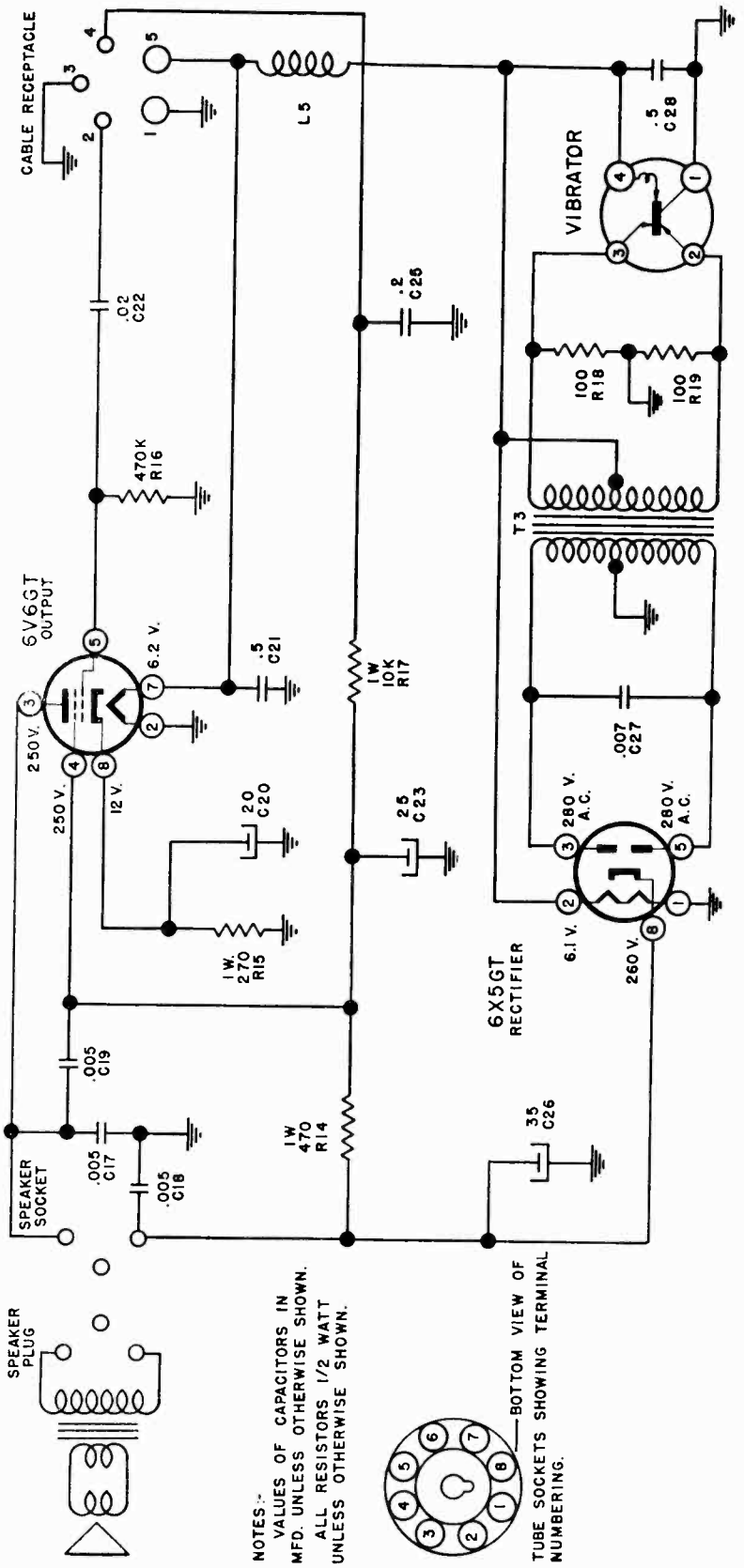

Fig. 12. Schematic Diagram—Power Unit

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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD., 30 MMFD.

For alignment points refer to Figures 13 and 14.

Slug Position	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Out	262 KC	.1 MFD.	6BE6 Grid	T2	Maximum	Output I.F.
Fully Out	262 KC	.1 MFD.	6BE6 Grid	T1	Maximum	Input I.F.
Fully Out	1610 KC	*	Ant. lead	C9	Maximum	Oscillator
Tune in signal from generator	1400 KC	*	Ant. lead	C3	Maximum	R.F.
Tune in signal from generator	1400 KC	*	Ant. lead	C1	Maximum	Antenna

*30 MMFD across input terminals and 75 MMFD in series with "hot" side of signal generator leads.

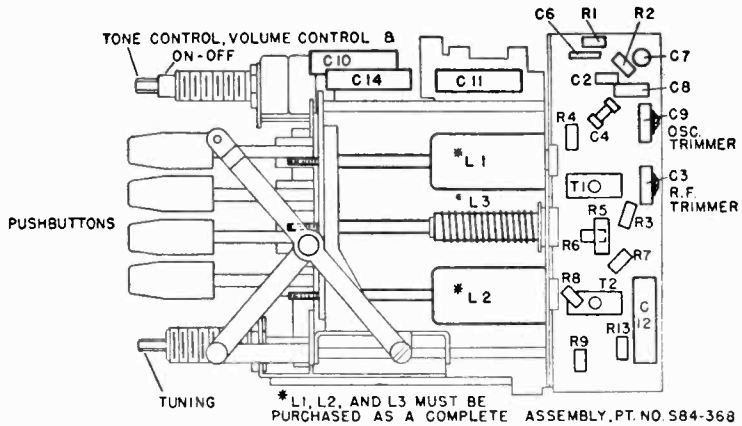

Fig. 13. Control Unit—Bottom View

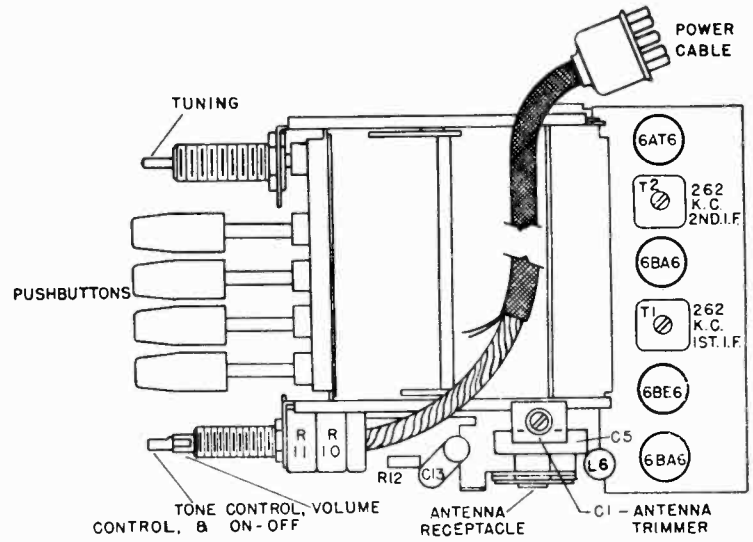

Fig. 14. Control Unit—Top View

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MODEL 6295-1,
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PARTS LIST

Schematic Location	Part No.	Description
C1	A20-148	Capacitor—antenna trimmer
C2	A15-197	Capacitor—ceramic—10 mmfd.
C3, C9	A20-147	Capacitor—dual trimmer—R.F. and Oscillator
C4	A15-194	Capacitor—ceramic—50 mmfd.
C5	A16-197	Capacitor—.05 mfd.—200 v.
C6, C17, C18	A16-177	Capacitor—ceramic—.005 mfd.
C7	A15-215	Capacitor—ceramic—270 mmfd.
C8	A15-218	Capacitor—silver mica—220 mmfd.
C10, C19	A16-190	Capacitor—.005 mfd.—600 v.
C11, C12	A16-189	Capacitor—.05 mfd.—400 v.
C13, C14	A16-192	Capacitor—.01 mfd.—400 v.
C15		Capacitor—spark plate
C16, C21, C28	A16-184	Capacitor—.5 mfd.—100 v.
	A18-300	Capacitor—electrolytic
C20		20 mfd.—25 v.
C23		25 mfd.—350 v.
C26		35 mfd.—400 v.
C22	A16-206	Capacitor—.02 mfd.—600 v.
C25	A16-188	Capacitor—.2 mfd.—400 v.
C27	A16-207	Capacitor—.007 mfd.—1600 v.—oil filled
	B23-157	Cable—power
L1, L2, L3	S84-368	Coil—assembly—including carriage and slugs, etc.
L4	A33-229	Coil—"A" line choke
L5	A33-228	Coil—vibrator hash choke
L6	A10-527	Coil—antenna loading
	A83-421	Clip—I.F. transformer mounting
R10, R11, S1	A24-183	Control—dual—ON-OFF-VOLUME and TONE
	A43-10	Fuse—15 amp.—3AG
	A47-115	Grommet—rubber—power cable
	S84-233	Kit—"A" lead assembly
	B52-296	Knob—Tuning
	B52-297	Knob—Volume
	B52-298	Knob—Tone
	A89-7	Lamp—pilot—No. 47 Bayonet
R1	A60-770	Resistor—470 ohm—½ watt
R2	A60-760	Resistor—10K ohm—½ watt
R3	A60-668	Resistor—1 megohm—½ watt
R4	A60-744	Resistor—22K ohm—½ watt
R5	A60-773	Resistor—22K ohm—1 watt
R6	A60-675	Resistor—1000 ohm—½ watt
R7	A60-726	Resistor—2.2 megohm—½ watt
R8	A60-730	Resistor—47K ohm—½ watt
R9	A60-728	Resistor—10 megohm—½ watt
R12	A60-775	Resistor—68K ohm—½ watt
R13	A60-672	Resistor—220K ohm—½ watt
R14	A60-694	Resistor—470 ohm—1 watt
R15	A60-754	Resistor—270 ohm—1 watt
R16	A60-731	Resistor—470K ohm—½ watt
R17	A60-698	Resistor—10K ohm—1 watt
R18, R19	A60-752	Resistor—100 ohm—½ watt
	A83-646	Retainer—dial scale—left
	A83-647	Retainer—dial scale—right
	C79-387	*Speaker—7" round
	C79-386	*Speaker—6"x9" oval
	S84-383	Transformer—output—with cable and plug
T1	A10-537	Transformer—I.F. No. 1
T2	A10-540	Transformer—I.F. No. 2
T3	C80-258	Transformer—power
	A34-105	Vibrator—Mallory No. 659

Mechanical Tuner Parts

A56-141	Pusher nut—manual tuning
A56-142	Pusher nut—pushbutton tuning
A75-75	Pusher rod—manual tuning
S84-355	Pushbutton and rod assembly

IMPORTANT: All tubular condensers must be high temperature (85°C.) wax type.

*When ordering a replacement speaker, order the same type, 7" round or 6"x9" oval, as the old one that was installed in your car.

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MODEL 6295-2,
Ch. 528.6295-2

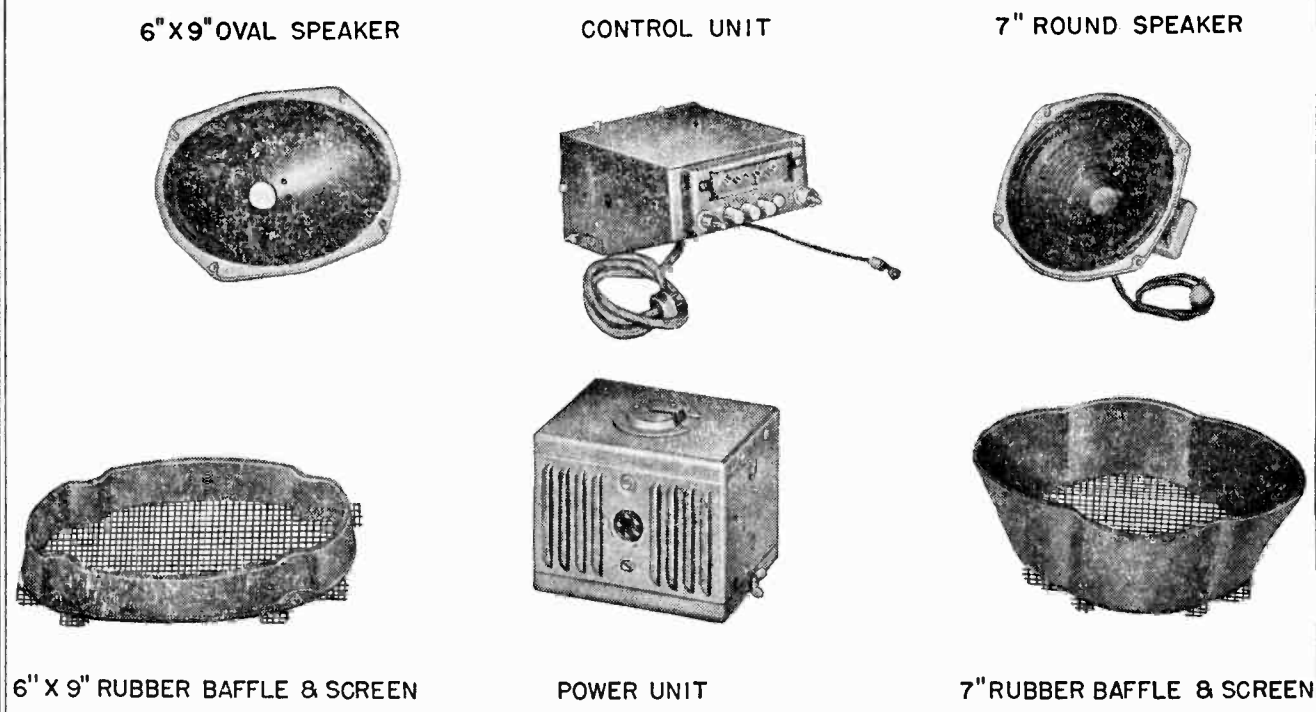

Fig. 1. Parts in Master Package

Only one of the speakers illustrated is supplied with each radio; the type of speaker you receive will be determined by the make of car for which the radio is ordered.

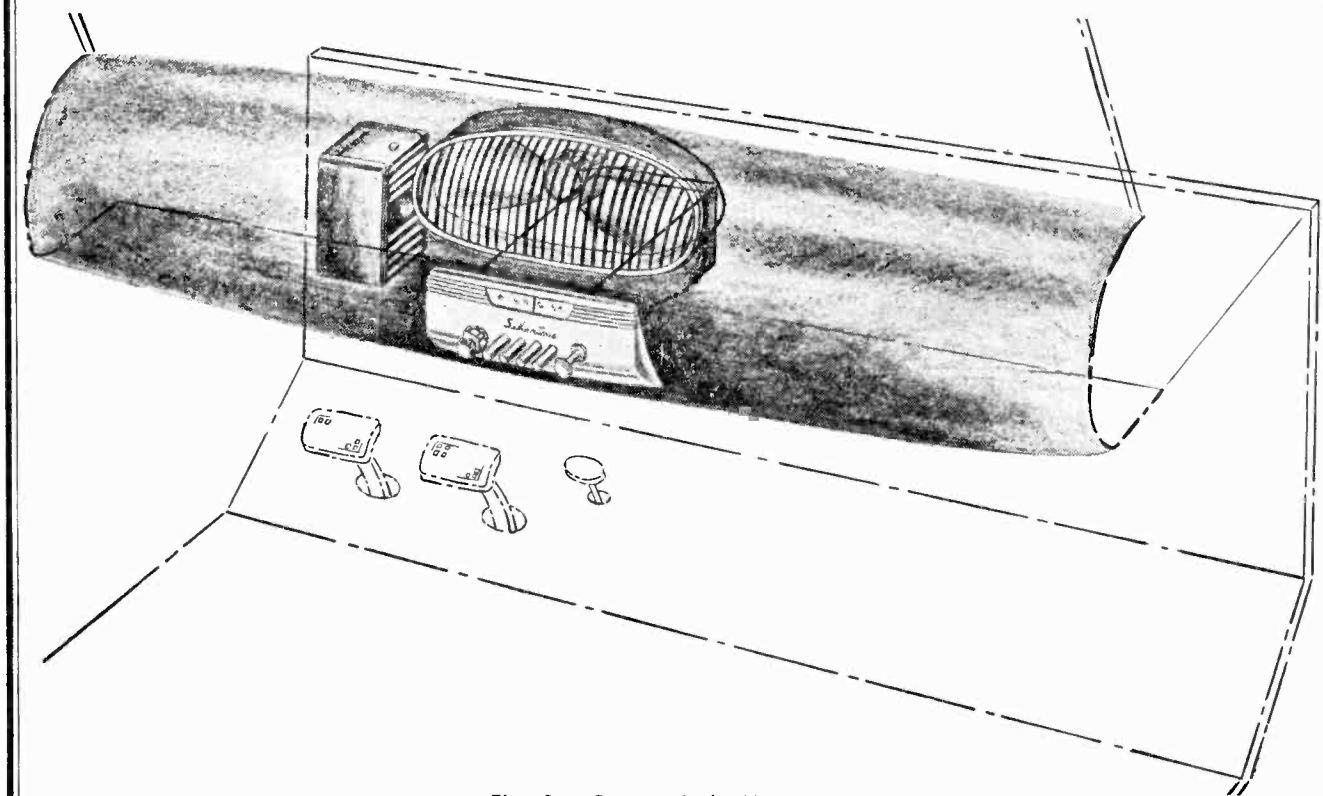

Fig. 2. Custom Style Mounting

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MODEL 6295-2,
Ch. 528.6295-2

DESCRIPTION

Your SILVERTONE radio is a newly designed DE LUXE PUSHBUTTON TUNING AUTOMOBILE RECEIVER of advance superheterodyne circuit design, for operation on the six volt storage battery in your car. It covers the frequency range from 540 KC to 1600 KC. In addition to PUSHBUTTON TUNING it features BASS-COMPENSATED VOLUME CONTROL supplemented by a MANUAL TONE CONTROL. It consists of three principal parts—the Control Unit, the Power Unit and the Speaker (See Fig. 1)—and is supplied with mounting parts to accommodate either custom installation in the instrument panel or underdash mounting. (See Figs. 2 and 3.)

Special care has been taken in the design of this receiver to insure the finest in sensitivity and selectivity, thereby insuring good reception of even distant or very weak stations. It is simple to install. The antenna input circuit is adjustable to permit the use of any two, three or four section telescopic, whip or "fishpole" type antenna.

Each complete radio, with accessories, is made up in two separate packages, one carton containing the Escutcheon Kit and speaker mounting hardware, the other carton containing the Control Unit, the Power Unit and either a 7" round speaker or a 6"x9" oval speaker, depending on the make and and model of the car for which the radio was ordered. This second carton will be stamped with the letter "A" to indicate that it contains a 7" round speaker, or the letter "B" to indicate the 6"x9" oval speaker.

Control Unit Escutcheon Kits (instrument panel matching or universal) are supplied as a separate item, thus permitting you to transfer the radio from one car to another with only the small expense of replacing the Escutcheon Kit and speaker if you desire to match the instrument panel of your new or different car. Instrument panel matching Escutcheon Kits for most popular late model cars are available at your nearest Sears retail store or Mail Order House. If your Silvertone radio is equipped with a universal underdash tuning panel it may be transferred as is to a different car without changing the Escutcheon Kit. However, if you wish to change from an underdash mounting to a custom style instrument panel mounting, this can be accomplished by discarding the universal Escutcheon Kit and replacing it with an instrument panel matching Escutcheon Kit (and 6"x9" oval speaker, if necessary), as outlined above.

INSTALLATION

THE SPEAKER

The speakers (7" round or 6"x9" oval) are supplied with sponge rubber baffles for mounting on flat or curved instrument panels. The rubber baffle for the 7" round speaker has flared sides so that it will cover an oval opening in the car's speaker grill as well as a round opening.

Speaker mounting hardware is supplied with each Escutcheon Kit for mounting the speaker in your car. This includes a "U-shaped" bracket for mounting the round speaker in cars on which it is not possible to mount the speaker on existing bolts.

SPECIFIC INSTRUCTIONS PERTAINING TO THE MOUNTING OF THE SPEAKER AND CONTROL UNIT IN THE CAR FOR WHICH YOU ORDERED YOUR RADIO ARE CONTAINED IN THE LEAFLET PACKED IN THE ESCUTCHEON KIT.

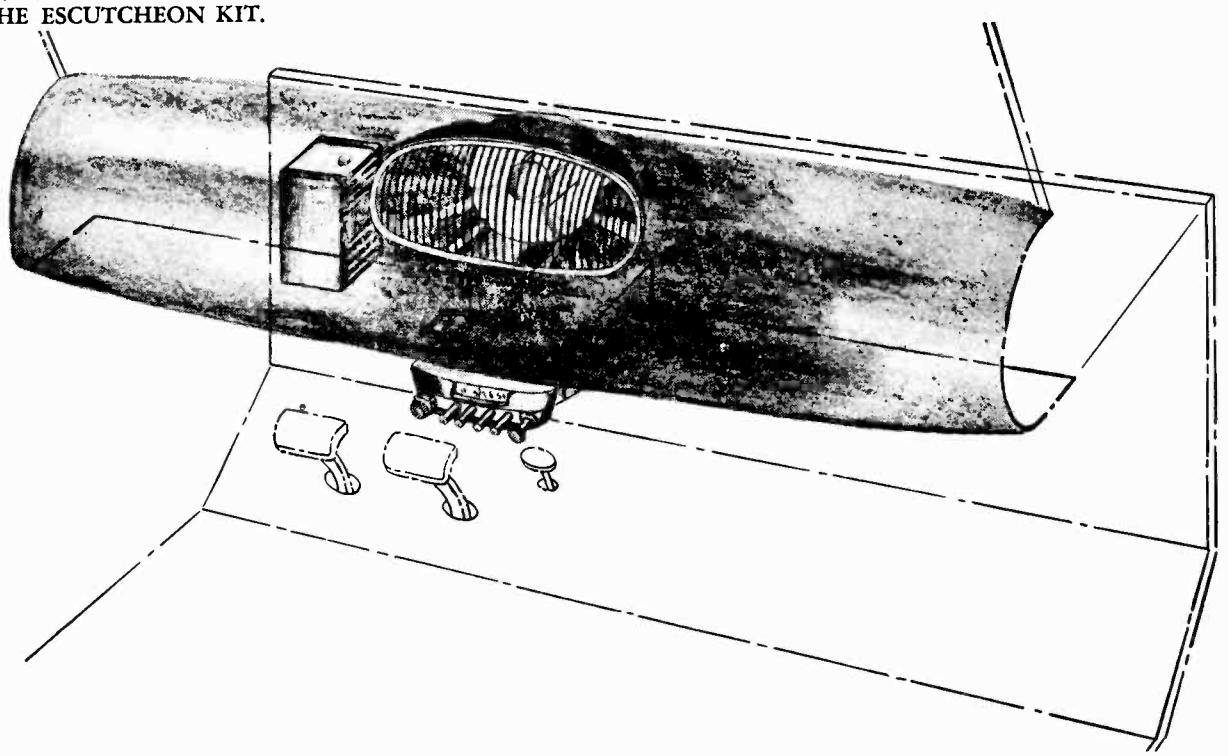

Fig. 3. Underdash Mounting

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MOUNTING THE POWER UNIT

The power unit mounts on the firewall (see Fig. 3). Determine a suitable position for mounting it by holding the case in your hands against the firewall. When a suitable position has been determined, then check the underhood side of the wall, to make sure there is no obstruction to prevent drilling a hole and inserting the mounting bolt. Having located a suitable position that will permit drilling, mark and drill a 5/16" hole. Insert the ¼ inch diameter by 3 inch long, carriage type mounting bolt into the hole from the underdash side and attach the lockwasher and nut on the underhood side, but do not tighten. Now holding the case in a vertical position (with wingnut on the bottom), bring the case up to the bolt and slide the channel in the mounting plate down over the head of the bolt. The lockwasher and nut on the underhood side should then be tightened down securely.

If, because of limited space, you find it necessary to mount the power unit in a horizontal or angle position, this type of mounting is entirely satisfactory and has no ill effect on the operation of the radio.

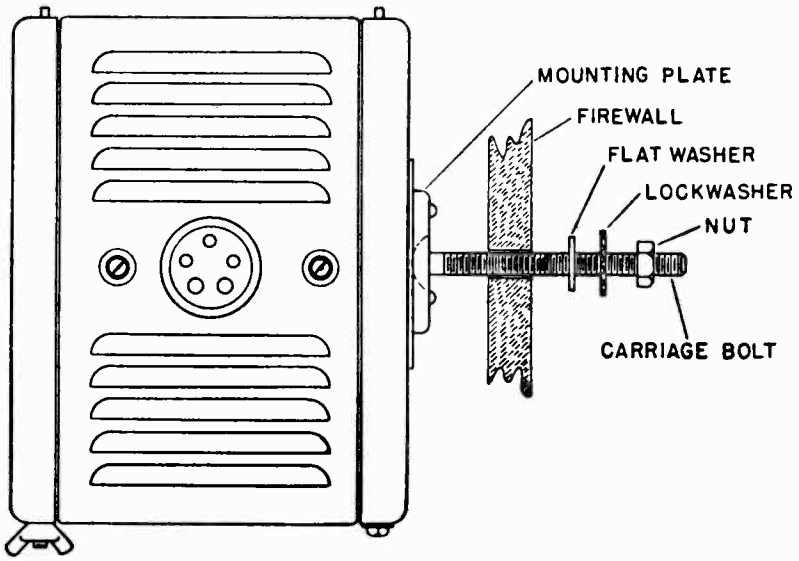

Fig. 3. Power Unit Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the plug into the antenna receptacle on the side of the control unit (see Fig. 4). Plug the speaker and power cables into the sockets provided on the sides of the Power Unit. **IMPORTANT: LOOSEN SCREW "A" (SEE FIG. 4) ON POWER UNIT CASE. WRAP THE PIGTAIL OF BRAID ON THE POWER SUPPLY CABLE AROUND THE SCREW AND TIGHTEN DOWN THE SCREW AGAIN. BE SURE THAT THE PIGTAIL IS SECURELY HELD BY THE SCREW.** Connect the "A" lead to the battery side of the ammeter behind the instrument panel. The fuse should then be inserted into the holder in the "A" lead. These connections are illustrated in Fig. 4.

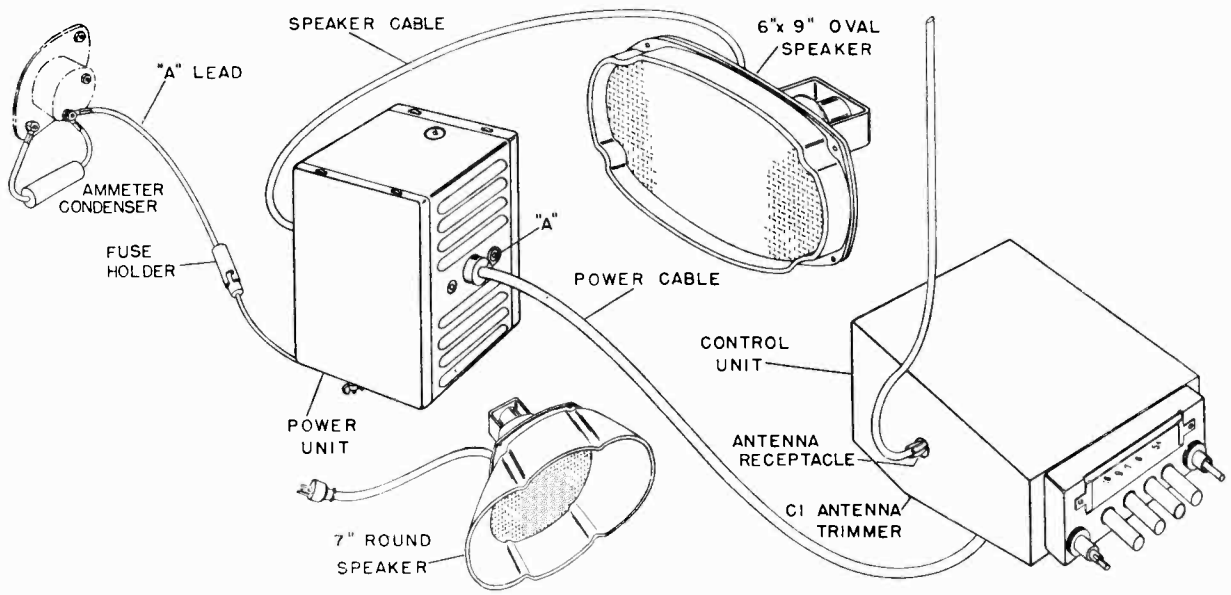

Fig. 4. Connecting the Radio

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MODEL 6295-2,
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CONTROLS

There are six operating controls on the front of the Control Unit, (see Fig. 5). The two outside knobs are dual purpose controls, the other four are PUSHBUTTON STATION SELECTORS. The left-hand control consists of two knobs mounted on concentric shafts; the front knob (round) is the ON-OFF-SWITCH and VOLUME CONTROL; the rear knob (with four points) is the MANUAL TONE CONTROL. The knob on the right is the MANUAL TUNING CONTROL and it also serves as a fifth PUSHBUTTON STATION SELECTOR. The use of these controls is explained below.

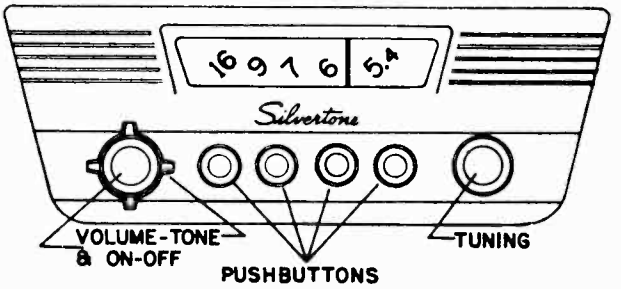

Fig. 5. Control Unit Panel

THE ON-OFF-SWITCH AND VOLUME CONTROL

When the outer left knob is turned all the way to the left the receiver is switched off and there is no drain from the car's battery. Rotating the knob part of a turn toward the right switches the receiver on and illuminates the dial. Further rotation of the knob increases the volume. After a station has been tuned in properly the volume control knob should be adjusted to give the desired volume.

MANUAL TUNING

Use the right-hand knob to tune in stations manually. To select a station, push in the knob and tune the radio by turning the knob until the desired station is heard. The dial pointer will indicate the frequency to which you are tuned.

The dial is marked in Kilocycles minus the final two zeroes. Always tune carefully for the clearest sound and minimum background noise.

PUSHBUTTON TUNING

Adjusting the pushbutton station selectors is simple and quick. No tools are required and a button may be set up for a new station in a few seconds. Each button can be tuned to any station in the broadcast band; thus you can arrange the tuning in any order to suit your convenience.

Before making the following adjustments, turn the radio on and let it warm up for 15 minutes.

Choose the PUSHBUTTON STATION SELECTOR you wish to adjust, and push the button all the way in; it will lock in this position. Now tune in the station to which you wish to pre-tune by turning the button to right or left until the desired station is heard. The dial pointer will indicate the frequency to which you are tuned, but to insure the accuracy of the setting, keep the volume control turned low and adjust the button for sharpest tuning. This will be indicated when the sound is clearest and noise at a minimum. The button is now properly adjusted and should not be turned again until it is desired to set it for a different station.

Follow the above procedure to adjust the remaining PUSHBUTTON STATION SELECTORS.

As was mentioned under the heading *CONTROLS*, the MANUAL TUNING CONTROL has been designed to serve as a fifth PUSHBUTTON STATION SELECTOR. If you wish to use this control as a PUSHBUTTON STATION SELECTOR, simply follow the procedure given above for adjusting the other PUSHBUTTON STATION SELECTORS. However, remember that if you use this control for MANUAL TUNING at any time, it will have to be re-set to the desired station if you wish to use it again as a PUSHBUTTON STATION SELECTOR.

S84--382 SUPPRESSION KIT AND MISCELLANEOUS PARTS

1 S84-233—"A" lead assembly
1 A43-10—Fuse
1 A81-13—Sleeve (for fuse)
2 A16-183—.5 MFD condensers
1 A96-4—Distributor Suppressor
20" wire braid
1 bolt—¼" diameter by 3" long
1 lockwasher
1 flat washer
1 nut

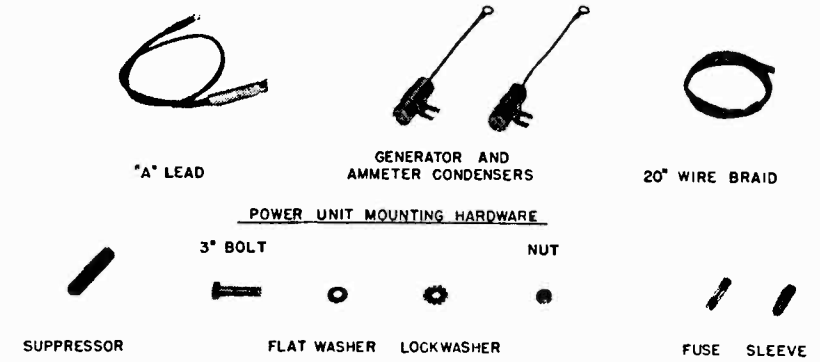

Fig. 6. Suppression Kit and Miscellaneous Parts

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THE TONE CONTROL

The inner left knob (with four points) is the TONE CONTROL, which permits you to select the most pleasing tonal range. When it is turned all the way to the right (clockwise) the tone is treble or brilliant. This position is best for the most distinct reproduction, especially of speech. Turning the knob to the left (counterclockwise) makes the tone more mellow. This is often desirable for certain types of music and is also useful to lessen the effects of static and electrical noise. Turn the knob to the position that gives the tone most pleasing to you.

MATCHING THE ANTENNA

An adjusting screw for matching the receiver to the particular antenna used is accessible through a hole in the bottom side of the Control Unit. (See Fig. 4.) Set the dial pointer between 1400 KC and 1500 KC, where no station is heard with the volume control fully on. Then use a small screw driver to turn the adjusting screw to the point giving the most hiss or noise. The set is now ready for operation.

ELIMINATING MOTOR NOISE

Every precaution was taken in the design of this radio to eliminate motor noise interference. However, in the remote instance that it may be found desirable to take further steps, the following notes are added for your guidance. It may not be necessary to use all of the following suggestions to correct a noise condition in any one car. We recommend using these helpful hints in the manner of a process of elimination, using only those methods that correct your condition.

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

GENERATOR CONDENSER

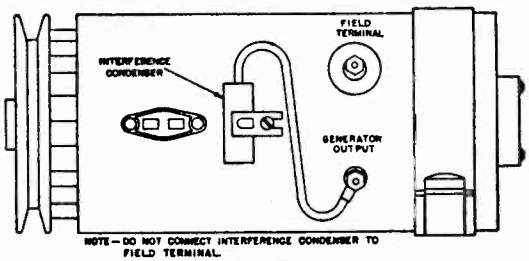

Fig. 7

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove from distributor cap the high tension lead from coil to distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.

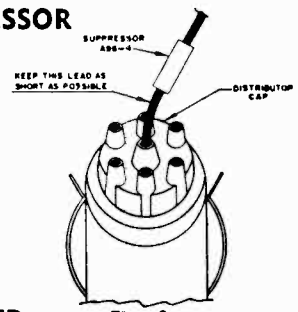

Fig. 8

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most cases the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

VOLTAGE REGULATOR

It is normal to connect a .5 mfd condenser from the battery terminal on the voltage regulator to ground; however, in a number of cars the voltage regulator is mounted on rubber grommets. In such instances, the condenser should be grounded directly to the case of the regulator, rather than to some other ground point. Do not use a larger condenser than .5 mfd or else it will affect the timing of the regulator rendering it less useful.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

Considerable ignition interference is experienced from leads in cables that run along the inside of the fire wall near the auto radio. For example, the battery lead to the low voltage side of the ignition coil on a 1950 Model Oldsmobile '88' runs through the fire wall and along the inside past the auto radio to a point beyond the steering column. This lead has heavy radiation. It can be disconnected at the ignition coil and pulled through the fire wall and pushed back through the fire wall at a point to the left of the steering column and run along the outside to its original point of connection on the ignition coil. Such types of leads should be watched for in all installations. They should be rerouted, if possible, or shielded with braid material. It is advisable in extreme cases to bond all leads by wrapping braid around them, and grounding the braid at the closest point. In wrapping a braid around a lead, do not remove the insulation from the leads as this is a radiation type of shield. Keep all ground leads as short as possible, or they will pick up interference.

Bunch up any excess length of the shielded power cable, wrap it with braid and ground it to the closest ground point.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

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Bonding of Ungrounded Engine and Body Parts

The best rule is to keep the ignition interference underneath the hood as much as possible. This is best accomplished by using filters and suppressors on all points that would produce radiation as well as effectively bonding the hood, motor block, and any engine and body parts that are isolated from each other. It would be advisable to check all bolt-on fenders on which antennas are mounted, in that these fenders frequently are not sufficiently well grounded to the rest of the car. Use bonding braid wherever necessary to ground such fenders. Use wide bonding braid and keep all such braid as short as possible. Bonding all cables and tubes that go through the fire wall is necessary in some cases.

ELECTRICAL SPECIFICATIONS

Power Supply.....6.3 volts DC
Current.....6.5 amp. average
Frequency Range.....540 to 1600 KC
I. F. Frequency.....262 KC
Speaker.....7" round or 6"x9" oval
Power Output.....2.5 watts, undistorted
5 watts, maximum
Sensitivity.....3 microvolt average for 1 watt output
Selectivity...40 KC broad at 1000 times signal, at 1000 KC

The set contains the following:

1—6BA6—R. F. Amplifier.
1—6BE6—Converter.
1—6BA6—I. F. Amplifier.
1—6AT6—Detector—AVC—1st audio.
1—6V6GT—Power output.

1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with the volume and tone controls in maximum position, all tubes and the rectifier in their sockets, no signal applied, and with a voltmeter having a resistance of 20,000 ohm per volt. These voltages are clearly shown on the schematic diagram (Figs. 11 and 12). All voltages should be measured with an input voltage of 6.3 volts DC.

The tubes and rectifier are accessible for servicing without removing the chassis. Loosen the wing-nut on the cover of the power supply case and lift off the cover. On the RF Tuning Unit, loosen the wing nuts on the two stud bolts protruding from the side of the case at the top, rear, and remove the plate over the tubes. CAUTION: Be sure to replace the tubes and the rectifier in the proper sockets. Refer to Tube and Rectifier Location Pictorials, Fig. 10 and 14.

WARNING: The dash pot (brass cylinder on the mechanical tuner) should never be oiled. If it is ever necessary to make adjustments on the mechanical tuner, the dash pot may be cleaned with ordinary cleaning solvents.

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace the coils or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, the rectifier, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE." After realignment has been completed repeat the procedure as a final check.

INSTRUCTIONS FOR REMOVING THE CHASSIS FROM THE CASE

RF TUNING UNIT: Remove the knobs and nuts from the two control shafts. Take out the six self-tapping screws around the back edge of the case and remove the back cover. Remove the plate over the tubes (see service notes). Loosen the screw securing the cable clamp, slip the cable out from under the clamp and out of the notch. Remove the lead from the plug-in terminal on the spark plate attached to the inside top of case. Slide the "A" lead out of the notch. Now tilt the front of the case up so that the chassis can slide out. Grasp the chassis at the rear with the fingers against the chassis plate and with the thumb hooked over the IF transformer. Pull the chassis straight back, being careful that the pointer bracket does not get caught against the spark plate components. Handle the chassis carefully and set down gently so that the mechanical tuning parts may not be damaged or the settings of the coil cores upset by jarring.

POWER SUPPLY: Loosen the wing-nut and lift the top cover off. Remove the 6-32x½ screw securing the high voltage cable socket to the case. Remove the four screws (one on each side) near the bottom outside of the case. Now take the case in one hand and grasp the output transformer with the other hand and lift the chassis straight up.

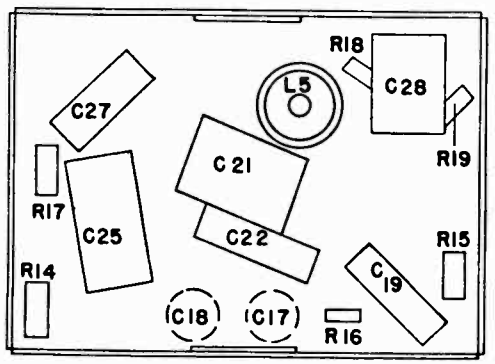

Fig. 9. Power Unit—Bottom View

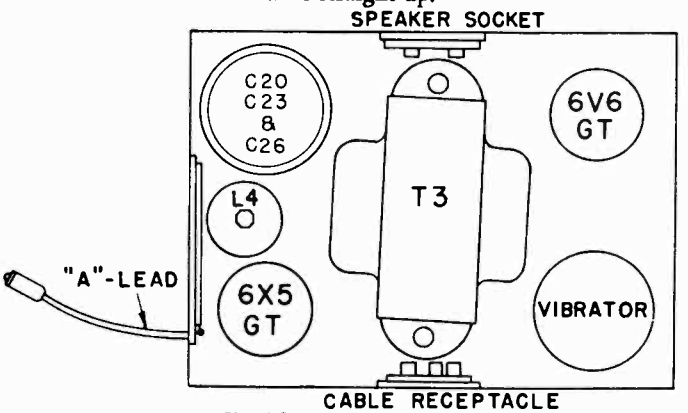

Fig. 10. Power Unit—Top View

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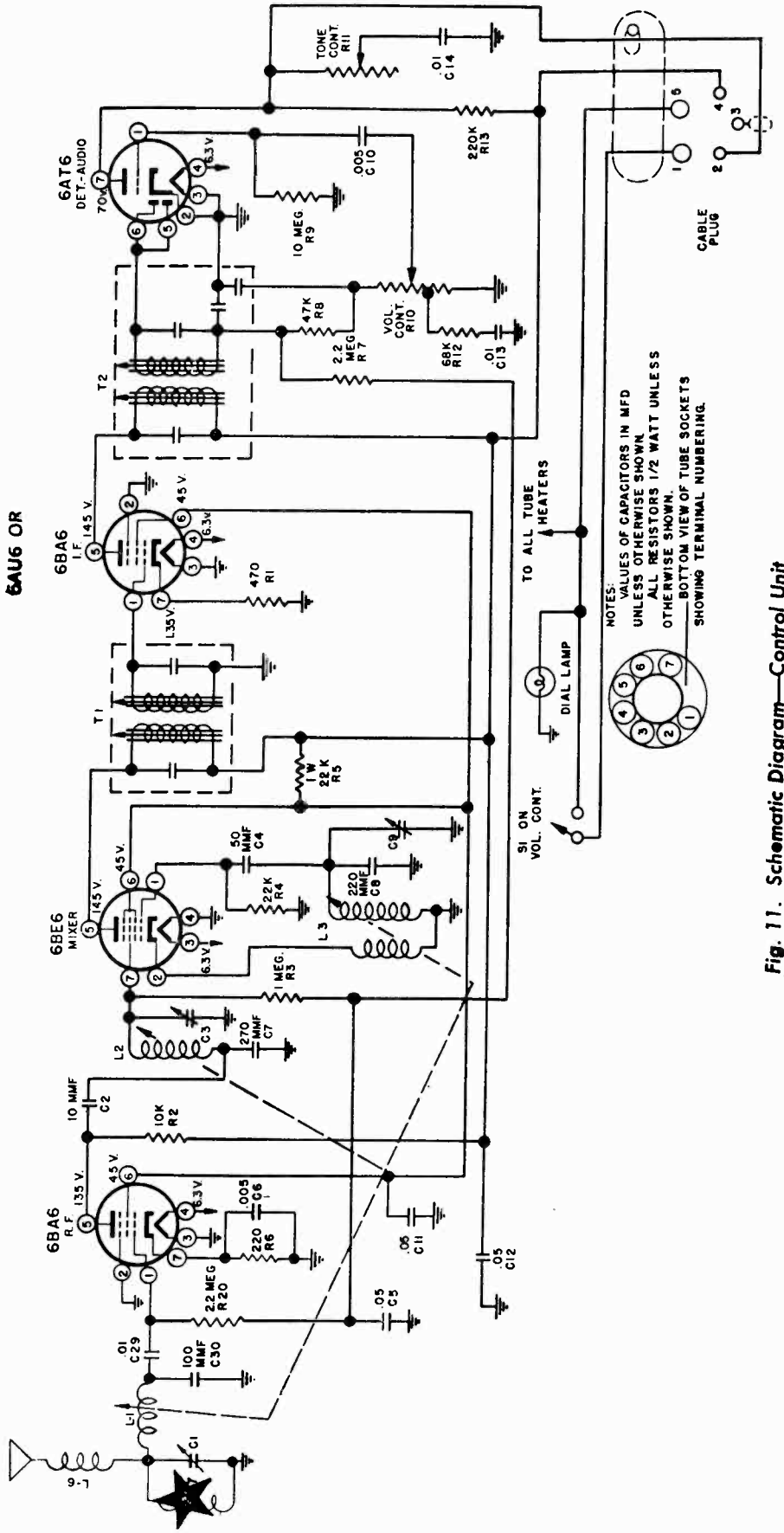

Fig. 11. Schematic Diagram—Control Unit

★ A60-775 Res. 68K—½ w.

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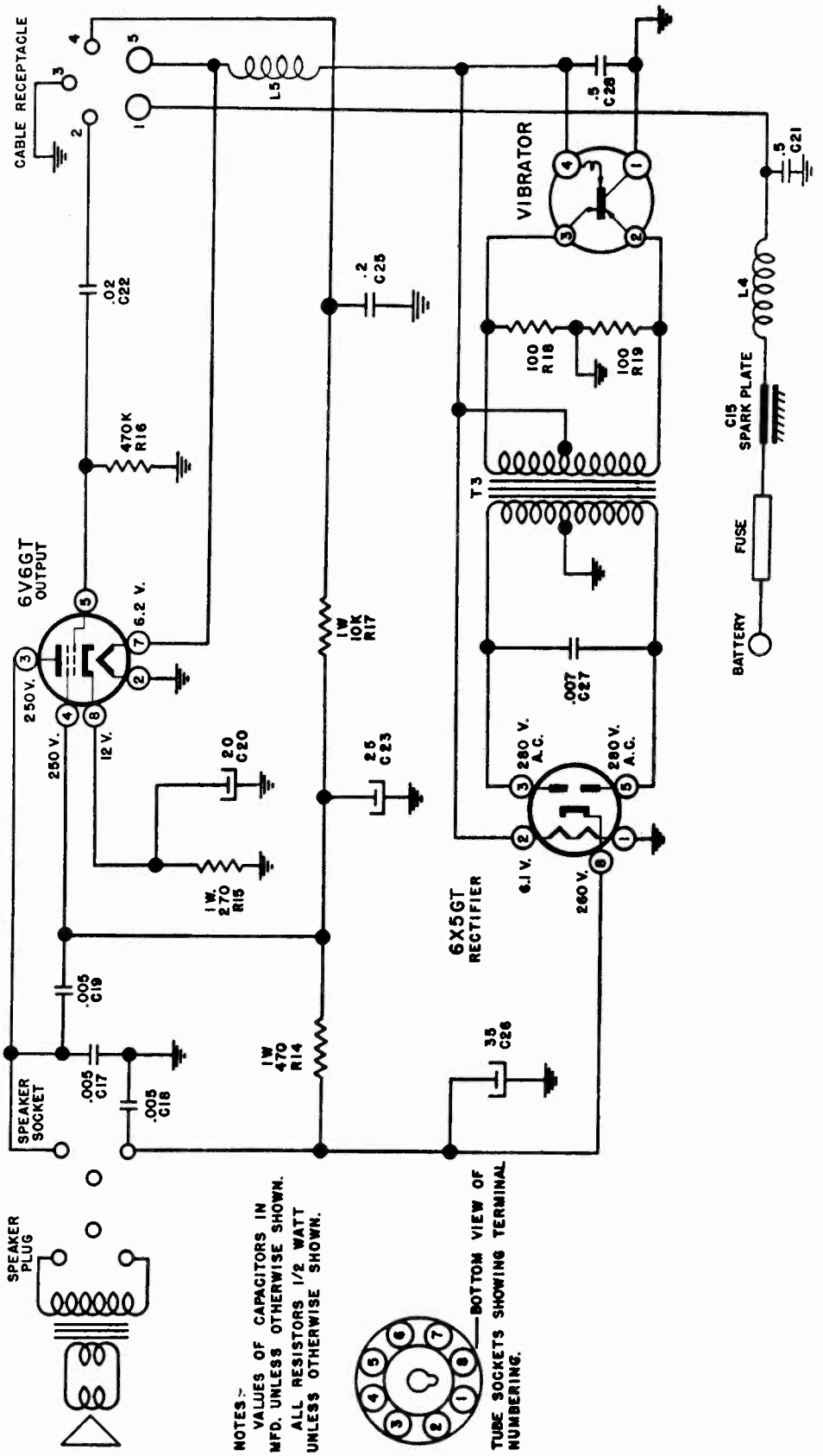

Fig. 12. Schematic Diagram—Power Unit

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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD., 30 MMFD.

For alignment points refer to Figures 13 and 14.

Slug Position	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Out	262 KC	.1 MFD.	6BE6 Grid	T2	Maximum	Output I.F.
Fully Out	262 KC	.1 MFD.	6BE6 Grid	T1	Maximum	Input I.F.
Fully Out	1610 KC	*	Ant. lead	C9	Maximum	Oscillator
Tune in signal from generator	1400 KC	*	Ant. lead	C3	Maximum	R.F.
Tune in signal from generator	1400 KC	*	Ant. lead	C1	Maximum	Antenna

*30 MMFD across input terminals and 75 MMFD in series with "hot" side of signal generator leads.

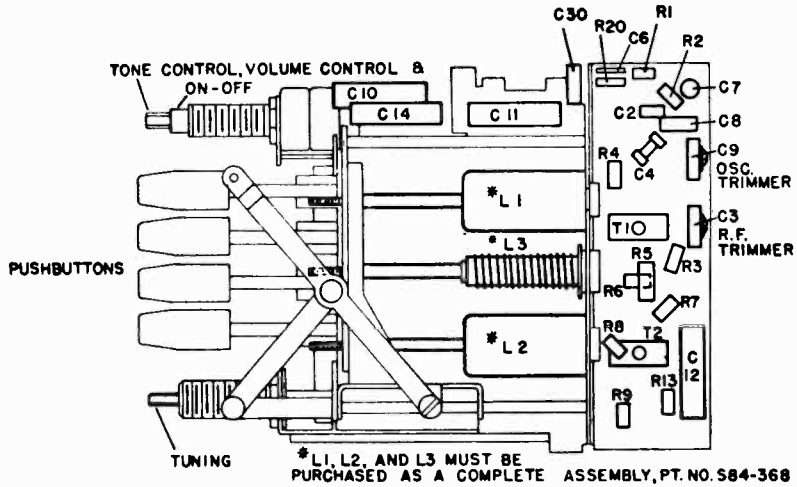

Fig. 13. Control Unit—Bottom View

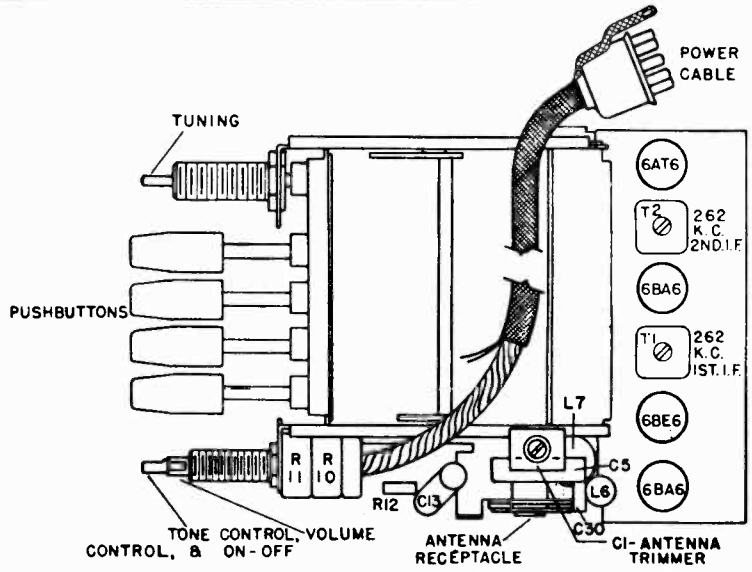

Fig. 14. Control Unit—Top View

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PARTS LIST

Schematic Location	Part No.	Description
C1	A20-148	Capacitor—antenna trimmer
C2	A15-197	Capacitor—ceramic—10 mmfd.
C3, C9	A20-147	Capacitor—dual trimmer—R.F. and Oscillator
C4	A15-194	Capacitor—ceramic—50 mmfd.
C5	A16-197	Capacitor—.05 mfd.—200 v.
C6, C17, C18	A16-177	Capacitor—ceramic—.005 mfd.
C7	A15-215	Capacitor—ceramic—270 mmfd.
C8	A15-218	Capacitor—silver mica—220 mmfd.
C10, C19	A16-190	Capacitor—.005 mfd.—600 v.
C11, C12	A16-189	Capacitor—.05 mfd.—400 v.
C13, C14	A16-192	Capacitor—.01 mfd.—400 v.
C15		Capacitor—spark plate
C21, C28	A16-184	Capacitor—.5 mfd.—100 v.
	A18-300	Capacitor—electrolytic
C20		20 mfd.—25 v.
C23		25 mfd.—350 v.
C26		35 mfd.—400 v.
C22	A16-206	Capacitor—.02 mfd.—600 v.
C25	A16-188	Capacitor—.2 mfd.—400 v.
C27	A16-207	Capacitor—.007 mfd.—1600 v.—oil filled
C29	A15-211	Capacitor—ceramic—.01 mfd.
C30	A15-188	Capacitor—mico—100 mmfd.
	B23-157	Cable—power
L1, L2, L3	S84-470	Coil—assembly—including carriage and slugs, etc.
L4	A33-234	Coil—"A" line choke
L5	A33-228	Coil—vibrator hash choke
L6	A10-527	Coil—antenna loading
L7	[illegible]	A60-775 Res.—68K—½ watt
	A83-421	Clip—I.F. transformer mounting
R10, R11, S1	A24-183	Control—dual—ON-OFF-VOLUME and TONE
	B67-547	Dial scale
	A43-10	Fuse—15 amp.—3AG
	A47-115	Grommet—rubber—power cable
	S84-233	Kit—"A" lead assembly
	B52-296	Knob—Tuning
	B52-297	Knob—Volume
	B52-298	Knob—Tone
	A89-7	Lamp—pilot—No. 47 Bayonet
R1	A60-770	Resistor—470 ohm—½ watt
R2	A60-760	Resistor—10K ohm—½ watt
R3	A60-668	Resistor—1 megohm—½ watt
R4	A60-744	Resistor—22K ohm—½ watt
R5	A60-773	Resistor—22K ohm—1 watt
R6	A60-753	Resistor—220 ohm—½ watt
R7, R20	A60-726	Resistor—2.2 megohm—½ watt
R8	A60-730	Resistor—47K ohm—½ watt
R9	A60-728	Resistor—10 megohm—½ watt
R12	A60-775	Resistor—68K ohm—½ watt
R13	A60-672	Resistor—220K ohm—½ watt
R14	A60-694	Resistor—470 ohm—1 watt
R15	A60-754	Resistor—270 ohm—1 watt
R16	A60-731	Resistor—470K ohm—½ watt
R17	A60-698	Resistor—10K ohm—1 watt
R18, R19	A60-752	Resistor—100 ohm—½ watt
	A83-646	Retainer—dial scale—left
	A83-647	Retainer—dial scale—right
	C79-387	*Speaker—7" round
	C79-386	*Speaker—6"x9" oval
	S84-383	Transformer—output—with cable and plug
T1	A10-537	Transformer—I.F. No. 1
T2	A10-540	Transformer—I.F. No. 2
T3	C80-258	Transformer—power
	A34-105	Vibrator—Mallory No. 659

Mechanical Tuner Parts

A56-141	Pusher nut—monual tuning
A56-152	Pusher nut—pushbutton tuning
A75-75	Pusher rod—monual tuning
S84-355	Pushbutton and rod assembly

IMPORTANT: All tubular condensers must be high temperature (85°C.) wax type.

***When ordering a replacement speaker, order the same type, 7" round or 6"x9" oval, as the old one that was installed in your car.**

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MODEL 6297-1,
Ch. 528.6297-1

DESCRIPTION

Your new automobile receiver is a 5-tube (plus rectifier) superheterodyne, designed to operate from the 6 volt storage battery in your car. It is a universal type of receiver for mounting underneath the dash panel. It has a self-contained PM speaker, and covers the frequency range 540 to 1600 K.C. Two simple controls are provided for operating the receiver. (see fig. 1).

Special care has been taken in the design of this receiver to insure the finest in sensitivity and selectivity, there-by insuring good reception of even distant or weak stations. The unit is simple to install, the antenna input circuit adjustable to permit the use of any two or three section whip or "fish pole" antenna.

OPERATION

To turn the receiver on, rotate the volume control and switch knob (left hand knob) to the right about half its range. After allowing about 30 seconds for the tubes to warm up, the desired station may be tuned by rotating the tuning control (right hand knob) to the desired frequency. The dial scale is calibrated in kilocycles minus the final two zeros. After the station has been properly tuned, the volume may be adjusted by means of the volume control knob. To increase the volume, turn the control to the right; to decrease the volume, turn it to the left. Turning this control to the left as far as it will go, turns the radio off.

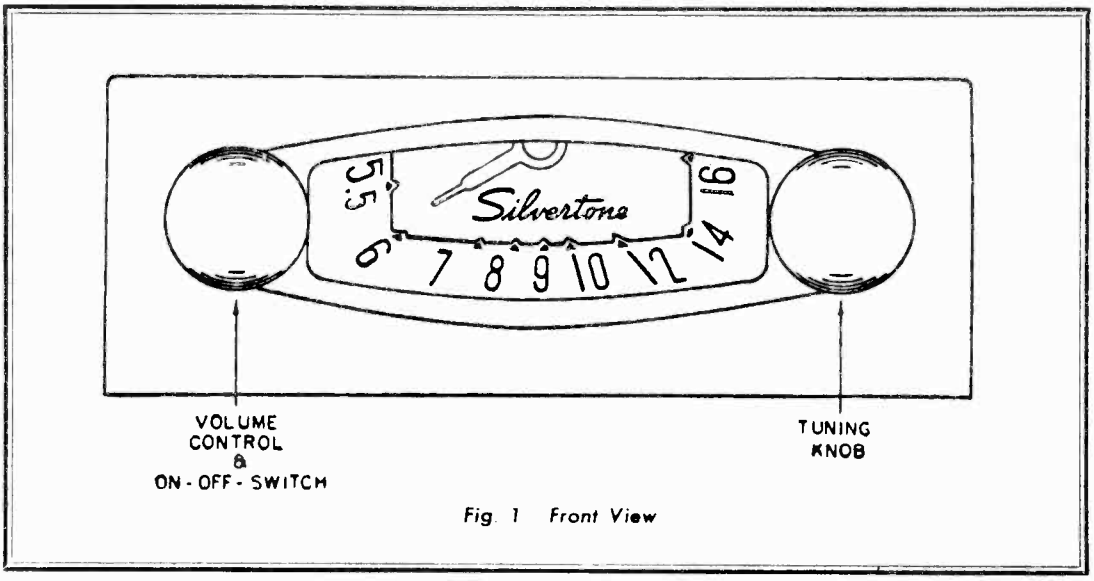

Fig. 1 Front View

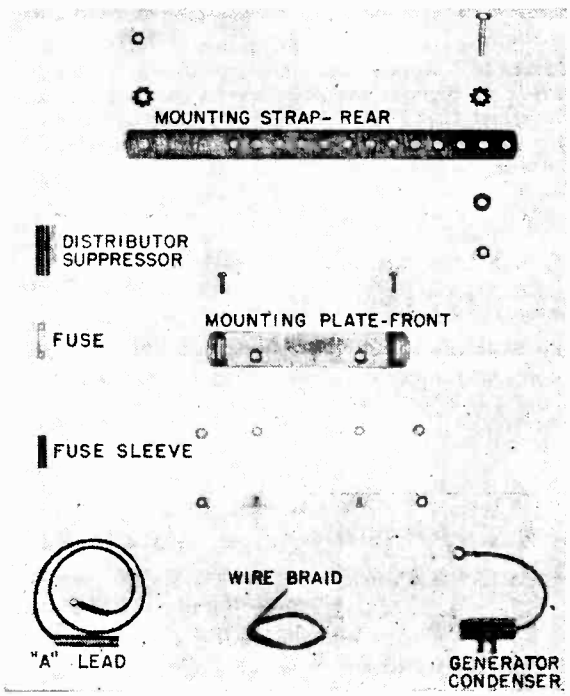

Fig 2

DIAL POINTER ADJUSTMENT

If it should become necessary to readjust the dial pointer for correct calibration, this may be easily done without removing the radio from the car by proceeding as follows:

A. Turn tuning knob to the right (clockwise) as far as it will go.

B. Remove snap button located on the right side of the case (viewed from the front), in the extreme upper front corner.

C. Insert screwdriver through hole in case and move dial pointer directly over white dot at high end of dial (1600KC).

D. Tune receiver to station of known frequency in the center of the dial and readjust pointer for more accurate indication, if necessary.

E Replace snap button into hole in case.

CAUTION: Be careful not to scratch or damage dial scale or dial pointer when making this adjustment

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MODEL 6297-1,
Ch. 528.6297-1

INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, and generator condenser. By referring to Figures 2 and 3, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 7/32" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided. and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed by bending to the correct angles, as illustrated in Figure 3, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

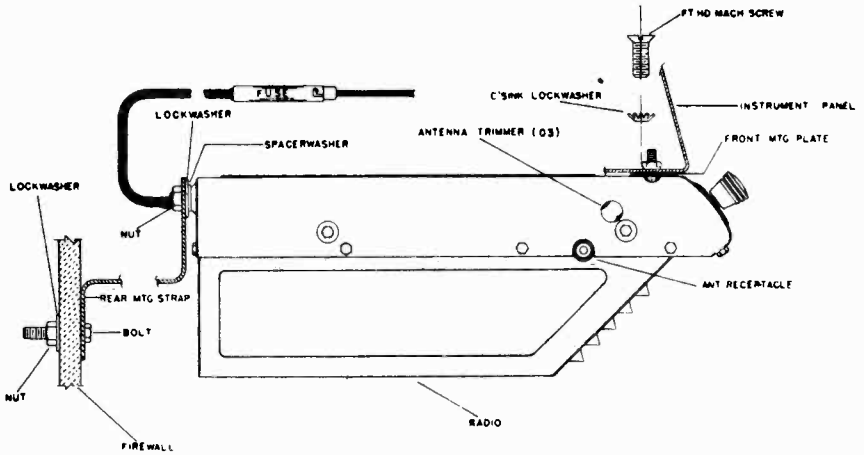

Fig.3 Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 1100 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 3) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression and Misc. Parts Kit, part No. S84-407, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-138.

S84-192 MOUNTING PARTS KIT

- 1 1/4" Bolt
- 2 1/4" Lock Washers
- 2 1/4" Hexagon Nuts
- 2 10-32 x 5/8" Screws
- 2 10-32 x 3/8" Screws
- 2 External Tooth Lock Washers
- 2 Internal Tooth Lock Washers
- 2 10-32 Hexagon Nuts
- 1 Washer-Spacer

S84-407 SUPPRESSION KIT & MISC. PARTS

- 1 S84-233 "A" lead assem.
- 1 A43-10 Fuse
- 2 A52-300 Control Knobs
- 1 A81-13 Sleeve (for fuse)
- 1 S84-322 Suppression Kit consisting of:
  - 1 .5 MFD Condenser
  - 1 Distributor Suppressor
  - 20" Wire Braid

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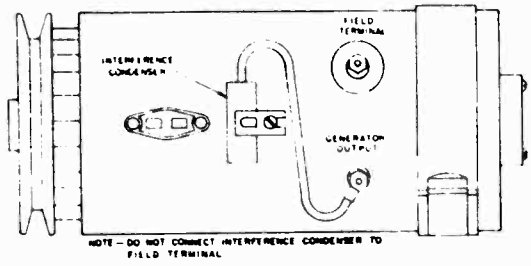
MODEL 6297-1,
Ch. 528.6297-1

ELIMINATING MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

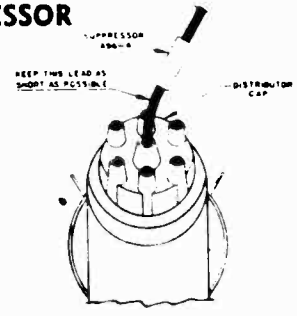
GENERATOR CONDENSER



The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove from distributor cap the high tension lead from coil to distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.



NOTE

In most cases the use of the generator condenser and the distributor suppressor will eliminate all objectionable ignition interference. However, if further reduction of noise is found to be desirable, it is suggested that a .5 MFD. condenser, (similar to the one used on the generator), be connected from either side of the ammeter to a good ground.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These wires will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF STEERING COLUMN TO BODY

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

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MODEL 6297-1,
Ch. 528.6297-1

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	6.2 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	455 KC
Speaker	4" P. M.
Power Output	1.2 watts, undistorted 2.5 watts, maximum
Sensitivity	10 microvolt average for 1 watt output
Selectivity	50 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

A 6X5GT Rectifier is used.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes and the rectifier in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage diagram (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, rectifier, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

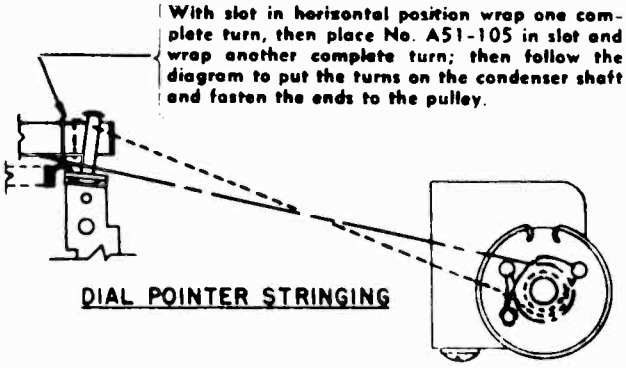
INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes, rectifier and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

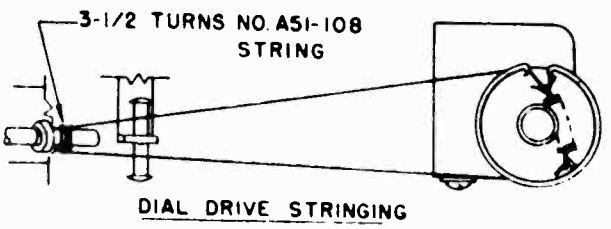
CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.



DIAL POINTER STRINGING



DIAL DRIVE STRINGING

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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD.

For alignment points refer to Figures 5 and 6.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	1600 KC	75 MMFD.	Ant. lead	C1B	Maximum	Oscillator
Tune in signal from generator	1400 KC	75 MMFD	Ant. lead	C1A	Maximum	Antenna

NOTE: The antenna trimmer condenser, C3, (see Fig. 3) should be adjusted after the radio is installed in the car. Tune the receiver to a weak station at about 1100 KC and adjust this trimmer for maximum volume.

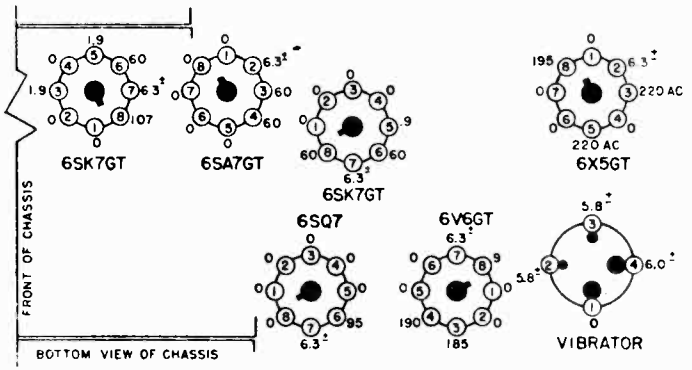

Fig.4. Socket Voltages

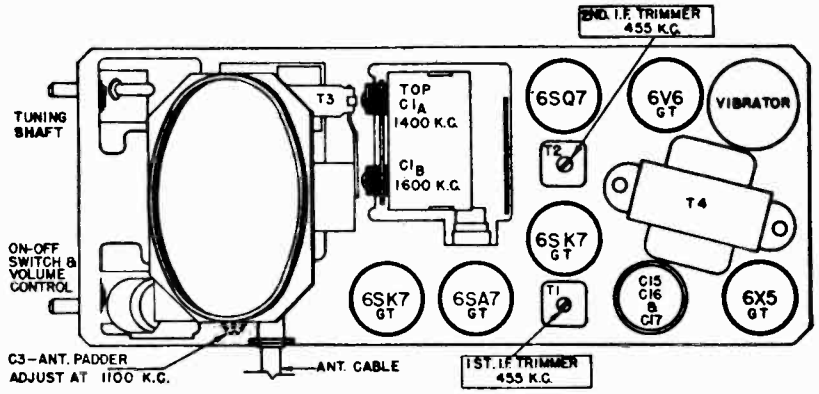

Fig. 5. Tube, Rectifier and Trimmer Locations

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MODEL 6297-1,
Ch. 528.6297-1

PARTS LIST

Schematic Diagram Reference	Part No.	Description
		CONDENSERS
C1A, C1B	B19-201	Variable condenser
C2, C14	A16-192	.01 MFD 400 volt condenser
C3	A20-145	Trimmer condenser
C4	A16-189	.05 MFD 400 volt condenser
C5	A15-196	100 MMFD ceramic condenser
C7	A15-204	50 MMFD ceramic condenser
C8	A15-205	12 MMFD ceramic condenser, temp. comp.
C9	A16-187	.1 MFD 400 volt condenser
C10	A15-176	250 MMFD mica condenser
C11	A16-190	.005 MFD 600 volt condenser
C12	A16-195	.001 MFD ceramic condenser
C13	A16-193	.05 MFD 600 volt condenser
C15	A18-289	20 MFD 25 volt electrolytic condenser
C16		20 MFD 350 volt electrolytic condenser
C17		30 MFD 350 volt electrolytic condenser
C19, C20	A16-184	.5 MFD 100 volt condenser
C21	A16-185	.005 MFD 1600 volt oil filled condenser
		RESISTORS
R1, R3	A60-659	22K ohm ½ watt 20% resistor
R2	A60-685	47K ohm ½ watt 20% resistor
R4	A60-769	7.5K ohm 2 watt 10% resistor
R5	A60-726	2.2 megohm ½ watt 20% resistor
R6	A24-177	Volume control, 500,000 ohm, with switch
R7	A60-728	10 megohm ½ watt 20% resistor
R8, R15	A60-758	560 ohm ½ watt 10% resistor
R9	A60-667	220K ohm ½ watt 20% resistor
R10	A60-731	470K ohm ½ watt 20% resistor
R11	A60-771	270 ohm ½ watt 10% resistor
R12	A60-770	470 ohm ½ watt 10% resistor
R13, R14	A60-752	100 ohm ½ watt 10% resistor
		COILS AND TRANSFORMERS
L1	A10-527	Antenna Loading Coil
L2	B10-511	Antenna Coil
L4	A10-512	Oscillator Coil
L5	A33-229	Choke, "A" Line
L6	A33-228	Choke, vibrator hash
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer
T3	B80-242	Output Transformer (Part of Speaker, not furnished separately)
T4	B80-243	Power transformer
		DIAL PARTS
	A11-303	Bracket, Dial Scale
	B11-328	Bracket, String Guide
	A72-29	Bushing, Tuning Shaft Bearing
	A70-130	Clip, Spring, for Tuning Shaft
	A58-55	Dial Pointer
	B67-545	Dial Scale
	A28-101	Gasket for Speaker
	A52-300	Knob
	A11-329	Link, String Guide
	A89-10	Pilot Light, No. 47 Bayonet
	A65-37	Rivet, Shoulder, for Dial Pointer Stringing
	A65-42	Rivet, Shoulder, for String Guide Brkt. and Link
	A65-12	Rivet, Shoulder, for Dial Drive Stringing
	A75-70	Shaft, tuning
	A75-74	Shaft, for Dial Pointer
	A70-132	Spring, for Pilot Light Socket
	A70-135	Spring, Dial Drive String Tension
	A70-142	Spring, Pointer Drive String Tension
	A51-105	String, Pointer Travel, 17"
	A51-108	String, Condenser Drive, 19"

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MODEL 6297-1,
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MISCELLANEOUS

S84-233	"A" lead assembly
A83-421	Clip, I.F. Transformer Mounting
A83-517	Clip, Oscillator Coil Mounting
A43-10	Fuse, 15 Amp.
A47-112	Grommet, rubber, (Spkr. & Gang mounting)
B31-134	Mounting strap, rear
A31-138	Mounting Plate, Front
S84-192	Mounting parts kit
A87-38	Receptacle, Antenna Cable
B79-379	Speaker, 4" P.M. (includes Output Transformer)
S84-322	Suppression Kit Assembly
A34-105	Vibrator
A83-519	Wiper, grounding, for case cover

Note: Tubular condensers must be high temperature (85°C) wax type.

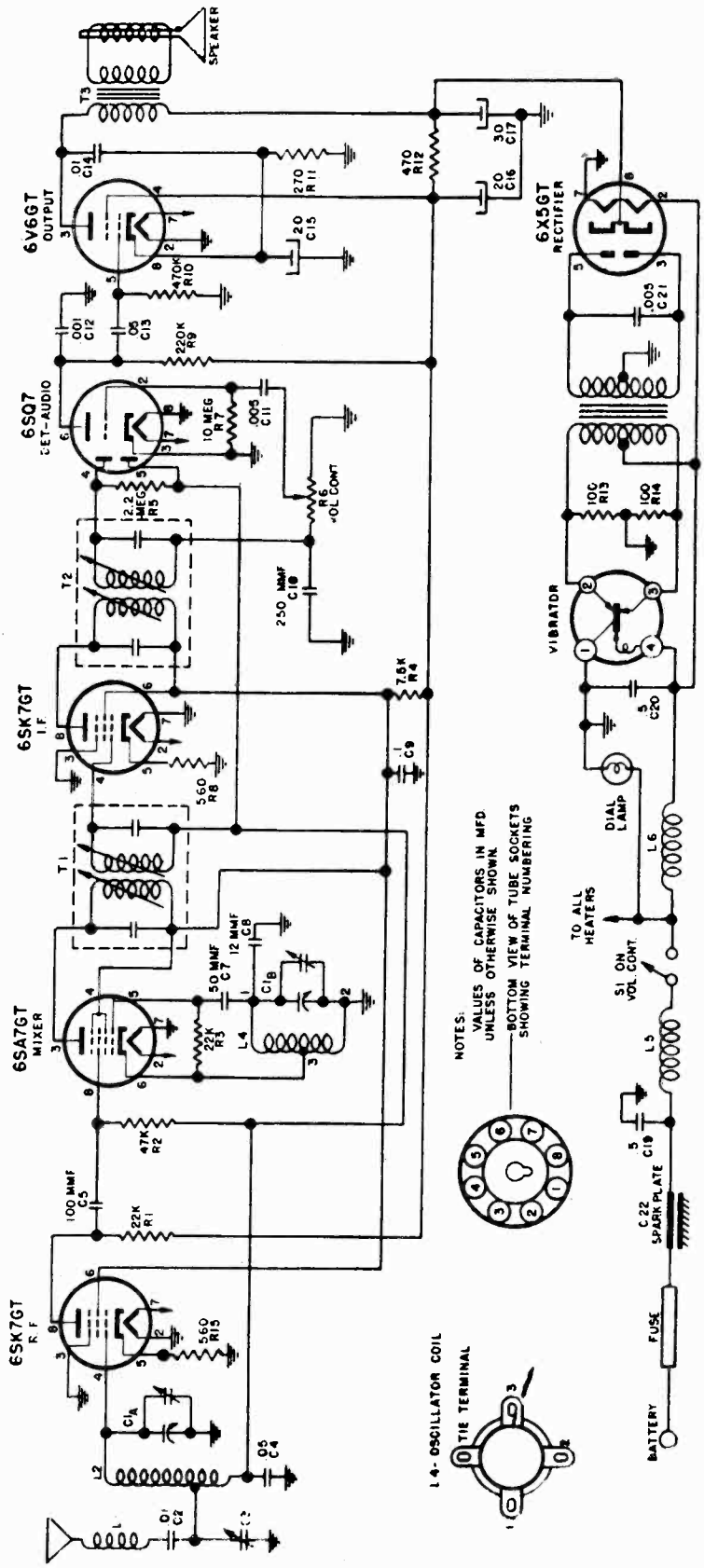

Fig 6. Schematic Diagram

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MODEL 6297-2,
Ch. 528.6297-2

DESCRIPTION

Your new automobile receiver is a 5-tube (plus rectifier) superheterodyne, designed to operate from the 6 volt storage battery in your car. It is a universal type of receiver for mounting underneath the dash panel. It has a self-contained PM speaker, and covers the frequency range 540 to 1600 K.C. Two simple controls are provided for operating the receiver. (see fig. 1).

Special care has been taken in the design of this receiver to insure the finest in sensitivity and selectivity, there-by insuring good reception of even distant or weak stations. The unit is simple to install, the antenna input circuit adjustable to permit the use of any two or three section whip or "fish pole" antenna.

OPERATION

To turn the receiver on, rotate the volume control and switch knob (left hand knob) to the right about half its range. After allowing about 30 seconds for the tubes to warm up, the desired station may be tuned by rotating the tuning control (right hand knob) to the desired frequency. The dial scale is calibrated in kilocycles minus the final two zeros. After the station has been properly tuned, the volume may be adjusted by means of the volume control knob. To increase the volume, turn the control to the right; to decrease the volume, turn it to the left. Turning this control to the left as far as it will go, turns the radio off.

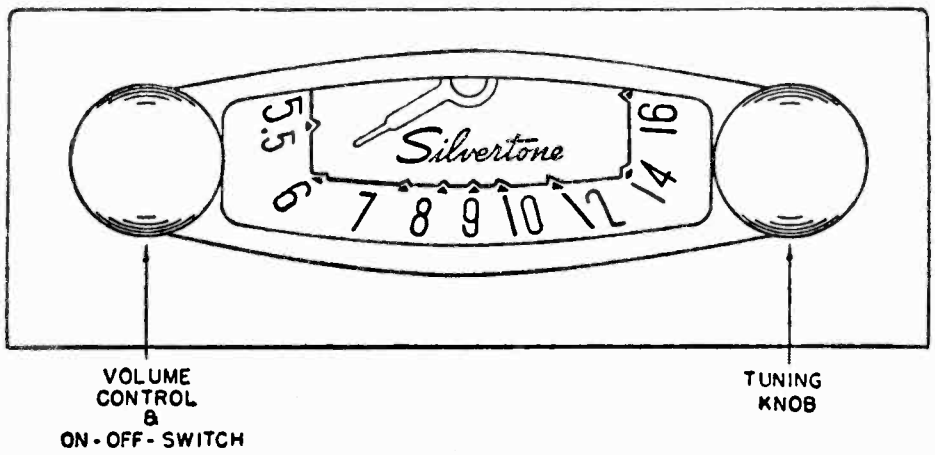

Fig. 1 Front View

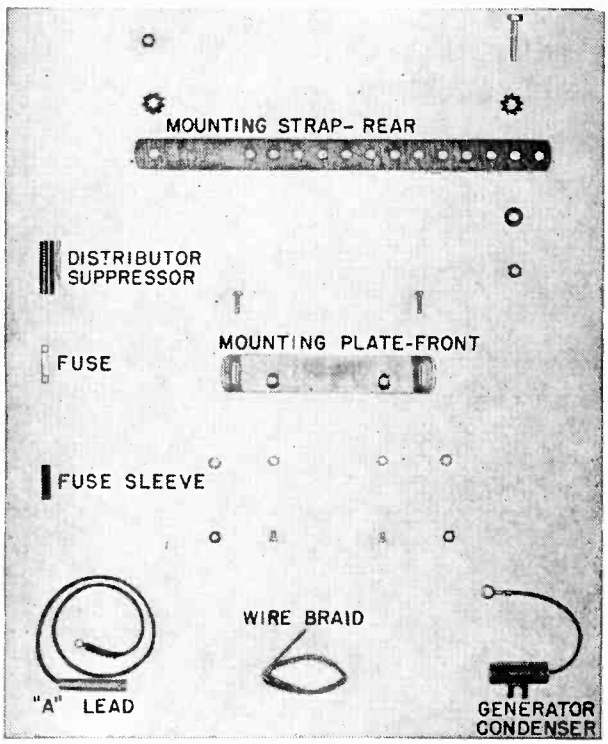

Fig. 2

DIAL POINTER ADJUSTMENT

If it should become necessary to readjust the dial pointer for correct calibration, this may be easily done without removing the radio from the car by proceeding as follows:

A. Turn tuning knob to the right (clockwise) as far as it will go.

B. Remove snap button located on the right side of the case (viewed from the front), in the extreme upper front corner.

C. Insert screwdriver through hole in case and move dial pointer directly over white dot at high end of dial (1600KC).

D. Tune receiver to station of known frequency in the center of the dial and readjust pointer for more accurate indication, if necessary.

E. Replace snap button into hole in case.

CAUTION: Be careful not to scratch or damage dial scale or dial pointer when making this adjustment.

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MODEL 6297-2,
Ch. 528.6297-2

INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, and generator condenser. By referring to Figures 2 and 3, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 7/32" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed by bending to the correct angles, as illustrated in Figure 3, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

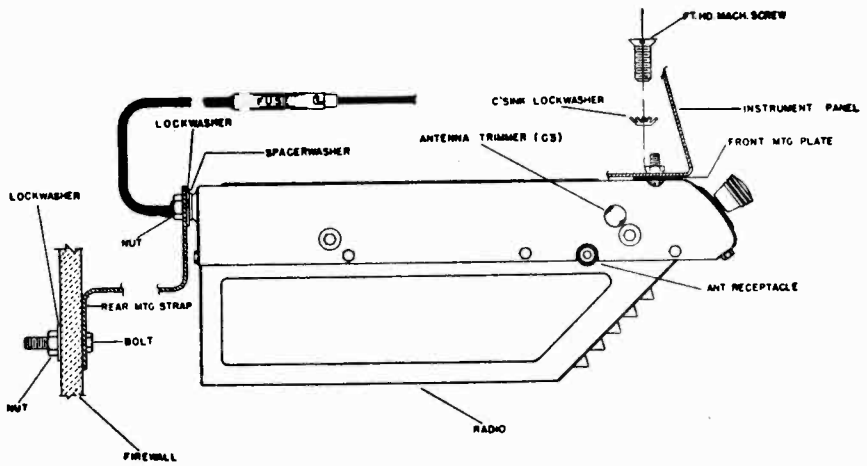

Fig.3. Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 1100 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 3) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression and Misc. Parts Kit, part No. S84-407, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-138.

S84-192 MOUNTING PARTS KIT

- 1 1/4" Bolt
- 2 1/4" Lock Washers
- 2 1/4" Hexagon Nuts
- 2 10-32 x 5/8" Screws
- 2 10-32 x 3/8" Screws
- 2 External Tooth Lock Washers
- 2 Internal Tooth Lock Washers
- 2 10-32 Hexagon Nuts
- 1 Washer-Spacer

S84-407 SUPPRESSION KIT & MISC. PARTS

- 1 S84-233 "A" lead assem.
- 1 A43-10 Fuse
- 2 A52-300 Control Knobs
- 1 A81-13 Sleeve (for fuse)
- 1 S84-322 Suppression Kit consisting of:
  - 1—.5 MFD Condenser
  - 1 Distributor Suppressor
  - 20" Wire Braid

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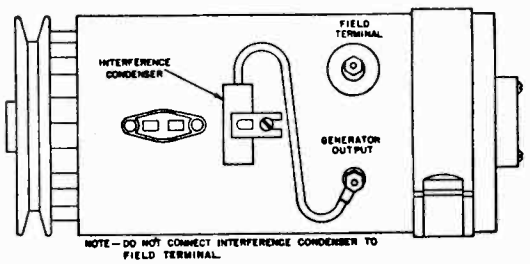
MODEL 6297-2,
Ch. 528.6297-2

ELIMINATING MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise.

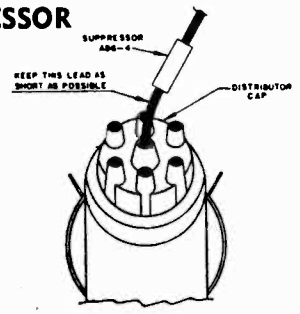
GENERATOR CONDENSER



The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Remove from distributor cap the high tension lead from coil to distributor. Cut the lead two inches from the end, and screw the distributor resistor on to the coil lead, then screw the short length into the resistor and plug the cable into the distributor cap.



NOTE

In most cases the use of the generator condenser and the distributor suppressor will eliminate all objectionable ignition interference. However, if further reduction of noise is found to be desirable, it is suggested that a .5 MFD. condenser, (similar to the one used on the generator), be connected from either side of the ammeter to a good ground.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to try another by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

HIGH AND LOW TENSION LEADS

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These wires will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instru-instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

BONDING OF STEERING COLUMN TO BODY

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

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MODEL 6297-2,
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ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	6.2 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	455 KC
Speaker	4" P. M.
Power Output	1.2 watts, undistorted 2.5 watts, maximum
Sensitivity	10 microvolt average for 1 watt output
Selectivity	50 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio

1—6V6GT—Power output.

A 6X5GT Rectifier is used.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes and the rectifier in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage diagram (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, rectifier, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

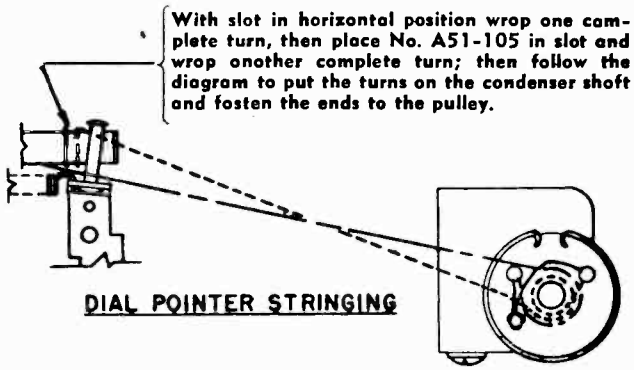
INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

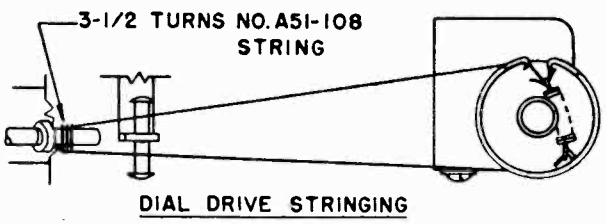
The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes, rectifier and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.





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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD.

For alignment points refer to Figures 5 and 6.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	1600 KC	75 MMFD.	Ant. lead	C1B	Maximum	Oscillator
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C1A	Maximum	Antenna

NOTE: The antenna trimmer condenser, C3, (see Fig. 3) should be adjusted after the radio is installed in the car. Tune the receiver to a weak station at about 1100 KC and adjust this trimmer for maximum volume.

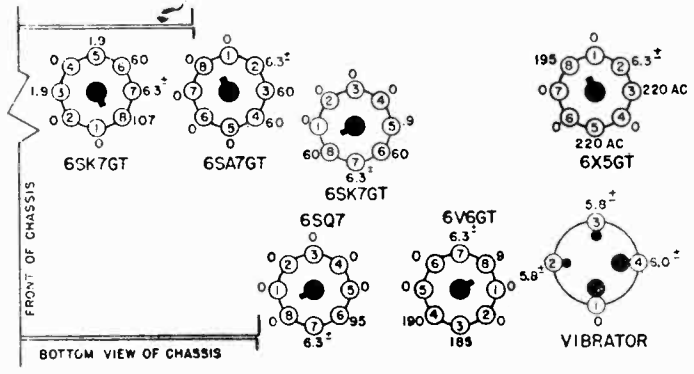

Fig.4. Socket Voltages

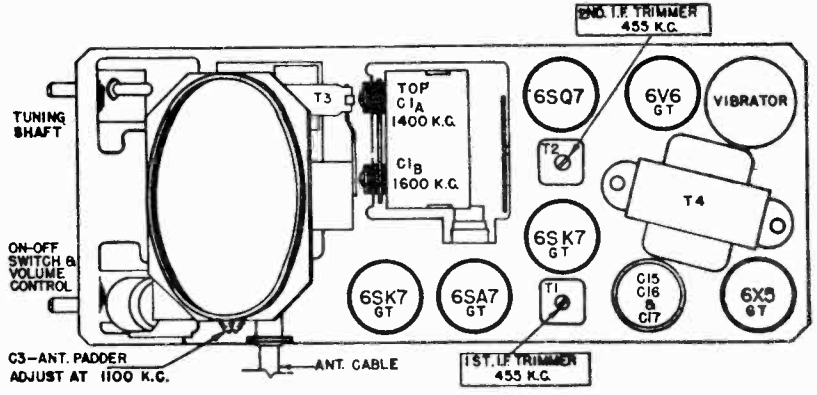

Fig. 5. Tube, Rectifier and Trimmer Locations

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MODEL 6297-2,
Ch. 528.6297-2

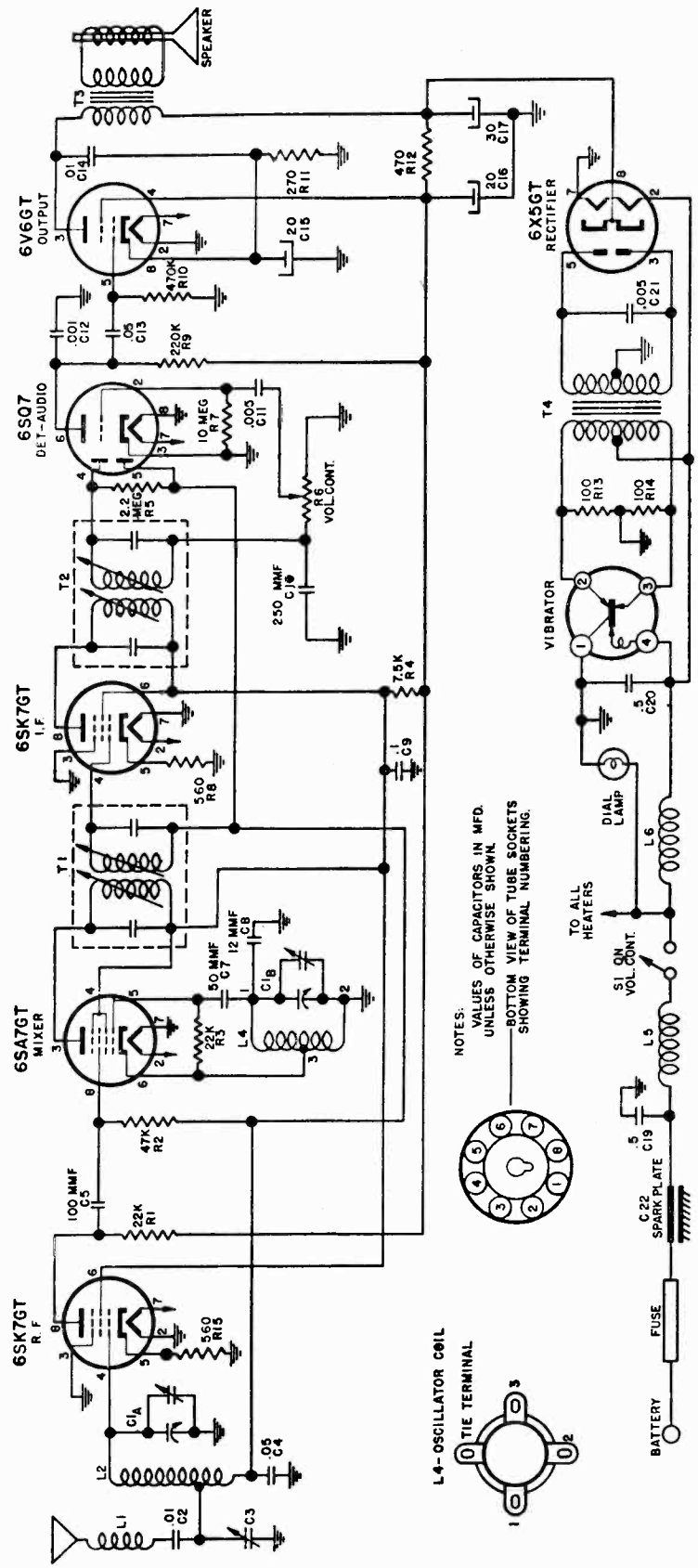

Fig 6. Schematic Diagram

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MODEL 6297-2,
Ch. 528.6297-2

Schematic Diagram Reference	Part No.	Description
		CONDENSERS
C1A, C1B	B19-201	Variable condenser
C2, C14	A16-192	.01 MFD 400 volt condenser
C3	A20-145	Trimmer condenser
C4	A16-189	.05 MFD 400 volt condenser
C5	A15-196	100 MMFD ceramic condenser
C7	A15-204	50 MMFD ceramic condenser
C8	A15-205	12 MMFD ceramic condenser, temp. comp.
C9	A16-187	.1 MFD 400 volt condenser
C10	A15-176	250 MMFD mica condenser
C11	A16-190	.005 MFD 600 volt condenser
C12	A16-195	.001 MFD ceramic condenser
C13	A16-193	.05 MFD 600 volt condenser
C15, C16, C17	A18-289	20 MFD 25 volt electrolytic condenser; 20 MFD 350 volt electrolytic condenser; 30 MFD 350 volt electrolytic condenser
C19, C20	A16-184	.5 MFD 100 volt condenser
C21	A16-185	.005 MFD 1600 volt oil filled condenser
		RESISTORS
R1, R3	A60-659	22K ohm ½ watt 20% resistor
R2	A60-685	47K ohm ½ watt 20% resistor
R4	A60-769	7.5K ohm 2 watt 10% resistor
R5	A60-726	2.2 megohm ½ watt 20% resistor
R6	A24-182	Volume control, 500,000 ohm, with switch
R7	A60-728	10 megohm ½ watt 20% resistor
R8, R15	A60-758	560 ohm ½ watt 10% resistor
R9	A60-667	220K ohm ½ watt 20% resistor
R10	A60-731	470K ohm ½ watt 20% resistor
R11, R12	A60-770	270 ohm ½ watt 10% resistor; 470 ohm ½ watt 10% resistor
R13, R14	A60-752	100 ohm ½ watt 10% resistor
		COILS AND TRANSFORMERS
L1	A10-527	Antenna Loading Coil
L2	B10-511	Antenna Coil
L4	A10-512	Oscillator Coil
L5	A33-229	Choke, "A" Line
L6	A33-228	Choke, vibrator hash
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer
T3	B80-242	Output Transformer (Part of Speaker, not furnished separately)
T4	B80-243	Power transformer
		DIAL PARTS
	A11-303	Bracket, Dial Scale
	B11-328	Bracket, String Guide
	A72-36	Bushing, Tuning Shaft Bearing
	A70-130	Clip, Spring, for Tuning Shaft
	A58-55	Dial Pointer
	B67-545	Dial Scale
	A28-101	Gasket for Speaker
	A52-316	Knob
	A11-329	Link, String Guide
	A89-10	Pilot Light, No. 47 Bayonet
	A65-37	Rivet, Shoulder, for Dial Pointer Stringing
	A65-42	Rivet, Shoulder, for String Guide Brkt. and Link
	A65-12	Rivet, Shoulder, for Dial Drive Stringing
	A75-83	Shaft, tuning
	A75-74	Shaft, for Dial Pointer
	A70-132	Spring, for Pilot Light Socket
	A70-135	Spring, Dial Drive String Tension
	A70-142	Spring, Pointer Drive String Tension
	A51-105	String, Pointer Travel, 17"
Note: Tubular condensers must	A51-108	String, Condenser Drive, 19"
be high temperature (85°C) wax type.		**MISCELLANEOUS**
	S84-233	"A" lead assembly
	A83-421	Clip, I.F. Transformer Mounting
	A83-517	Clip, Oscillator Coil Mounting
	A43-10	Fuse, 15 Amp.
	A47-112	Grommet, rubber, (Spkr. & Gang mounting)
	B31-134	Mounting strap, rear
	B31-138	Mounting Plate, Front
	S84-192	Mounting parts kit
	A87-38	Receptacle, Antenna Cable
	B79-379	Speaker, 4" P.M. (includes Output Transformer)
	S84-322	Suppression Kit Assembly
	A34-105	Vibrator
	A83-519	Wiper, grounding, for case covers

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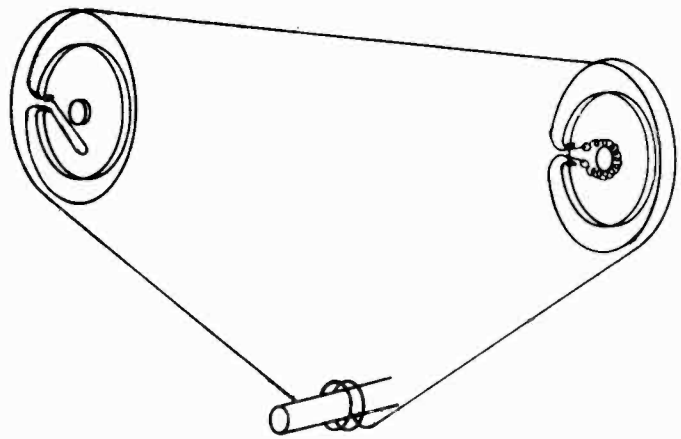
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	F-7621	Arm, Assembly (including pickup arm, pivot spring and arm lift bearing pin assembly)
	F-7622	Cartridge—Crystal (Less Needle)—Shure Bros. P92B
	F-298	Cabinet (including Lid, Hinges and Lid Support)
		Lid—Cabinet (For F-298 Cabinet)
	F-7679	Capacitor—Variable Assembly)
C19, C20	F-5051	Capacitor—Electrolytic—40 MFD. 150 V. 40 MFD. 150 V.
C5, C11	F-6015	Capacitor—Ceramic 100 MMFD. 500 V. 20%
C12	F-7549	Capacitor—Ceramic 100 MMFD. 500 V. 10%
C15	F-6488	Capacitor—Ceramic 250 MMFD. 500 V. 20%
C13	F-4894	Capacitor—Paper .005 MFD. 600 V.
C16	F-1344	Capacitor—Paper .01 MFD. 400 V.
C18	F-1376	Capacitor—Paper .02 MFD. 400 V.
C6, C7, C14	F-1345	Capacitor—Paper .05 MFD. 200 V.
C21	F-1346	Capacitor—Paper .05 MFD. 400 V.
C10	F-4957	Capacitor—Paper .09 MFD. 200 V.
C17	F-1623	Capacitor—Paper .1 MFD. 400 V.
	F-6149	Coil—Antenna
	F-7139	Coil—Oscillator
R5	F-5757	Control—On-Off & Volume
R12	F-6157	Control—Tone
	F-1090	Cord—Line
	F-6738	Knob—Plastic—Volume Control
	F-6740	Knob—Plastic—Tone Control
	F-6742	Knob—Plastic—Radio-Phono
	F-6744	Knob—Station Tuning
	F-7683	Leaflet—Instruction
	F-7623	Motor—Phono—60 Cycle (Less Turntable)
	F-7707	Needle—Phono
	F-7673	Panel Assembly—Cabinet Front
R14	F-4022	Resistor—33 Ohm—½ W.—20%
R10	F-4067	Resistor—180 Ohm—½ W.—10%
R1	F-4025	Resistor—22,000 Ohm—½ W.—20%
R4	F-4063	Resistor—47,000 Ohm—½ W.—20%
R9	F-4064	Resistor—33,000 Ohm—½ W.—20%
R2, R8	F-4026	Resistor—220,000 Ohm—½ W.—20%
R11	F-4027	Resistor—470,000 Ohm—½ W.—20%
R3, R6	F-1262	Resistor—1 Megohm—½ W.—20%
R7	F-4028	Resistor—6.8 Megohm—½ W.—20%
R13	F-5358	Resistor—1,000 Ohm—1 W.—10%
	F-4978	Shield—I.F. Transformer
	F-7515	Socket—Tube—8 Prong—Octal
	F-6148	Speaker—5" P.M. Dynamic
	F-6156	Switch—Radio-Phono
T1	F-7676	Transformer—I.F. #1
T2	F-7677	Transformer—I.F. #2
T3	F-4875	Transformer—Output

NOTE: In some receivers the following components—R8, R11, C15 and C16 are replaced by the assembly listed below:

F-6477 Audio Coupling Plate



DIAL DRIVE STRINGING DIAGRAM

RADIO SPECIFICATIONS

Power Supply:
All models available . . . . . 117 Volts AC 60 Cycles

Frequency Range:
Broadcast . . . . . 535-1620 KC

Power Output:
Undistorted . . . . . 1.0 Watt
Maximum . . . . . 1.8 Watts

DISASSEMBLY INSTRUCTIONS

The following steps must be taken in removing the chassis from the cabinet:

1. Remove wood enclosure panel in record changer compartment.
2. Remove two speednuts located in rear of front panel. These speednuts retain the pins used to fasten the top of Dial Crystal to front panel.
3. Remove two pins and lift out crystal.
4. Remove dial pointer, knobs, motor & pickup plugs and antenna connections.
5. Remove five screws used to mount chassis board to underside of cabinet.
6. Remove chassis and mounting board.

MODELS 41, 41A, 9082, Ch. 135.245

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MODELS 41, 41A,
9082, Ch. 135.245

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER) SHOWN	TRIMMER FUNCTION
Closed	455 KC	.1 mfd.	12SA7GT Transl.Grid	T2, C9, & C8	I.F.
Open	1620 KC	.0002 mfd.	Loop	C4	Oscillator
1400 KC	1400 KC	.0002 mfd.	Loop	C2	Transl.

IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

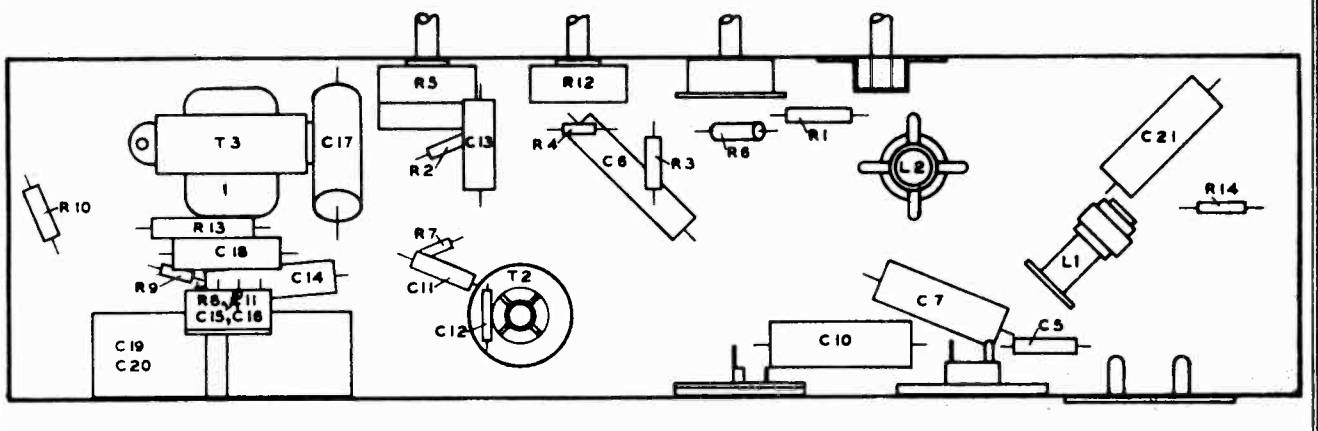
The entire Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

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.

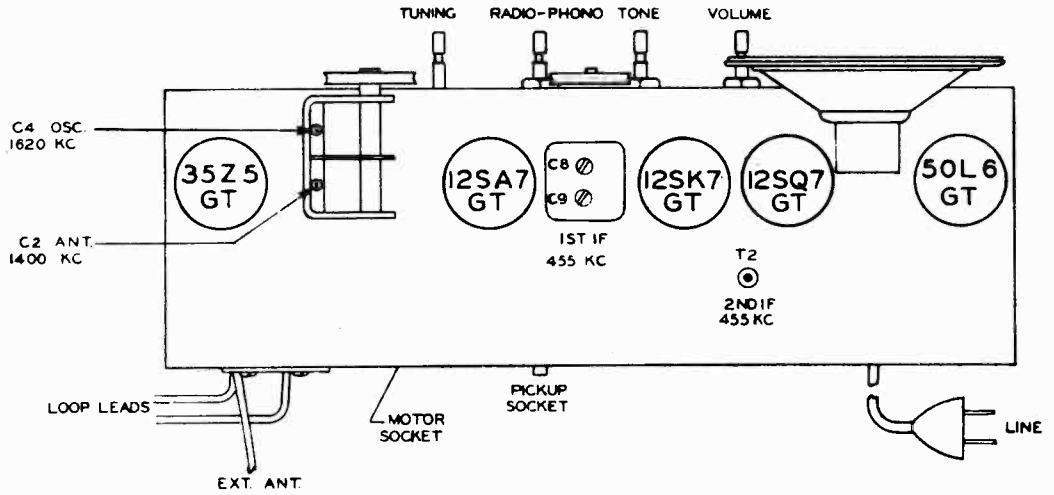
ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter Connection. . . . . Across loud speaker voice coil
Generator ground lead connection. . . . . Floating Ground
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



LOCATION OF PARTS UNDER CHASSIS



LOCATION OF PARTS ON TOP OF CHASSIS

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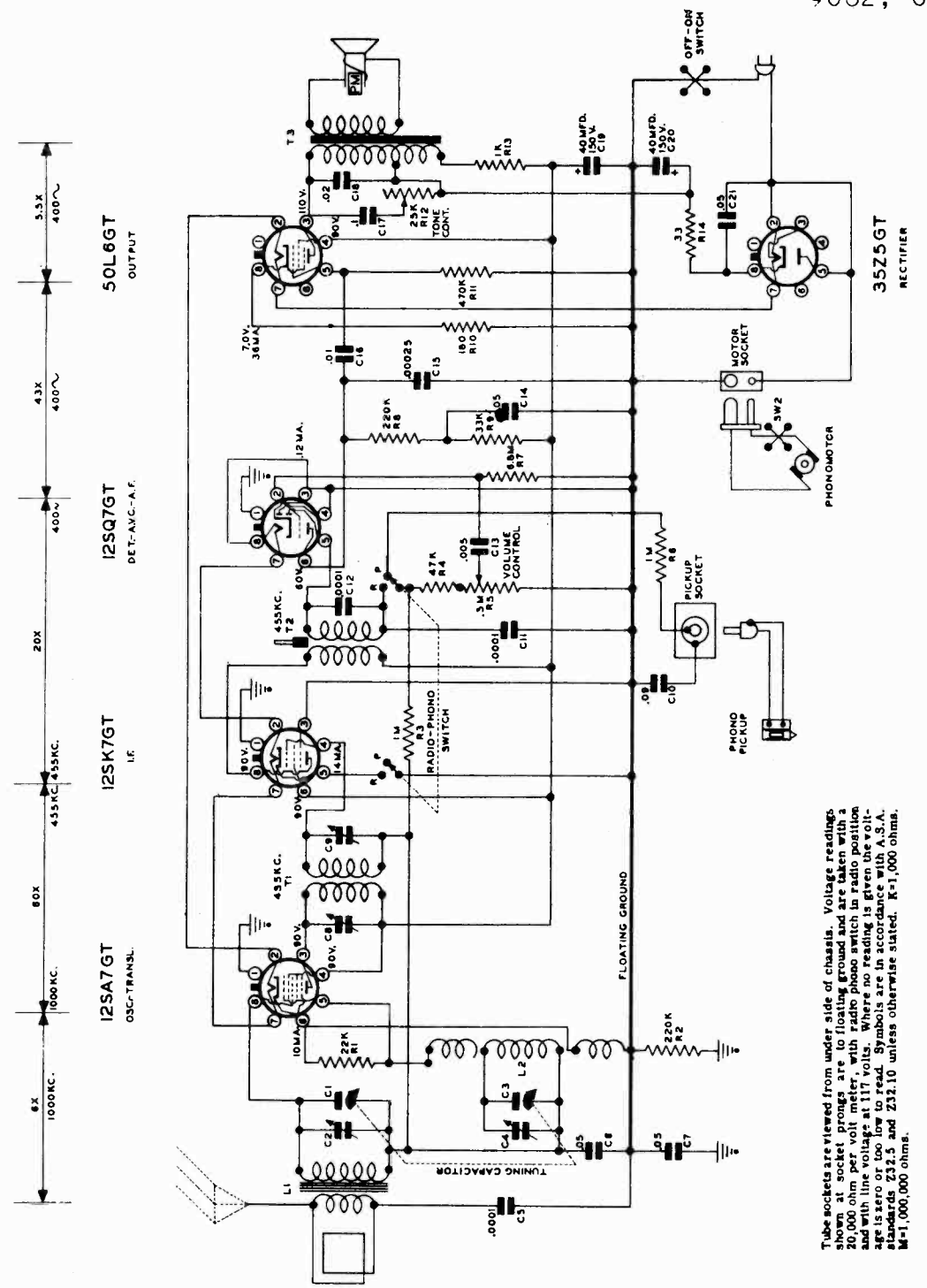
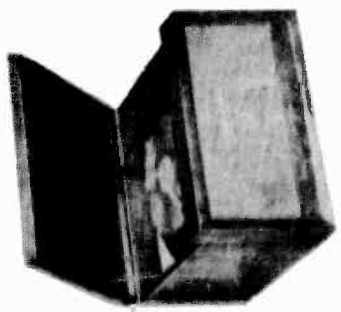
MODELS 41, 41A,
9082, Ch. 135.245



Tube sockets are viewed from under side of chassis. Voltage readings shown at socket prongs are to floating ground and are taken with a 20,000 ohm per volt meter, with radio phono switch in radio position and with line voltage at 117 volts. Where no reading is given the voltage is zero or too low to read. Symbols are in accordance with A.S.A. standards Z32.5 and Z32.10 unless otherwise stated. K=1,000 ohms. M=1,000,000 ohms.



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MODEL 9083,
Ch. 100.154

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter reading to indicate 0.05 Watt across voice coil. . . . . 0.4 Volt

Generator ground lead connection. . . . . Receiver chassis

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

Position of volume control. . . . . Fully on

Position of tone control. . . . . Radio-Speech

Position of pointer with tuner fully closed . . . . . Horizontal position at low end of dial, parallel to bottom edge of dial scale. Repositioning of pointer may be accomplished by holding tuning control shaft steady and turning pointer to correct position.

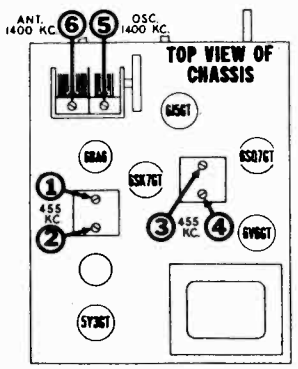
POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	SENSITIVITY (FOR .05 WATT OUTPUT)
Closed	455 Kc.	0.1 mfd.	Trimmer #6	1, 2, 3 & 4	I.F.	46 mv
1400 Kc.	1400 Kc.	200 mmfd.	Ext. Ant. Clip	5	Osc.	
1400 Kc.	1400 Kc.	200 mmfd.	Ext. Ant. Clip	6	Ant.	100 mv/m

IMPORTANT ALIGNMENT NOTES:

The alignment must be done in the order given.

The entire alignment procedure should be repeated step by step in the original order for greatest 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.



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the speaker.

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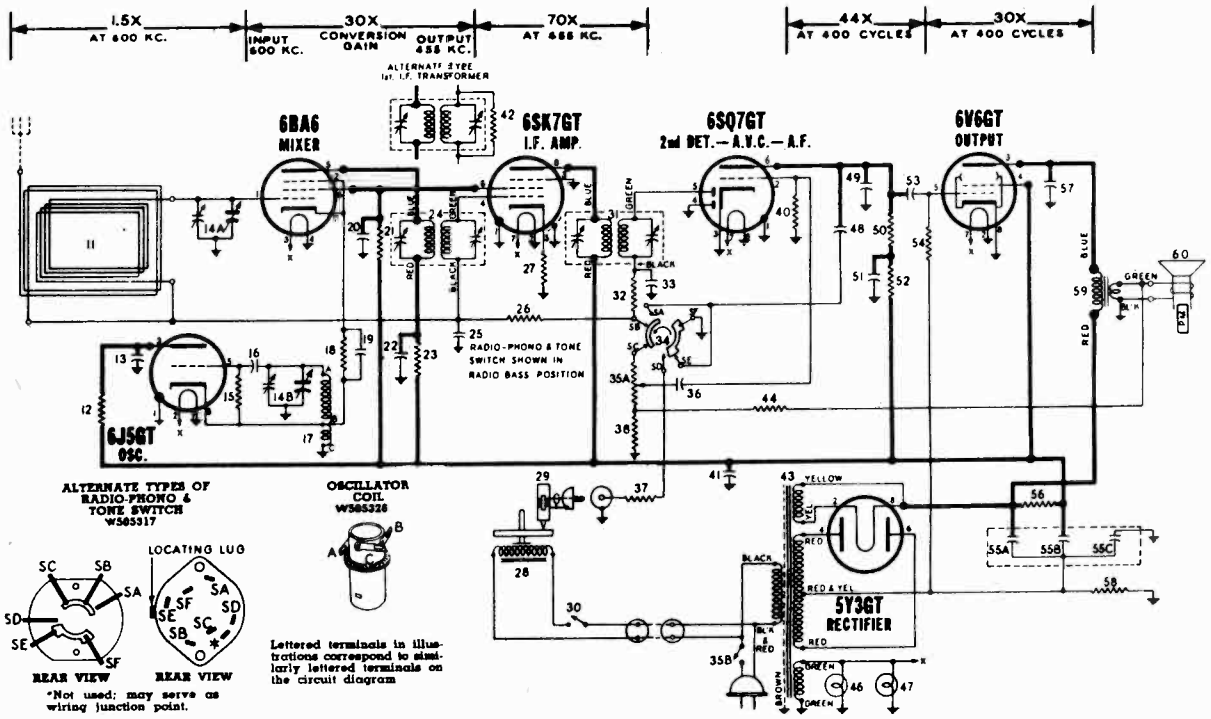
MODEL 9083,
Ch. 100.154

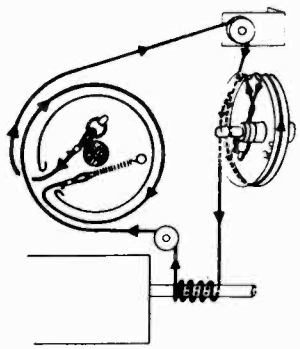
SCHEMATIC DIAGRAM



DIAL POINTER DRIVE CORD ARRANGEMENT (Side View)

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

W 114955 Clip on end of cord
W 117057 Cord (3 feet)
W 119087 Ring for dial cord
W 505161 Tension spring

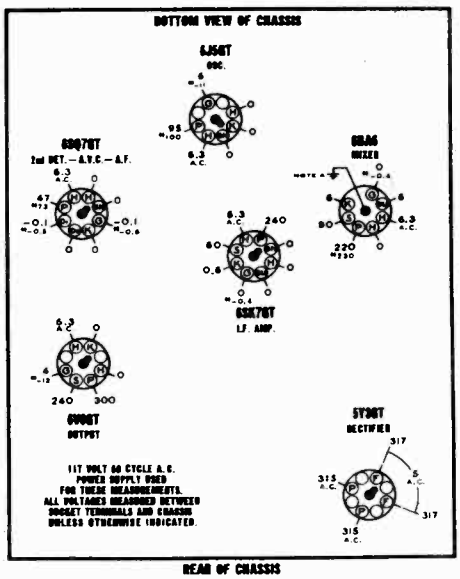


To replace and properly position pointer see step 1 in "Alignment Procedure"

SOCKET VOLTAGES

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

DIAL TUNED TO 540 KC.
VOLUME ON FULL WITH NO SIGNAL
RADIO-PHONO & TONE SWITCH IN
"RADIO-BASE" POSITION



NOTE A: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

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SPECIFICATIONS

Power Supply
All models available . . . .117 volts AC, 60 cycle Radio 60 watts
Phono 30 watts

Frequency Range
Broadcast . . . 540-1600 Kc.

Power Output
Undistorted . . 3.0 watts
Maximum . . . . 5.0 watts

REPAIR PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
		CONDENSERS
13.....	W502151	Condenser—.01 Mfd. 400 volt.....
14-A,B...	W505315	Condenser—variable gang (with drum)..
16.....	W502931	Condenser—ceramic 100 Mmfd. 500 volt.
19.....	W502153	Condenser—.05 Mfd. 200 volt.....
20.....	W502157	Condenser—.05 Mfd. 400 volt.....
22.....	W502152	Condenser—.02 Mfd. 400 volt.....
25.....	W502153	Condenser—.05 Mfd. 200 volt.....
33.....	W502931	Condenser—ceramic 100 Mmfd. 500 volt.
36.....	W502156	Condenser—.004 Mfd. 400 volt.....
41.....	W502157	Condenser—.05 Mfd. 400 volt.....
48.....	W512006	Condenser—.005 Mfd. 600 volt.....
49.....	W502271	Condenser—mica 260 Mmfd. 500 volt....
51.....	W502410	Condenser—.1 Mfd. 400 volt.....
53.....	W502152	Condenser—.02 Mfd. 400 volt.....
55-A,B,C.	W502207	Condenser—electrolytic A—20 Mfd. 400 volt B—10 Mfd. 400 volt ..... C—20 Mfd. 25 volt.
57.....	W502156	Condenser—.004 Mfd. 400 volt.....
		RESISTORS
12.....	W502466	Resistor—carbon 33,000 Ohms ± 10% 1w.
15.....	W502131	Resistor—carbon 47,000 Ohms 1/4 watt.
18.....	W502128	Resistor—carbon 2200 Ohms 1/4 watt...
21.....	W502288	Resistor—carbon 47,000 Ohms 1 watt ..
23.....	W502459	Resistor—carbon 6800 Ohms 1/4 watt...
26.....	W502269	Resistor—carbon 3.3 Meg. 1/4 watt....
27.....	W502264	Resistor—carbon 47 Ohms ± 10% 1/4 w..
32.....	W502131	Resistor—carbon 47,000 Ohms 1/4 watt.
35-A,B...	W505318	Volume control 1 Meg. (with switch)...
37.....	W510185	Resistor—carbon 470,000 Ohms 1/2 watt
38.....	W510122	Resistor—carbon 150 Ohms 1/2 watt....
40.....	W502468	Resistor—carbon 4.7 Meg. 1/4 watt....
42.....	W510191	Resistor—carbon 1 Meg. 1/2 watt.....
44.....	W510146	Resistor—carbon 150 Ohms 1/2 watt....
50.....	W502133	Resistor—carbon 220,000 Ohms 1/4 watt
52.....	W502133	Resistor—carbon 220,000 Ohms 1/4 watt
54.....	W502134	Resistor—carbon 470,000 Ohms 1/4 watt
56.....	W504771	Resistor—carbon 3300 Ohms 2 watt.....
58.....	W502293	Resistor—wire wound 200 Ohms ± 10% 2 w

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
		COILS AND TRANSFORMERS
11.....	W508361	Loop antenna.....
17.....	W505326	Coil—oscillator.....
24.....	W502657	Transformer—1st I.F.....
31.....	W502658	Transformer—2nd I.F.....
43.....	W502174	Transformer—power.....
59.....	W505305	Transformer—output.....
		OTHER ELECTRICAL PARTS
28.....	W508120	Motor—for record changer; 115 volt 60 cycle.....
29.....	W508432	Crystal Cartridge.....
30.....	W505269	Switch—"ON-OFF" for record changer...
34.....	W505317	Switch—radio-phono.....
46, 47...	W110629	Lamp—dial (Mazda #44) 6.3 volt 0.25 Amp.....
60.....	W506657	Speaker—P.M. Dynamic (6 inch).....
		MISCELLANEOUS PARTS
	W116467	Base for mtg. electrolytic condenser..
	W505165	"C" Washer—for tuning shaft.....
	KX508371	Cabinet.....
	W112745	Clip—coil mounting.....
	W114955	Clip—retainer on end of dial cord....
	W160326	Clip—retains dial scale.....
	W117057	Cord—dial drive (3 ft. required) .....per foot
	W508363	Dial scale (foil).....
	W508350	Escutcheon and dial window assy.....
	W505464	Hinge for lid.....per pair
	W505344	Knob—tuning (clear plastic).....
	W505345	Knob—"Volume" (clear plastic).....
	W505346	Knob—"Radio-Phono" (clear plastic)...
	W508372	Lid (less hardware).....
	W505463	Lid support.....
	W508433	Needle—phonograph; for standard records.....
	W508434	Needle—phonograph; for "Fine Groove" and "Microgroove" records.....
	W500966	Plug for phono. pick-up cable.....
	W501031	Plug for phono. motor cable.....
	W505686	Pointer.....
	W508266	Record changer.....
	W119087	Ring for dial cord.....
	W505944	Rubber pad for mtg. chassis.....
	W79993	Screw—#8 x 1 1/4"; for mtg. chassis..
	W162054	Shaft and drum for pointer.....
	W505313	Shaft—tuning.....
	W117716	Shield—tube.....
	W505459	Socket—dial lamp.....
	W504397	Socket—miniature.....
	W116690	Socket—octal base.....
	W160392	Socket—octal (rectifier).....
	W160039	Socket—phono. plug.....
	W505307	Socket and phono. motor cable.....
	W505161	Spring—tension.....
	W111456	Washer—spring washer for tuning shaft

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MODEL 9280,
Ch. 528.168

SPECIFICATIONS

Power Supply: .....

Power Output:
Undistorted .....0.15 Watt
Maximum .....0.30 Watt

117 Volts, DC or 50-60 Cycles AC, 11 Watts or Catalog No. 6404 Battery Pack.

Frequency Range:
Broadcast .....540-1610 KC

Schematic Location	Part Number	DESCRIPTION
		CHASSIS PARTS
	T84-391	Cable, assembly, battery
	T83-421	Clip, I.F. transformer mounting
C1, C2, C3	T18-296	Capacitor, electrolytic
C4, C5, C6	T19-207	Capacitor, variable (3 gang)
C7	T20-149	Capacitor, trimmer
C8, C10		
C11	T16-153	Capacitor, .005 mfd. 600 v.
C9	T15-188	Capacitor, 100 mmfd. mica
C12, C17	T16-152	Capacitor, .05 mfd. 200 v.
C13	T15-186	Capacitor, 10 mmfd. mica
C14	T16-150	Capacitor, .02 mfd. 400 v.
C15, C16	T16-157	Capacitor, .1 mfd. 200 v.
C18, C19	T16-179	Capacitor, .05 mfd. 400 v.
C20, C21, C22	T17-100	Couplate, ceramic unit
L3	T10-553	Coil, ascillator
R11, S1	T24-185	Control, volume
	T84-77	Cord, power, AC/DC
	T51-105	Cord, pointer travel, 28"
	T21-152	Cover, plate, bottom
	T47-108	Grommet, variable condenser
	T76-13	Insulator, electrolytic
	T52-196	Knob, AC/DC/battery switch
L1	T82-65	Loop, antenna
	T45-121	Plug, AC/DC
	T58-77	Pointer
	T39-265	Pulley, dial cord
	T83-642	Rectifier, selenium
S2	T69-173	Switch, AC/DC/battery
T1, T2	T10-475	Transformer, 1st and 2nd I.F.
T3	T80-228	Transformer, output
L2	T10-535	Transformer, RF
	T86-51	Washer, "C", tuning shaft
	T86-80	Washer, compression, tuning shaft
		CABINET PARTS
	T44-10	Baffle
	T22-159	Button, plug (trimmer hole)
	T42-463	Cabinet
	T67-549	Dial scale
	T40-152	Escutcheon
	T52-203	Grille cloth
	T31-157	Knob
	T76-17	Plate, loop cover
	T97-70	Terminal strip, loop
	T97-132	Screw, #6-3/8, statuary bronze
	T98-12	Screw, #6-1/4, statuary bronze

Schematic Location	Part Number	DESCRIPTION
R1	T60-744	Resistor, 22,000 ohms, ½ w. 10%
R2	T60-669	Resistor, 4.7 meg. ½ w.
R3, R5	T60-728	Resistor, 10 meg. ½ w.
R4	T60-730	Resistor, 47,000 ohms, ½ w.
R6	T60-704	Resistor, 330 ohms, ½ w. 10%
R7	T60-727	Resistor, 100,000 ohms, ½ w.
R8	T60-676	Resistor, 30,000 ohms, ½ w.
R9	T60-770	Resistor, 470 ohms, ½ w. 10%
R10	T60-726	Resistor, 2.2 meg. ½ w.
R12, R15	T60-729	Resistor, 1500 ohms, ½ w. 10%
R13	T60-708	Resistor, 680 ohms, ½ w. 10%
R14	T60-796	Resistor, 110 ohms, 3 w. 10%
R16	T60-757	Resistor, 2000 ohms, 10 w. 5%
R17, R18, R19	T17-100	Couplate, ceramic unit
	T75-79	Shaft, tuning
	T68-39	Socket miniature, wafer
	T79-378	Speaker, 5" P.M.
	T70-122	Spring, dial cord

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 watt across voice coil ..... 0.4 v.

Generator ground lead connected.....To B- through 0.1 mfd. capacitor

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

Position of volume control.....Fully on

Position of pointer with tuner fully closed.....Center of pointer lined up with extreme left dot on dial backing plate. (Chassis right side up.)

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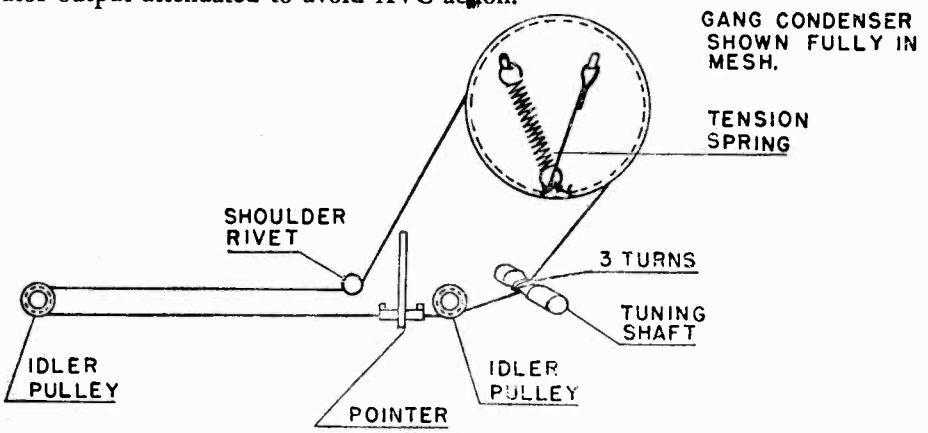
MODEL 9280,
Ch. 528.168

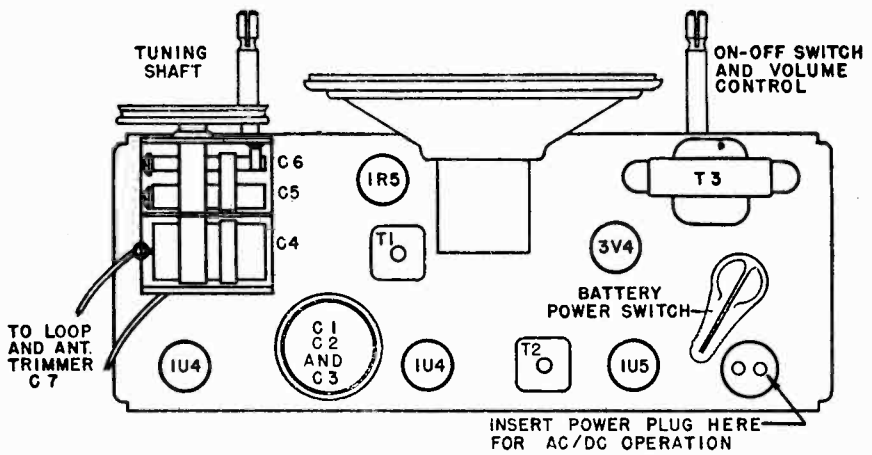
Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments (in order shown)	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1610 kc	0.1 mfd.	Stator ant. tuner	C6	Osc.	
1400 kc	1400 kc	0.1 mfd.	Stator ant. tuner	C5	R.F.	30
1400 kc	1400 kc		Hazeltine Test Loop	C7	Loop	100

ALIGNMENT NOTES:

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



STRING AND POINTER HOOKUP



LOCATION OF PARTS ON TOP OF CHASSIS

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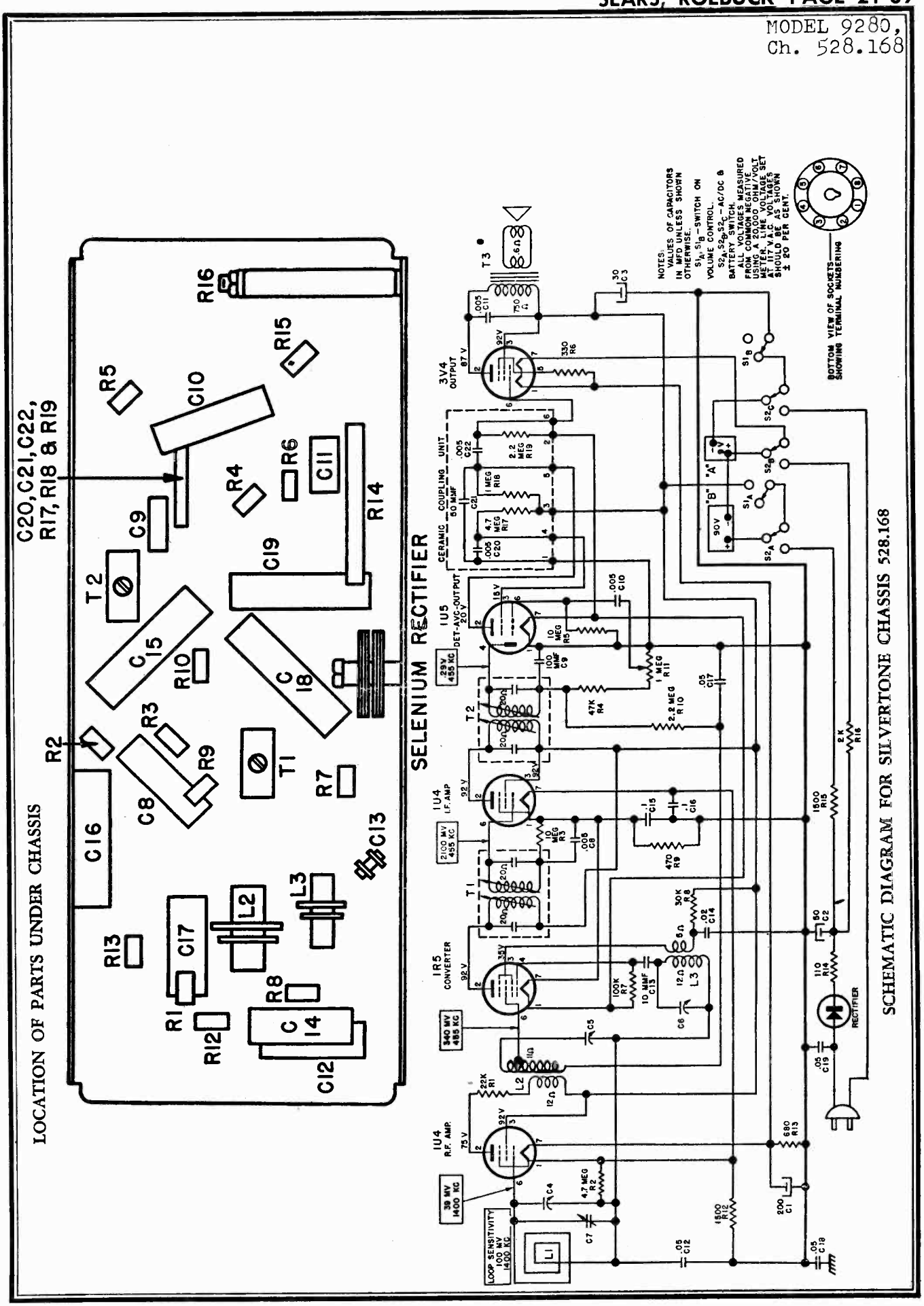
MODEL 9280,
Ch. 528.168



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MODEL 215,
Ch. 528.174

SPECIFICATIONS

Power Supply: .....

Power Output:
Undistorted .....0.15 Watt
Maximum .....0.30 Watt

117 Volts, DC or 50-60 Cycles AC, 11 Watts or Catalog No. 6480 "B" Battery and two Flashlight Cells

Frequency Range:
Broadcast .....540-1625 KC

Schematic Location	Part Number	DESCRIPTION
		CHASSIS PARTS
C1, C2	T19-209	Capacitor, variable (2 gang)
C3, C4, C5	T18-297	Capacitor, electrolytic
C6	T15-205	Capacitor, 50 mmfd. ceramic
C7, C14	T16-153	Capacitor, .005 mfd. 600 v.
C8, C16, C17	T16-150	Capacitor, .02 mfd. 400 v.
C9, C10, C11, C12, C13	T17-103	Capacitor, ceramic unit
C15	T16-152	Capacitor, .05 mfd. 200 v.
C18	T16-179	Capacitor, .05 mfd. 400 v.
	T11-187	Clamp, power cord
	T83-421	Clip, I.F. transformer mounting
L2	T10-554	Coil, oscillator

Schematic Location	Part Number	DESCRIPTION
	T76-69	Connector, "B" battery
R4, S1	T24-187	Control, volume and switch
	T23-162	Cord, power, AC/DC
	T21-159	Cover, bottom
	T47-108	Grommet, variable condenser
	T37-126	Insulator, volume control
	T37-127	Insulator, selenium rectifier
L1	T82-68	Loop, antenna
	T83-642	Rectifier, selenium
R1	A60-727	Resistor, 100,000 ohm, ½ w.
R2, R5	A60-728	Resistor, 10 megohm, ½ w.
R3	A60-730	Resistor, 47,000 ohm, ½ w.
R6	A60-669	Resistor, 4.7 megohm, ½ w.
R7, R8	A60-726	Resistor, 2.2 megohm, ½ w.
R9	A60-690	Resistor, 27 ohm, ½ w. 10%
R10	A60-753	Resistor, 220 ohm, ½ w. 10%

Schematic Location	Part Number	DESCRIPTION
R11, R12	T60-668	Resistor, 1 megohm, ½ w.
R13	T60-708	Resistor, 680 ohm, ½ w. 10%
R14	T60-709	Resistor, 820 ohm, ½ w. 10%
R15	T60-770	Resistor, 470 ohm, ½ w. 10%
R16	T60-729	Resistor, 1500 ohm, ½ w. 10%
R17	T60-725	Resistor, 160 ohm, 3 w. 5%
R18	T60-757	Resistor, 2000 ohm, 10 w. 5%
R19	T60-711	Resistor, 2700 ohm, ½ w. 10%
R20	T60-771	Resistor, 270 ohm, ½ w. 10%
	T71-43	Shield, volume control
	T68-39	Socket, miniature wafer
	T77-151	Spacer, variable condenser
	T79-382	Speaker, 3½" P.M.
	T70-165	Spring

Schematic Location	Part Number	DESCRIPTION
T1, T2	T10-508	Transformer, 1st and 2nd I.F.
T3	T80-256	Transformer, output
		CABINET PARTS
	T42-468	Cabinet—front
		—back cover
	T22-155	Clip, back cover
	T35-8	Clip, "A" battery retainer
	T83-431	Handle
	T70-164	Hinge, spring clip
	T52-307	Knob
	T67-544	Overlay, dial scale
	T67-555	Overlay, volume

ALIGNMENT PROCEDURE

Output meter reading to indicate 0.05 watt across voice coil ..... 0.4 v.

Generator ground lead connected.....To B- through 0.1 mfd. capacitor

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

Position of volume control.....Fully on

Position of pointer with tuner fully closed.....Pointer should be horizontal, pointing to left (9 o'clock).

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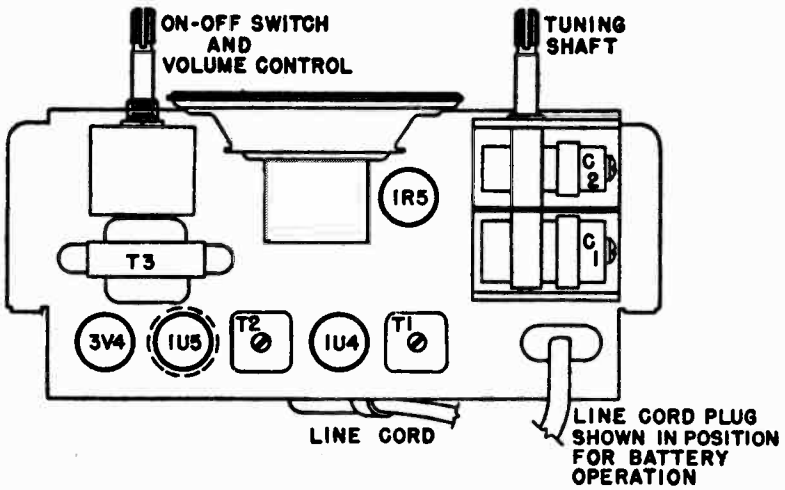
MODEL 215,
Ch. 528.174

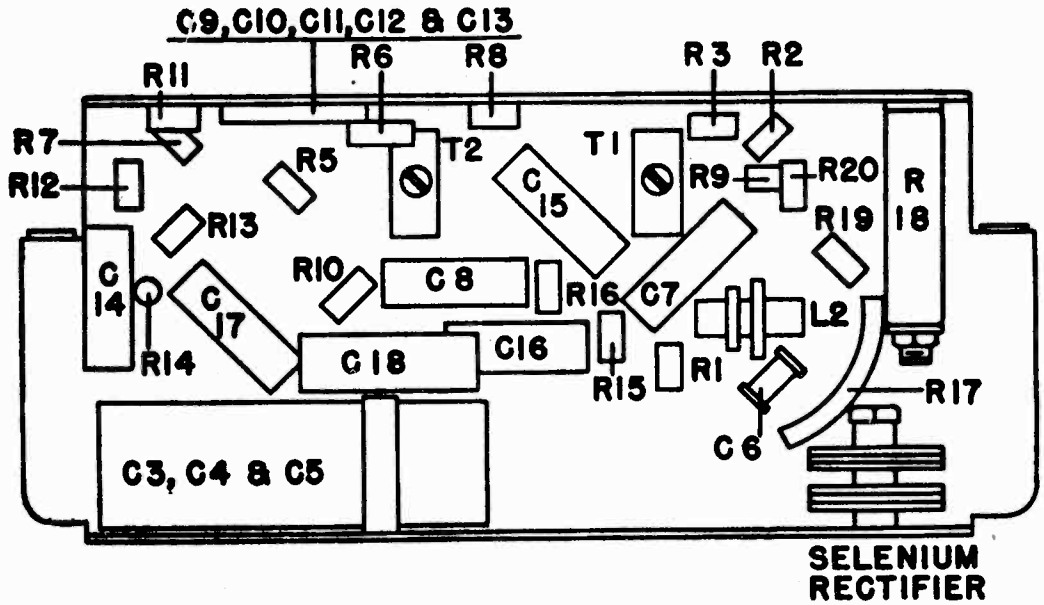
Position of Tuner	Generator Freq.	Dummy Antenna	Generator Connection	Adjustments (in order shown)	Function	Max. Microvolts Input to produce .05 w. output
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1U4 I-F Amp.	T2 (top and bottom)	I.F.	5000
Min. Cap.	455 kc	0.1 mfd.	Pin #6 of 1R5 Conv.	T1 (top and bottom)	I.F.	250
Min. Cap.	1625 kc	0.1 mfd.	Stator ant. tuner	C2	Osc.	
1400 kc	1400 kc		Hazeltine Test Loop	C1	Loop	100

ALIGNMENT NOTES:

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



LOCATION OF PARTS ON TOP OF CHASSIS



LOCATION OF PARTS UNDER CHASSIS

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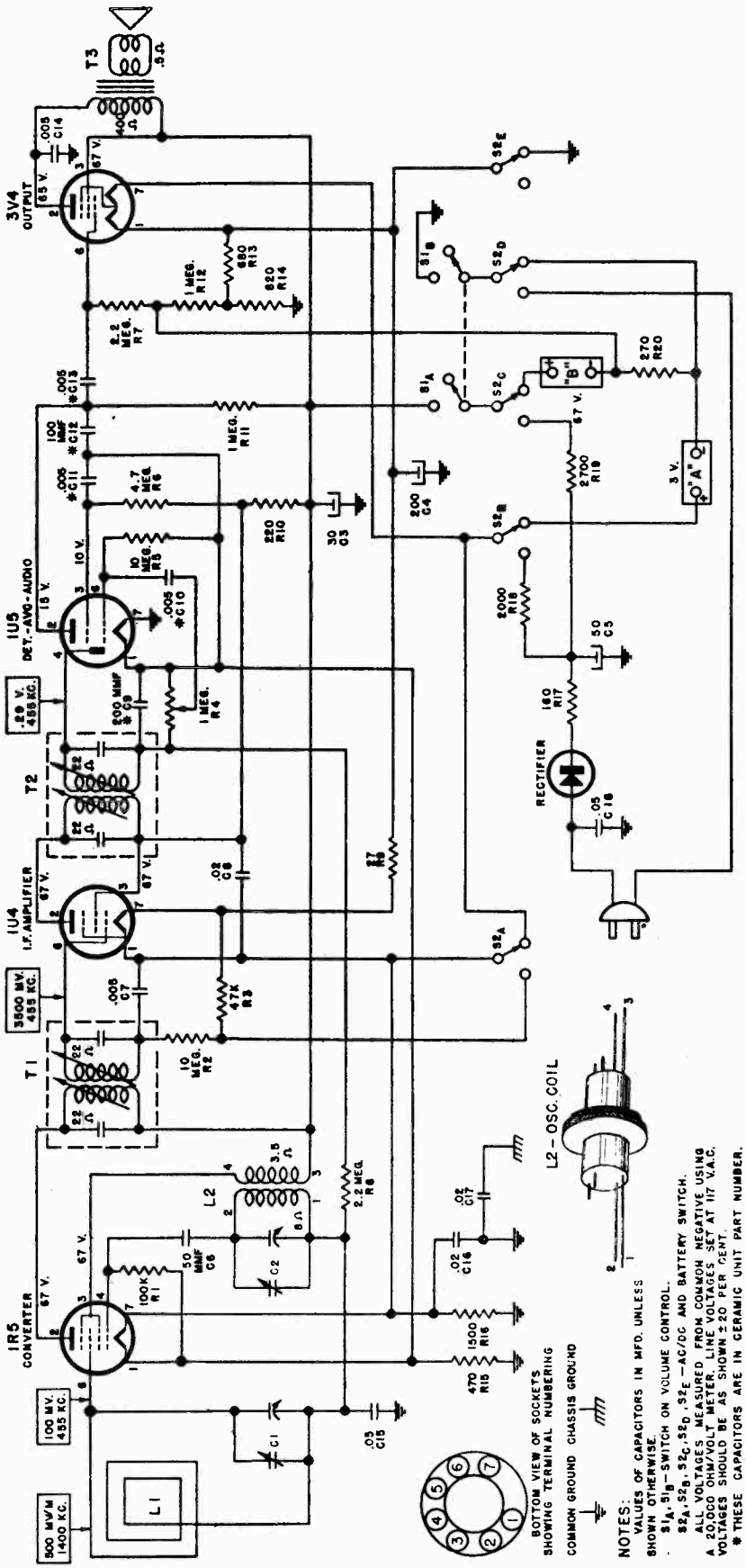
MODEL 215,
Ch. 528.174



SCHEMATIC DIAGRAM FOR SILVERTONE CHASSIS 528.174

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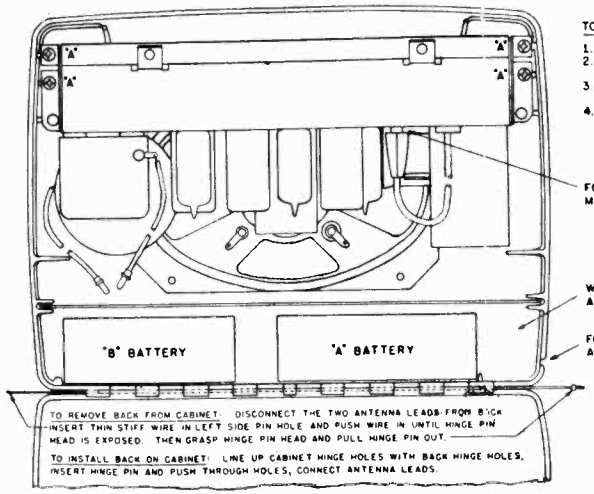


TO REMOVE CHASSIS FROM CABINET

1. DISCONNECT ANTENNA LEADS FROM CABINET BACK.
2. DISCONNECT BATTERY LEADS AND REMOVE BATTERIES AND CARDBOARD SEPARATOR.
3. LAY CABINET FACE DOWN AND REMOVE THE FOUR SCREWS MARKED "A".
4. TILT REAR OF CHASSIS UPWARD AND PULL BACK SLIGHTLY UNTIL CHASSIS CLEARS LOCATING PINS ON CABINET. THEN LOWER ENTIRE CHASSIS UNTIL KNOBS CLEAR TOP OF CABINET AND REMOVE.

FOR BATTERY OPERATION THE AC-DC LINE CORD PLUG MUST BE FIRMLY INSERTED IN THIS RECEPTACLE.

WIND EXCESS LINE CORD AND PLACE IN THIS SPACE ADJACENT TO BATTERY.

FOR AC-DC OPERATION PLACE LINE CORD IN NOTCH AND CLOSE BACK.

POWER SUPPLY

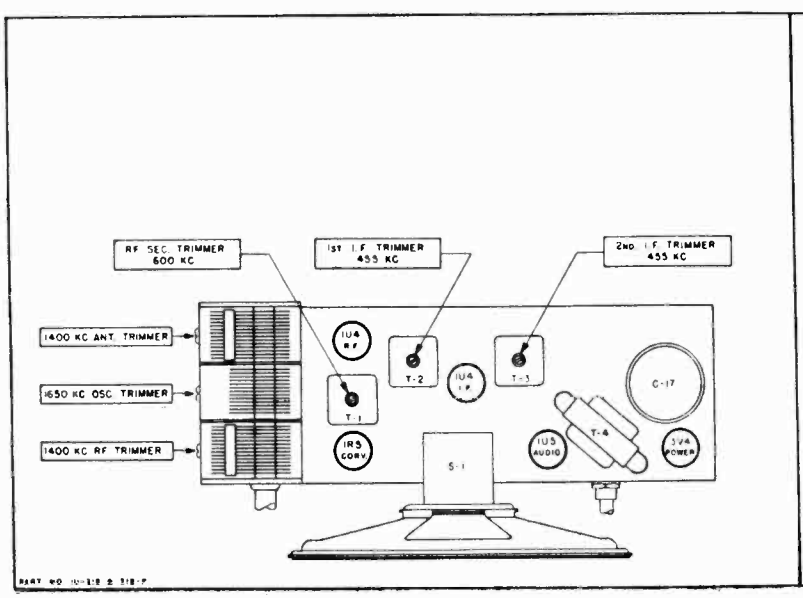
THIS RADIO CAN BE OPERATED ON EITHER:

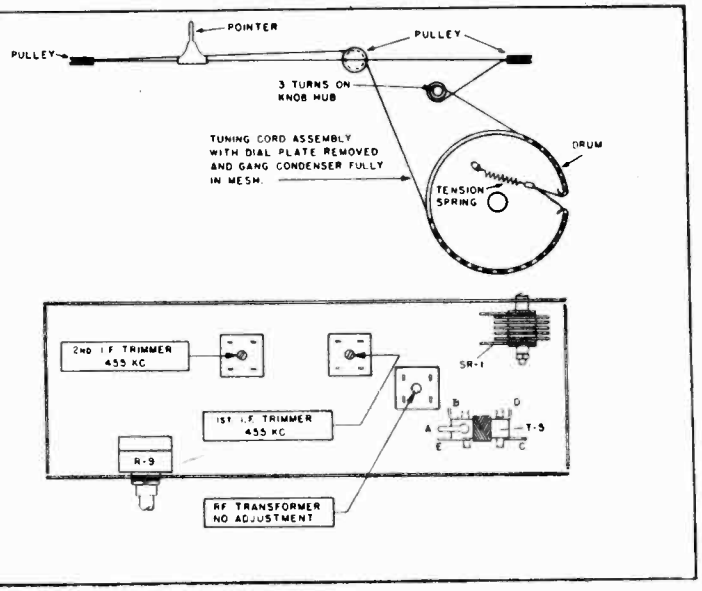
110 to 120 VOLTS DIRECT CURRENT
OR
110 to 120 VOLTS, 50 to 60 CYCLE, ALTERNATING CURRENT
OR
BATTERIES—WITH ONE 4½ VOLT "A" and ONE 90 VOLT "B"

GROUND

When an external aerial is attached to the radio be sure that a good ground is connected to the outer clip marked "GND" located inside of the cabinet back.

WARNING:—Do not attach a ground direct to the radio chassis—any external ground connection to any metal part of the chassis will cause a short and possible damage.





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ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure, read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third.

IF RADIO HAS METAL PLATE ON BOTTOM OF CHASSIS BE SURE TO HAVE PLATE MOUNTED ON CHASSIS WHEN ALIGNING SET IN STEPS 2, 3 AND 4.

Before starting alignment:

(A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the first mark at the low frequency end of the dial scale. If dial indicator does not point exactly to this mark, move pointer to correct position.

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

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

(D) THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. Open cabinet back just enough to insert a screw driver to adjust the antenna trimmer. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1R5 tube. Low side to chassis (common negative in Model 1U312) through a .02 Mfd. blocking condenser.	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.
4	Approximately 600 K. C.	Approx. 600 K. C.	See paragraph (D) above	See paragraph (D) above	While rocking gang adjust 600 K. C. R.F. trimmer for maximum output.

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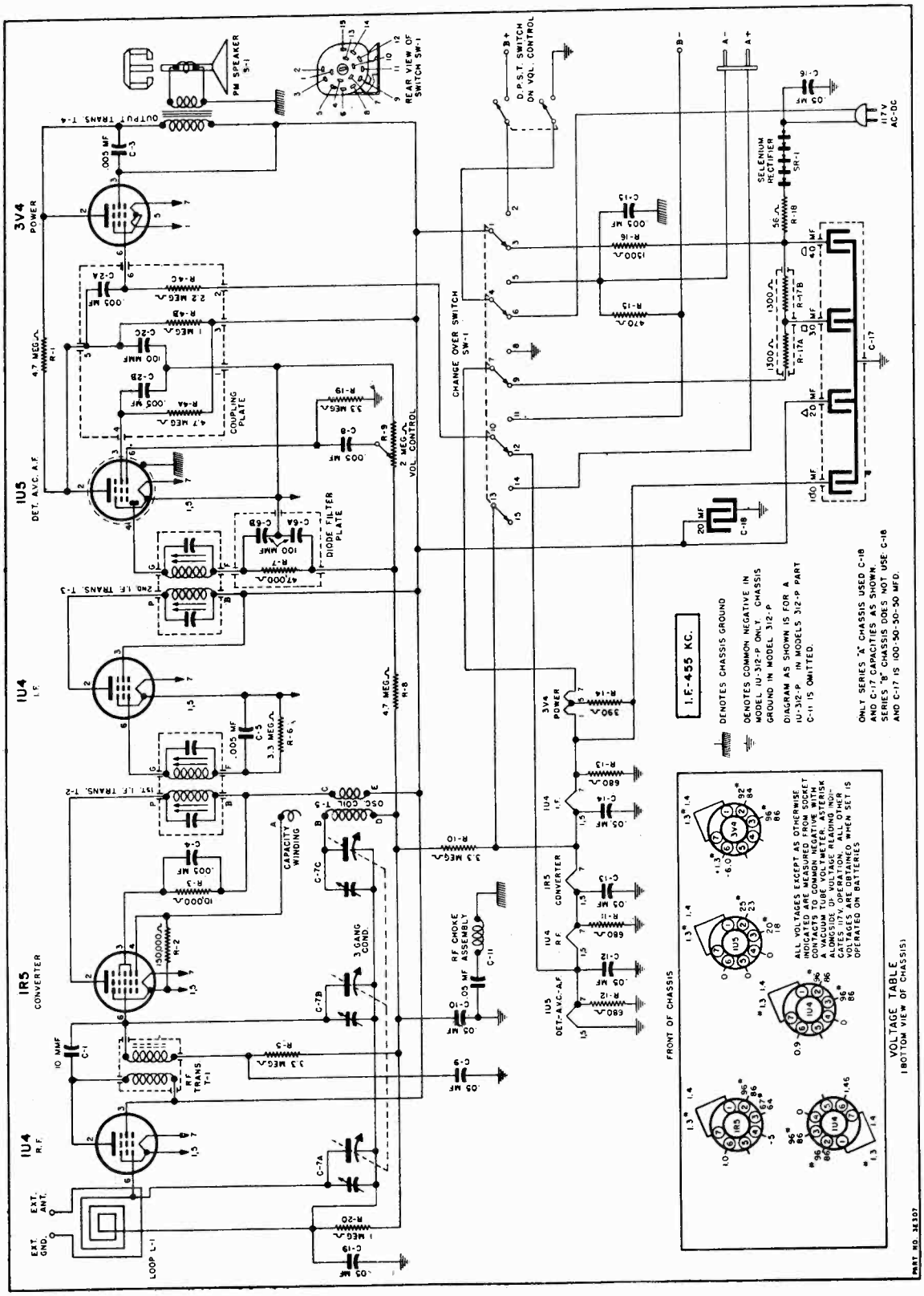
MODELS 1U-312-PG, 1U-312-PW, 312-PG, 312-PW



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PARTS LIST

Illus. No.	Part No.	Part Name and Description
C-1	23E2027-5	Capacitor, Fixed Ceramic, 10 MMF 350 V.
C-2A, C-2B, C-2C		Part of 23E2023-2 Ceramic Coupling Plate (See Misc. Parts)
C-3	23E2025	Capacitor, Fixed Ceramic, .005 MFD 350 V. (Disc)
C-4	23E2025	Capacitor, Fixed Ceramic, .005 MFD 350 V. (Disc)
C-5	23E2025	Capacitor, Fixed Ceramic, .005 MFD 350 V. (Disc)
C-6A, C-6B, C-7A		Part of 23E2022-2 Diode Filter Plate (See Misc. Parts)
C-7B, C-7C	24E54	Capacitor, 3 Gang, Tuning
C-8	23E2025	Capacitor, Fixed Ceramic, .005 MFD 350 V (Disc)
C-9	23E416	Capacitor, Tubular .05 MFD 400 V.
C-10	23E416	Capacitor, Tubular .05 MFD 400 V.
C-11	20E611	Capacitor, R. F. Choke & Capacitor Assembly (in Model 1U312P only)
C-12	23E416	Capacitor, Tubular, .05 MFD 400 V.
C-13	23E416	Capacitor, Tubular, .05 MFD 400 V.
C-14	23E416	Capacitor, Tubular, .05 MFD 400 V.
C-15	23E2025	Capacitor, Fixed Ceramic, .005 MFD 350 V. (Disc)
C-16	23E416	Capacitor, Tubular, .05 MFD 400 V.
C-17	25E48	Capacitor, Dry Electrolytic, 40-30-20 MFD 150 V., 100 MFD 25 V. (Used in "Series A" only)
C-17	25E53	Capacitor, Dry Electroyltic 50-50-50 MFD 150 V., 100 MFD 25 V. (Used, starting with "Series B")
C-17	25E56	Capacitor, Dry Electrolytic, 50-50-50 MFD 150 V., 100 MFD 25 V. (in Model 1U312P only)
C-18	25E55	Capacitor, Dry Electrolytic, 20 MFD 150 V. (used in Series "A" only)
C-19	23E416	Capacitor, Tubular .05 MFD 400 V.
R-1	27E475	Resistor, Carbon, 4.7 Megohm 1/3 W.
R-2	27E154	Resistor, Carbon, 150,000 Ohm 1/3 W.
R-3	27E103	Resistor, Carbon, 10,000 Ohm 1/3 W.
R-4A, R-4B, R-4C		Part of 23E2023-2 Ceramic Coupling Plate (See Misc. Parts)
R-5	27E335	Resistor, Carbon, 3.3 Megohm 1/3 W.
R-6	27E335	Resistor, Carbon, 3.3 Megohm 1/3 W.
R-7		Part of 23E2022-2 Diode Filter Plate (See Misc. Parts)
R-8	27E475	Resistor, Carbon, 4.7 Megohm 1/3 W.
R-9	28E63	Resistor, Volume Control, 2 Megohm
R-10	27E335	Resistor, Carbon, 3.3 Megohm 1/3 W.
R-11	27E681	Resistor, Carbon, 680 Ohm 1/3 W.
R-12	27E681	Resistor, Carbon, 680 Ohm 1/3 W.
R-13	27E681	Resistor, Carbon, 680 Ohm 1/3 W.
R-14	27E391	Resistor, Carbon, 390 Ohm 1/3 W.
R-15	27E471	Resistor, Carbon, 470 Ohm 1/3 W.
R-16	27E152-3	Resistor, Carbon, 1500 Ohm 1 W.
R-17A, R-17B	27E1000-6	Resistor, Wirewound, Dual, 1300 Ohm 6.5 W.
R-18	27E560-3	Resistor, Carbon, 56 Ohm 1 W.
R-19	27E335	Resistor, Carbon, 3.3 Megohm 1/3 W.
R-20	27E105	Resistor, Carbon, 1 Megohm 1/3 W.
L-1	64E31	Antenna, Loop
T-1	20E565	Coil, R. F. Transformer
T-2	20E463	Coil, 1st I. F. Transformer
T-3	20E463	Coil, 2nd I. F. Transformer
T-4	22E50	Transformer, Output
T-5	20E566	Coil, Oscillator
S-1	1E42	Speaker, 4" x 6" P. M.
SW-1	29E20	Switch, Change-Over, AC-DC-BATT.
SR-1	57E4	Rectifier, Selenium

IMPORTANT: When ordering complete cabinet, or cabinet parts, BE SURE TO MENTION REQUIRED COLOR in addition to proper part number.

MISCELLANEOUS PARTS

Part No.	Part Name and Description
20E570	Complete Brown Cabinet Assembly, with Handle, Baffle, Grille, Screen, Dial Scale, Loop and Cabinet Back
20E570-2	Complete Green Cabinet Assembly, with Handle, Baffle, Grille, Screen, Dial Scale, Loop and Cabinet Back
20E571	Cabinet Assembly, less Back and Loop, but with Handle, Baffle, Grille, Screen and Dial Scale, Brown
20E571-2	Cabinet Assembly, less Back and Loop, but with Handle, Baffle, Grille, Screen and Dial Scale, Green
7E230	Cabinet Assembly, with Handle only—less Back, Loop, Baffle, Grille, Screen and Dial Scale, Brown
7E230-2	Cabinet Assembly, with Handle only—less Back, Loop, Baffle, Grille, Screen and Dial Scale, Green
7E233	Cabinet Back, Less Loop, with 47E13 Hinge Pin, Brown
7E233-2	Cabinet Back, Less Loop, with 47E13 Hinge Pin, Green
20E253-26	Dial Drive Cord
65E2	Dial Cord Tension Spring
35E28	Dial Pointer
36E61	Dial Scale, Calibrated, Polysterene Scale
5E62	Dial Backplate, Metal, Background for Dial Scale
20E249-3	B— Battery Connector Assembly
20E249-4	B+ Battery Connector Assembly
20E340-2	"A" Battery Cable With Plug
55E52-2	Handle Bracket, for Mounting Handle
52E31-7	Handle Cover, Plastic, Brown
52E31-8	Handle Cover, Plastic, Green
55E39-2	Handle Strap, Clock Spring Steel
47E13	Hinge Pin, for Cabinet Back
37E64	Tuning Knob, less Hub, for Brown Cabinet
37E64-2	Tuning Knob, less Hub, for Green Cabinet
37E66	Off-On-Vol. Knob, for Brown Cabinet
37E66-2	Off-On-Vol. Knob, for Green Cabinet
37E65	Knob Hub, for 37E64 Tuning Knob
37E65-2	Knob Hub, for 37E64-2 Tuning Knob
41E13	Line Cord and Plug
17E3-2	"A" Battery Plug
84E6	Stud, Shaft for Tuning Knob
23E2022-2	Dicde Filter Plate, Capacitor and Resistor Assembly
23E2023-2	Ceramic Coupling Plate, Capacitor and Resistor Assembly

MOUNTING HARDWARE

Part No.	Part Name and Description
13E103-20	Clip, Holds Back to Cabinet
82E39-F10	Screw, No. 6-20 x ½ holds Chassis in Cabinet
10E43	Stud, Trimount, for mounting Speaker Baffle and Screen to Cabinet

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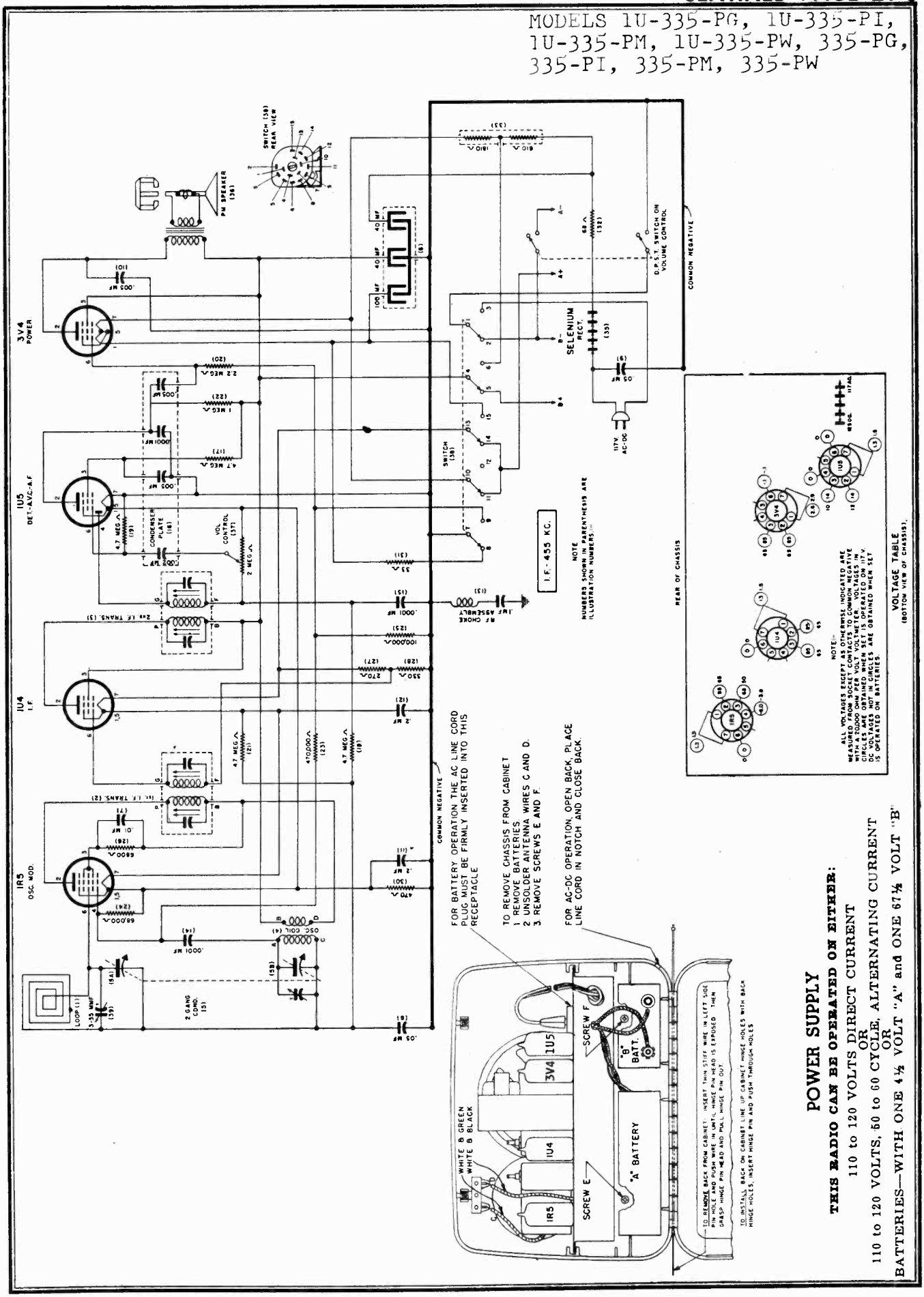
MODELS 1U-335-PG, 1U-335-PI, 1U-335-PM, 1U-335-PW, 335-PG, 335-PI, 335-PM, 335-PW



POWER SUPPLY

THIS RADIO CAN BE OPERATED ON EITHER:

110 to 120 VOLTS DIRECT CURRENT
OR
110 to 120 VOLTS, 50 to 60 CYCLE, ALTERNATING CURRENT
OR
BATTERIES—WITH ONE 4½ VOLT "A" and ONE 67½ VOLT "B"

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ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure, read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third.

IF RADIO HAS METAL PLATE ON BOTTOM OF CHASSIS BE SURE TO HAVE PLATE MOUNTED ON CHASSIS WHEN ALIGNING SET.

Before starting alignment:

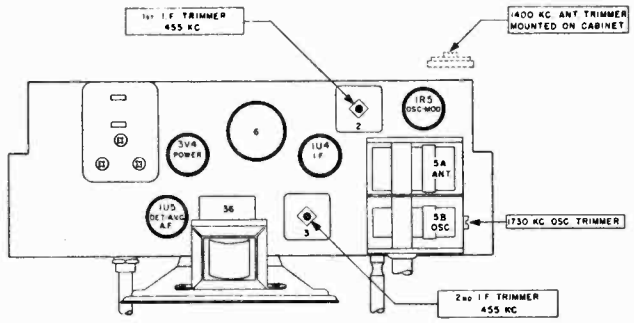
(A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the outside edge of the first 5 in the 55 calibration number at the low frequency end of the dial scale. If dial indicator does not point exactly to the outside edge, move pointer to correct position.

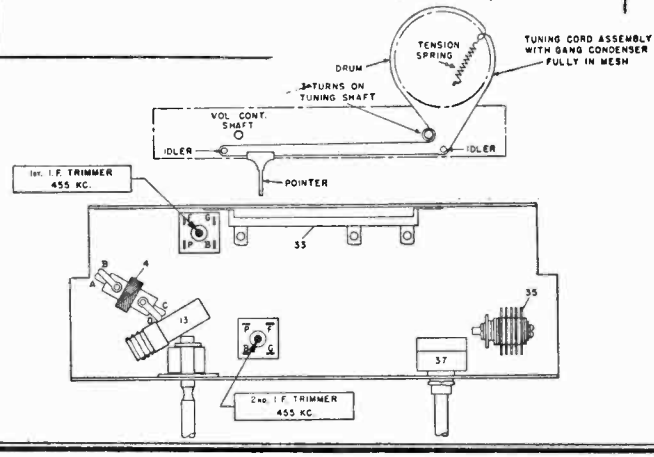
(B) Use an accurately calibrated test oscillator with some type of output measuring device.

(C) WHEN ADJUSTING THE 1730 KC OSCILLATOR TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the loop terminal strip. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.

(D) THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2″ or 3″ form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to	Refer to parts layout diagram for location of trimmers mentioned below:
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1R5 tube. Low side to chassis (common negative in Model 1U-335) through a .02 Mfd. blocking condenser.	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to minimum capacity	Exactly 1730 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1100 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1100 K. C. antenna trimmer for maximum output.





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MODELS 1U-335-PG, 1U-335-PI, 1U-335-PM, 1U-335-PW, 335-PG, 335-PI, 335-PM, 335-PW

PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	64E32	Antenna	Loop
2	20E463	Coil	1st I.F. Transformer
3	20E463	Coil	2nd I.F. Transformer
4	20E338	Coil	Oscillator
5	24E40	Condenser	Tuning, Two Gang
*6	25E28	Condenser	Dry Electrolytic 40-40 Mfd. 150 V. & 100 Mfd. 10 V.
OR			
*6	25E29	Condenser	Dry Electrolytic, 40-40 Mfd. 150 V. & 100 Mfd. 10 V. (1U-335P Only)
7	23E211	Condenser	Tubular, .01 Mfd. 200 V.
8	23E216	Condenser	Tubular, .05 Mfd. 200 V.
9	23E416	Condenser	Tubular, .05 Mfd. 400 V.
10	23E408	Condenser	Tubular, .005 Mfd. 400 V.
11	23E220	Condenser	Tubular, .2 Mfd. 200 V.
12	23E220	Condenser	Tubular, .2 Mfd. 200 V.
13	20E407	Choke	R. F. (1U-335P Only)
14	23E24	Condenser	Ceramic, .0001 Mfd.
15	23E24	Condenser	Ceramic, .0001 Mfd.
16	23E2024	Condenser	Ceramic Condenser Plate
17	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
18	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
19	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
20	27E225	Resistor	Carbon, 2.2 Megohm, 1/3 W.
21	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
22	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
23	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 W.
24	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W.
25	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.
26	27E682	Resistor	Carbon, 6,800 Ohm, 1/3 W.
27	27E271	Resistor	Carbon, 270 Ohm, 1/3 W.
28	27E331	Resistor	Carbon, 330 Ohm, 1/3 W.
30	27E471	Resistor	Carbon, 470 Ohm, 1/3 W.
31	27E330-2	Resistor	Carbon, 33 Ohm, 1/2 W.
32	27E680-3	Resistor	Carbon, 68 Ohm, 1 W.
33	27E1005	Resistor	Wire Wound, 1810 and 610 Ohms, 8 W.
*35	57E1-4	Rectifier	Selenium
	OR		
*35	57E1-5	Rectifier	Selenium
36	1E29	Speaker	4" P.M.
*37	28E30	Volume Control	With D.P.S.T. Switch, 2 Megohm
38	29E20	Switch	Spring Return Type
39	24E33	Condenser	Trimmer 3-35 MMF. Working Range

IMPORTANT: When ordering complete cabinet, or cabinet parts, BE SURE TO MENTION REQUIRED COLOR in addition to proper part number.

MISCELLANEOUS PARTS

Part No.	Part Name	Description
20E577	Cabinet	Complete Cabinet Assembly with Handle, Baffle, Loop and Cabinet Back, Red
20E577-2	Cabinet	Complete Cabinet Assembly with Handle, Baffle, Loop and Cabinet Back, Brown
20E577-3	Cabinet	Complete Cabinet Assembly with Handle, Baffle, Loop and Cabinet Back, White
20E577-4	Cabinet	Complete Cabinet Assembly with Handle, Baffle, Loop and Cabinet Back, Green
20E578	Cabt., less back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, Red
20E578-2	Cabt., less back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, Brown
20E578-3	Cabt., less back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, White
20E578-7	Cabt., less back	Cabinet Assembly, less Back, but with Handle, Baffle and Loop, Green
7E236	Cabinet Back	Back for cabinet with 47E13-2, Hinge Pin, Red
7E236-2	Cabinet Back	Back for cabinet with 47E13-2, Hinge Pin, Brown
7E236-3	Cabinet Back	Back for cabinet with 47E13-2, Hinge Pin, White
7E236-5	Cabinet Back	Back for cabinet with 47E13-2, Hinge Pin, Green
20E253-19	Dial Cord	Dial Drive Cord
65E2	Dial Spring	Dial Cord Tension Spring
20E348	Dial Shaft	Drive Shaft Assembly
5E32-2	Backplate	Dial Backplate
35E8-13	Dial Pointer	Dial Indicator
20E249	Batt. Connector	B— Battery Connector Assembly
20E249-2	Batt. Connector	B+ Battery Connector Assembly
20E340	"A" Batt. Cable	"A" Battery Cable with Plug
55E52	Handle Bracket	Bracket for Mounting Handle
52E31-9	Handle Cover	Plastic Cover, Red
52E31-10	Handle Cover	Plastic Cover, Brown
52E31-11	Handle Cover	Plastic Cover, White
52E31-12	Handle Cover	Plastic Cover, Green
55E39	Handle Strap	Clock Spring Steel
47E13-2	Hinge	Hinge Pin for Cabinet Back
37E17-15	Knob	Red
37E17-16	Knob	Brown
37E17-17	Knob	White
37E17-18	Knob	Green
41E14	Line Cord	Line Cord and Plug
17E3-2	Plug	"A" Battery Plug
20E579	Speaker Baffle	Baffle Assembly with Grille Cloth

MOUNTING HARDWARE

Part No.	Part Name	Description
13E103-9	Clip	Holds Back to Cabinet
82E37-F10	Screw	6-20x3/8—Holds 13E103-9 Clip to Cabt.
82E36-F10	Screw	6-20x5/16—For Mounting Chassis
13E103-17	Speednut	For Mounting Speaker Baffle to Cabt.

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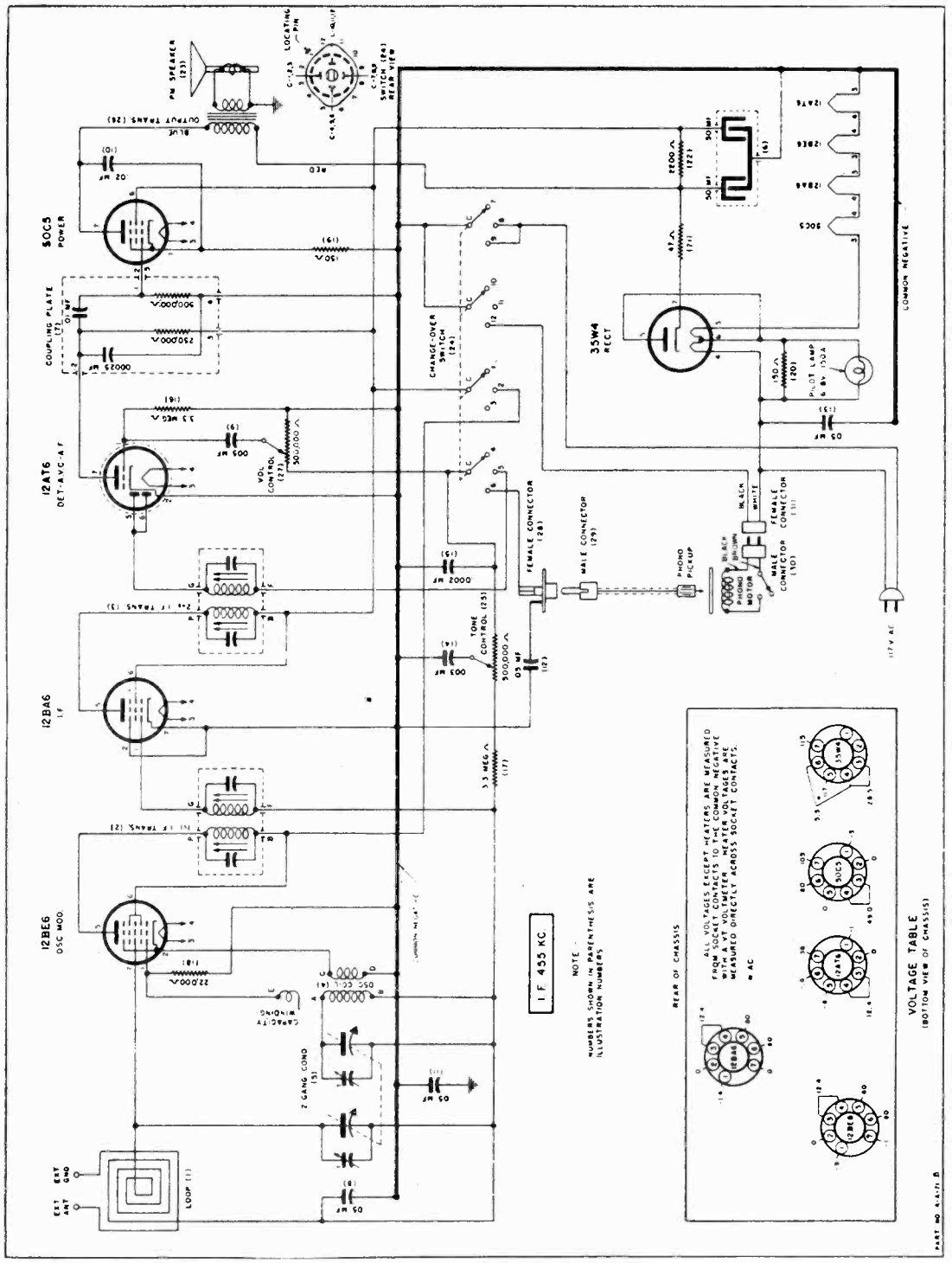
MODELS 1U-339-K,
339-K



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ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

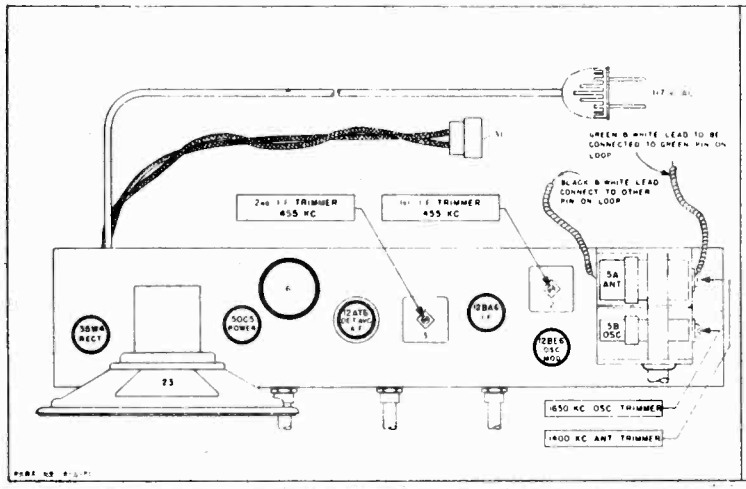
Before starting alignment:

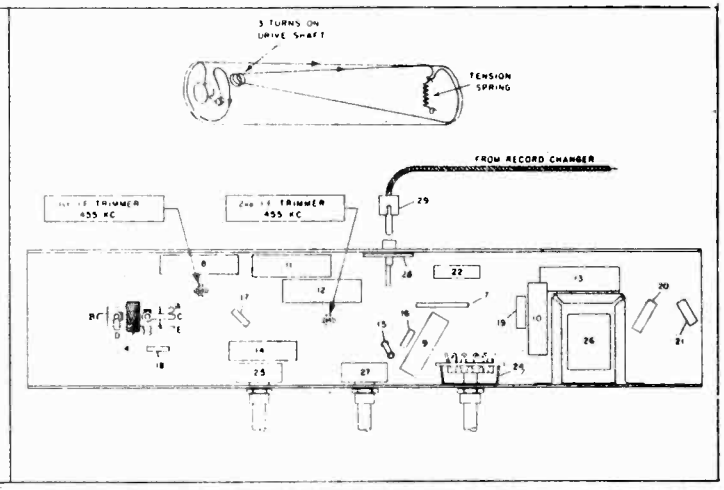
(A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move to correct position by holding dial needle shank at the point where it attaches to its drum while turning the drum on the gang condenser.

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

(C) THE LOOP MAY BE LEFT IN THE CABINET and the chassis with its mounting board pulled out of the cabinet just far enough for adjustment of the trimmers, or the loop and chassis may be removed from the cabinet and the loop placed in the same position and plane it will be in when both are mounted in cabinet—approximately 1" space between receiver loop and chassis. Couple test oscillator to receiver loop by: (1) make loop consisting of 5 to 10 turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	Any point where no interfering signal is received	455 K. C.	.02 MFD. See Paragraph (C) Above	High side to rear stator plates of tuning condenser. Low side to chassis (common negative in 1U339K) through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I.F. trimmers for maximum output.
2	Exactly 1650 K. C.	Exactly 1650 K. C.	See Paragraph (C) Above	See Paragraph (C) Above	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Approx. 1400 K. C.	See Paragraph (C) Above	See Paragraph (C) Above	Adjust 1400 K. C. antenna trimmer for maximum output.





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TO REMOVE TUBES OR REPLACE PILOT LIGHT it is necessary to remove chassis from cabinet. To do this:

A. Take knobs off control shafts.

B. Rest cabinet on its side.

C. Unscrew the four copper colored screws that are used to hold mounting board (on which chassis rests) to the cabinet.

D. Gently pull mounting board and chassis from cabinet.

DO NOT REMOVE THE TWO SCREWS USED TO HOLD THE CHASSIS TO THE MOUNTING BOARD.

RADIO PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	64E21	Antenna	Loop
2	20E402	Coil	1st I. F. Transformer
3	20E402	Coil	2nd I. F. Transformer
4	20E397	Coil	Oscillator
5	24E47	Condenser	2 Gang, Tuning
*6	25E1 OR	**Condenser**	**Dry Elect. 50-50 MFD. 150 V.**
*6	25E16	**Condenser**	**Dry Elect. 50-50 MFD. 150 V. (in Model 1U339 only)**
7	23E2023	Condenser	Ceramic Coupling Plate
8	23E216	Condenser	Paper .05 MF. 200 V.
9	23E208	Condenser	Paper .005 MF. 200 V.
10	23E413	Condenser	Paper .02 MF. 400 V.
11	23E416	Condenser	Paper .05 MF. 400 V. (in Model 1U339 only)
12	23E416	Condenser	Paper .05 MF. 400 V.
13	23E416	Condenser	Paper .05 MF. 400 V.
14	23E406	Condenser	Paper .003 MF. 400 V.
15	23E41 OR	Condenser	Mica, .0002 MF.
15	23E2027-3	Condenser	Ceramic, .0002 MF.
16	27E335	Resistor	Carbon, 3.3 MEG OHM 1/3 W.
17	27E335	Resistor	Carbon, 3.3 MEG OHM 1/3 W.
18	27E223	Resistor	Carbon, 22,000 OHM 1/3 W.
19	27E151	Resistor	Carbon, 150 OHM 1/3 W.
20	27E151	Resistor	Carbon, 150 OHM 1/3 W.
21	27E470-2	Resistor	Carbon, 47 OHM 1/2 W.
22	27E222-3	Resistor	Carbon, 2200 OHM 1 W.
23	1E33	Speaker	5" PM
24	29E23	Switch	"Off-Radio-Phono"
*25	28E41	**Tone Control**	**500,000 Ohm**
26	22E8-2	Transformer	Output
*27	28E46	**Vol. Control**	**500,000 Ohm**
28	17E21-5	Connector	Female, for Pickup
29	17E21-7	Plug	Male Phono Plug for Pickup
30	17E21-2	Plug	Male, Attached to Phono Motor
31	20E184-1	Socket	Female, 2 Contact, for Phono Motor

*Fast Moving Items.

MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E246	Cabinet	Cabinet only, less Frontplate Bezel Assembly
20E428-2	Cabt. Frontplate	Bezel, Frontplate with calibrated crystal
7E171-3	Cabinet Bottom	Cardboard Cabinet Bottom (in Model 1U339 only)
7E171-4	Cabinet Bottom	Cardboard Cabinet Bottom
41E8	Cord	8 Ft. Rubber Line Cord
30E116-3	Dial Plate Assembly	Dial Back Plate Assembly
20E253-21	Dial Cord	Dial Drive Cord
36E64	Dial Scale	Calibrated Scale
20E394	Dial Shaft & Pulley	Drive Shaft & Pulley Assembly with Mounting Bracket
68E16	Dial Shaft	Drive Shaft only with 12E124 "C" Washer
35E25-4	Dial Pointer	Dial Indicator with Set Screw
65E2	Dial Spring	Tension Spring for Drive Cord
37E56	Knob	
37E56-2	Knob	With Dot, for "Off-Radio-Phono" Switch
17E34	Pilot Lamp Socket	Pilot Lamp Socket Assembly
40E1	Pilot Lamp	6-8 Volt, .150 Amp. Type 47

MOUNTING HARDWARE

Part No.	Part Name	Description
P-122	Lid Stop	Cabinet Lid Stop
13E103-1	Speed Nut	For Mounting Front Plate Bezel to Cabt.
82E1111-F10	Screw	6x7/8 Hx Hd—no slot—for holding Chassis to Mounting Board
71E162	Screw	3-48x1/8" for Dial Pointer
86E227-F43	Screw	6x7/8 Rd Hd Copper Colored Iron Wood Screw for attaching Chassis Mtg. Board to Cabt.
86E183-F49	Screw	4x3/8 Rd Hd Iron Wood Screw for Mtg. Cardboard to Cabinet Bottom
12E124	Washer	"C" Washer for Dial Drive Shaft

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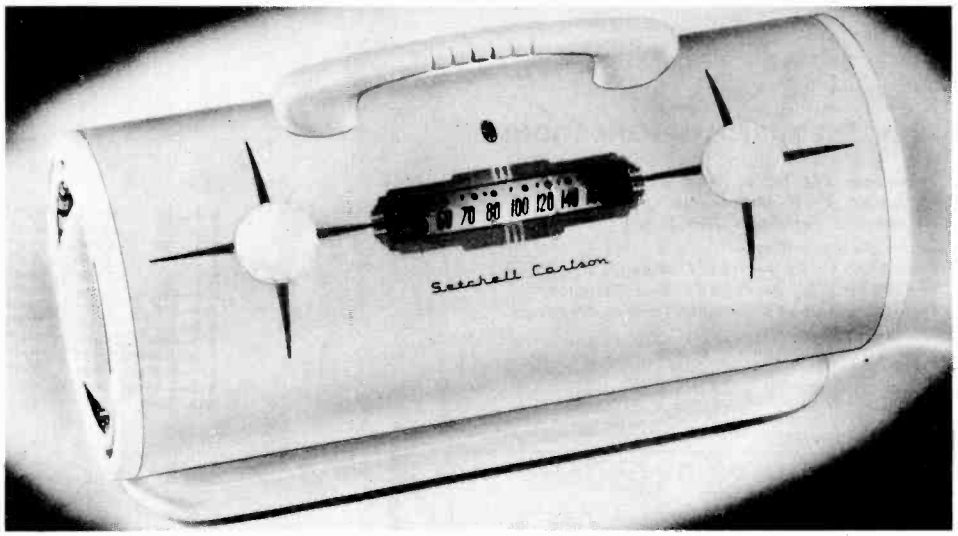
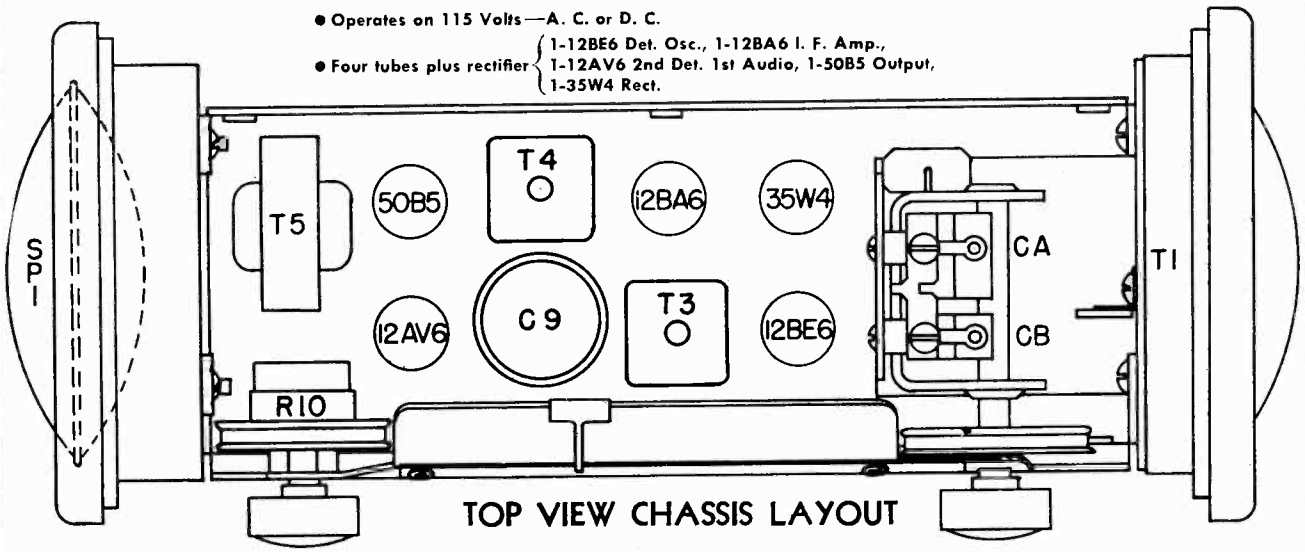
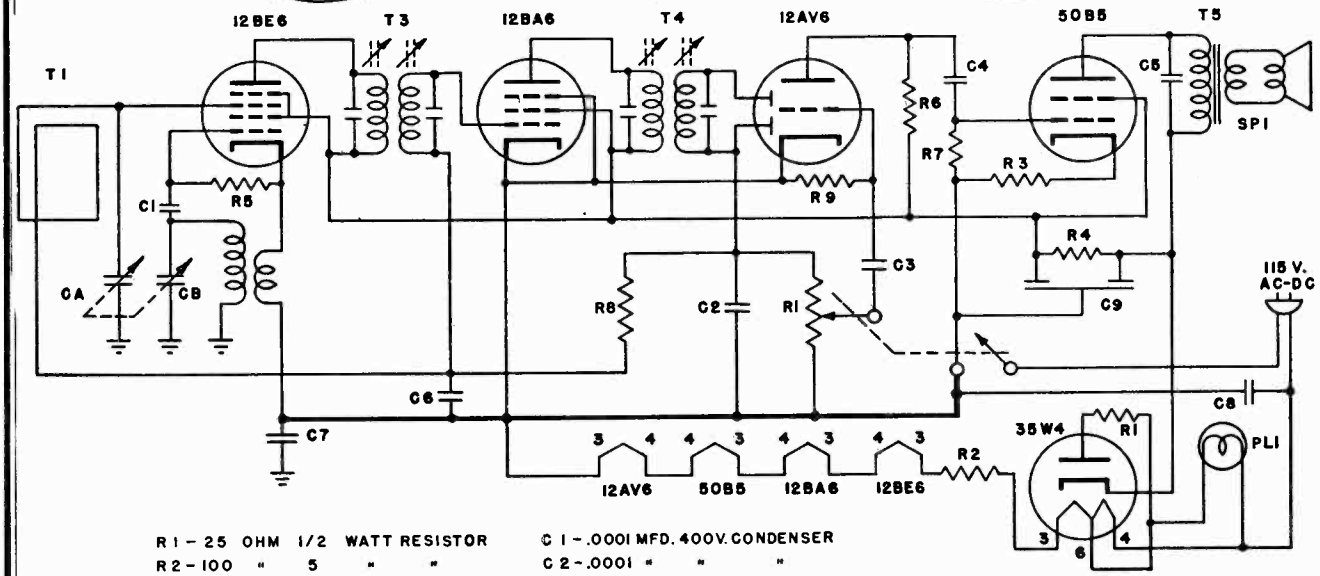
MODEL 570



- Band Coverage: 1750 KC to 535 KC.
- Operates on 115 Volts—A. C. or D. C.
- Four tubes plus rectifier { 1-12BE6 Det. Osc., 1-12BA6 I. F. Amp., 1-12AV6 2nd Det. 1st Audio, 1-50B5 Output, 1-35W4 Rect.



TOP VIEW CHASSIS LAYOUT



R1 - 25	OHM	1/2	WATT	RESISTOR	C 1 - .0001	MFD.	400V.	CONDENSER
R2 - 100	"	5	"	"	C 2 - .0001	"	"	"
R3 - 180	"	1/2	"	"	C 3 - .01	"	"	"
R4 - 1500	"	"	"	"	C 4 - .01	"	"	"
R5 - 25M	"	"	"	"	C 5 - .01	"	"	"
R6 - 500M	"	"	"	"	C 6 - .05	"	200V.	"
R7 - 500M	"	"	"	"	C 7 - .1	"	400V.	"
R8 - 5MEG.	"	"	"	"	C 8 - .1	"	"	"
R9 - 5MEG.	"	"	"	"	C 9 - 50+50	"	150V.	"
R10 - 500M	"	POT. WITH SWITCH			CA-B - GANG CONDENSER			

T1 - LOOP ANTENNA
T2 - OSC. COIL
T3 - 455 KC. I.F.
T4 - 455 KC. I.F.
T5 - O. P. TRANSFORMER
PL1 - NO. 44 PILOT LAMP
SP1 - PILLOW SPEAKER

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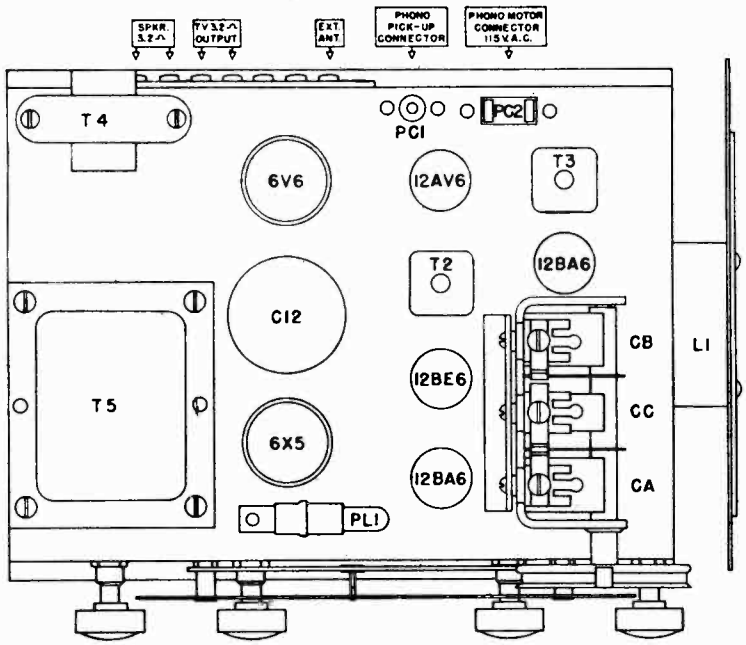
MODELS 580,
5803, Ch. 58A

MODEL 580, 5803 SPECIFICATIONS

- Band coverage: 540 KC to 1900 KC.
- Ten-inch Alnico V - P. M. console speaker.
- 3.2-ohm speaker terminals (for T. V.)
- Five tubes, plus rectifier—
  1—12BA6 R. F., 1—12BE6 Mixer,
  1—12BA6 I. F., 1—12AV6 2nd Detector,
  1st Audio, 1—6V6 Output, 1—6x5 Rectifier.
- Wattage load: 45 watts.
- Undistorted power output: 2 watts.



R 1—400 Ohm 1 Watt Resistor
R 2—500 Ohm 2 Watt Resistor
R 3— 3K Ohm ½ Watt Resistor
R 4—10K Ohm 1 Watt Resistor
R 5—25K Ohm ½ Watt Resistor
R 6—39K Ohm 1 Watt Resistor
R 7—50K Ohm ½ Watt Resistor
R 8—500K Ohm ½ Watt Resistor
R 9—500K Ohm ½ Watt Resistor
R10—2 Meg. Ohm ½ Watt Resistor
R11—5 Meg. Ohm ½ Watt Resistor
R12—5 Meg. Ohm ½ Watt Resistor
R13—500K Potentiometer

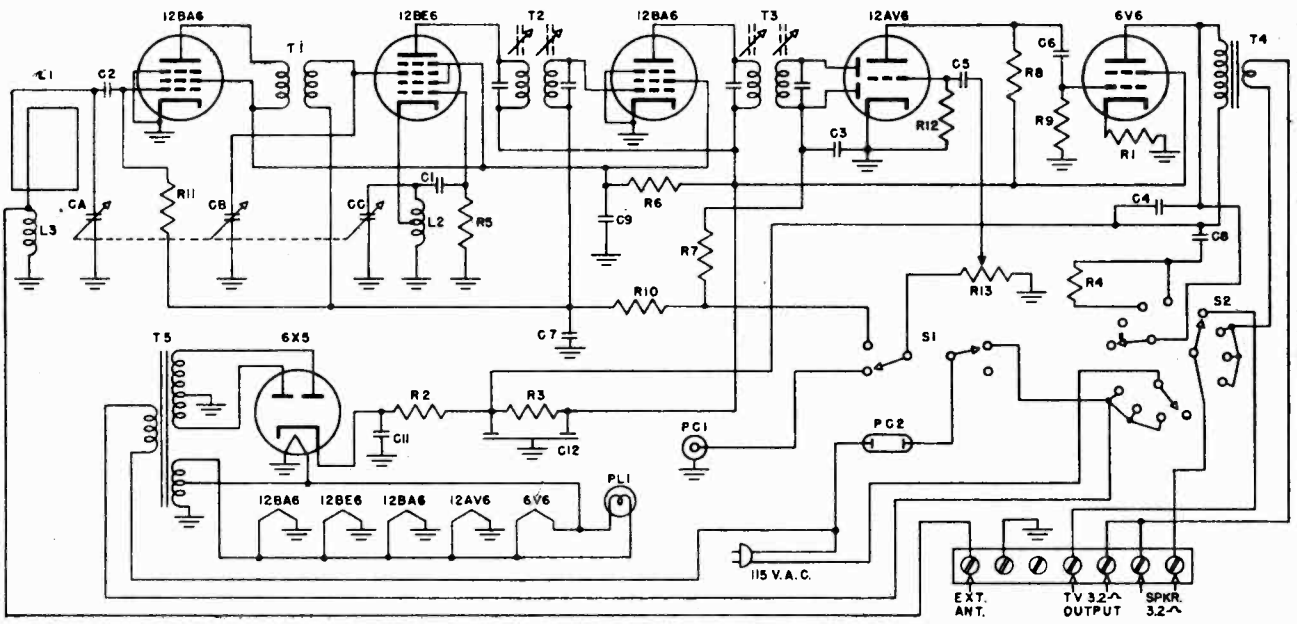
C 1—100 Mmfd. 400 V. Condenser
C 2—250 Mmfd. 400 V. Condenser
C 3—250 Mmfd. 400 V. Condenser
C 4— .0025 Mfd. 400 V. Condenser
C 5— .01 Mfd. 400 V. Condenser
C 6— .01 Mfd. 400 V. Condenser
C 7— .05 Mfd. 200 V. Condenser
C 8— .05 Mfd. 400 V. Condenser
C 9— .1 Mfd. 400 V. Condenser
C10— .1 Mfd. 400 V. Condenser
C11— 20 Mfd. 450 V. Condenser
C12—20+20 Mfd. 475 V. Condenser
CA, B and C Gang Condenser

L1 —Loop Antenna
L2 —Oscillator Coil
L3 —Antenna Coupling Coil
T1 —R. F. Transformer
T2 —455 KC I. F. Transformer
T3 —455 KC I. F. Transformer
T4 —Audio Output Transformer
T5 —Power Transformer
PL1—No. 47 Pilot Lamp
S1 —2-Pole 2-Pos. Switch
S2 —3-Pole 4-Pos. Switch
PC1—Phono Pickup Connector
PC2—Phono Motor Connector 115 V. AC

ALIGNMENT

Connect signal generator to mixer grid No. 12BE6 through an .01 condenser and align I.F.'s T2 and T3 to 455 KC. Use output meter across output transformer or vacuum tube volt meter for highest AVC voltage across condenser C7.

Align oscillator trimmer (CC) to dial calibration at approximately 1400 KC. Adjust antenna and RF section (CA and CB) for best sensitivity at approximately 1400 KC. Low frequency end alignment can be made by bending condenser plates.



SCHEMATIC DIAGRAM

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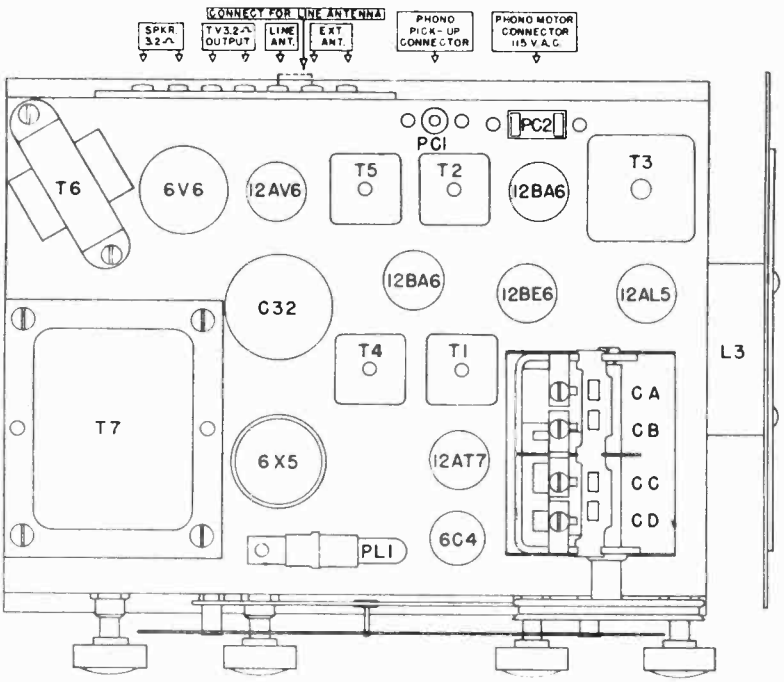
MODELS 5110,
51103, Ch. 511A



F. M. ALIGNMENT

Align I.F.'s, T1, T2, primary T3 to 10.7 KC by connecting unmodulated signal genera tor to grid of 12AT7 through .01 condenser. Use vacuum tube volt meter to read highest AVC voltage across C30 condenser. Adjust secondary T3 (ratio detector coil, top slug) for minimum hiss level (off station).
Adjust oscillator trimmer to correspond with dial calibration at 100 mc and RF trim mer for maximum sensitivity.

A. M. ALIGNMENT

Connect signal generator to mixer grid (12BE6) through .01 condenser and align I.F.'s T4 and T5 to 455 KC. Use output meter across output transformer or vacuum tube volt meter for highest AVC voltage across condenser C27. Align oscillator trimmer to dial calibration at approximately 1400 KC and antenna trimmer for best sensitivity.

MODEL 51103 5110 SPECIFICATIONS

- A. M. band coverage: 535 KC to 1800 KC.
- F. M. band coverage: 110 MC to 87 MC.
- Ten-inch Alnico V - P. M. console speaker.
- 3.2-ohm speaker terminals (for T. V.)
- Wattage load: A. M.—40 watts
  F. M.—50 watts
- Undistorted power output: 2 watts.
- Eight tubes, plus rectifier—
  6C4, 12AT7, 12BA6, 12BE6, 12BA6, 6V6, 12AL5, 12AV6, 6X5 Rectifier.

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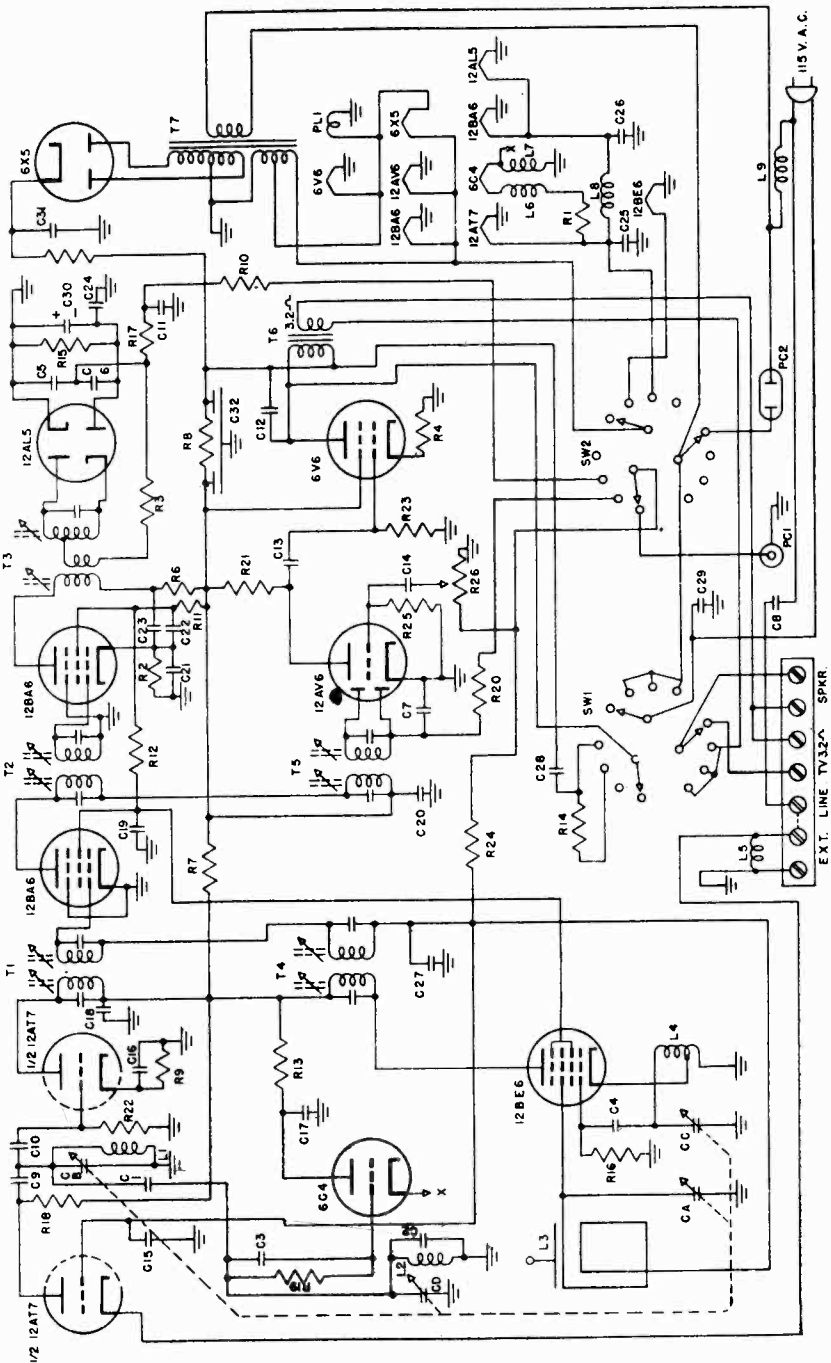
MODELS 5110,
51103, Ch. 511A



SCHEMATIC DIAGRAM

R1	42 Ohm	2	Watt Resistor
R2	68 Ohm	½	Watt Resistor
R3	68 Ohm	½	Watt Resistor
R4	400 Ohm	1	Watt Resistor
R5	500 Ohm	5	Watt Resistor
R6	500 Ohm	½	Watt Resistor
R7	500 Ohm	½	Watt Resistor
R8	2000 Ohm	10	Watt Resistor
R9	2500 Ohm	½	Watt Resistor
R10	5000 Ohm	½	Watt Resistor
R11	10K Ohm	1	Watt Resistor
R12	10K Ohm	1	Watt Resistor
R13	10K Ohm	1	Watt Resistor
R14	10K Ohm	1	Watt Resistor
R15	15K Ohm	½	Watt Resistor
R16	25K Ohm	½	Watt Resistor
R17	25K Ohm	½	Watt Resistor
R18	50K Ohm	½	Watt Resistor
R19	50K Ohm	½	Watt Resistor
R20	50K Ohm	½	Watt Resistor
R21	200K Ohm	½	Watt Resistor
R22	500K Ohm	½	Watt Resistor
R23	500K Ohm	½	Watt Resistor
R24	5 Meg. Ohm	½	Watt Resistor
R25	15 Meg. Ohm	½	Watt Resistor
R26	500K Ohm		Potentiometer

L1—FM RF Coil
L2—FM Oscillator Coil
L3—AM Loop Antenna
L4—AM Oscillator Coil
L5—FM Antenna Choke
L6—Filament Choke
L7—Filament Choke
L8—Filament Choke
L9—FM Line Antenna Choke

T1—10.7 Meg. I. F. Transformer
T2—10.7 Meg. I. F. Transformer
T3—10.7 Meg. Ratio Detector
T4—455 Meg. I. F. Transformer
T5—455 Meg. I. F. Transformer
T6—Audio O. P. Transformer
T7—Power Transformer

SW1—3-Pole 4-Pos. Off-On Tone Switch
SW2—3-Pole 4-Pos. AM—FM Phone Switch
PC1—Phono Pickup Connector
PC2—Phono Motor Connector 115 V. AC
PL1—No. 47 Pilot Light

C1	1.5	Mmfd.	400 V.	Condenser
C2	14	Mmfd.	400 V.	N220
C3	100	Mmfd.	400 V.	Tubular Ceramic
C4	100	Mmfd.	400 V.	Tubular Ceramic
C5	100	Mmfd.	400 V.	Tubular Ceramic
C6	100	Mmfd.	400 V.	Tubular Ceramic
C7	100	Mmfd.	400 V.	Tubular Ceramic
C8	100	Mmfd.	400 V.	Tubular Ceramic
C9	250	Mmfd.	400 V.	Tubular Ceramic
C10	250	Mmfd.	400 V.	Tubular Ceramic
C11	.0015	Mfd.	400 V.	Mica Condenser
C12	.0025	Mfd.	400 V.	Paper Condenser
C13	.01	Mfd.	400 V.	Paper Condenser
C14	.01	Mfd.	400 V.	Paper Condenser
C15	.01	Mfd.	400 V.	Disc Ceramic
C16	.01	Mfd.	400 V.	Disc Ceramic
C17	.01	Mfd.	400 V.	Disc Ceramic
C18	.01	Mfd.	400 V.	Disc Ceramic
C19	.01	Mfd.	400 V.	Disc Ceramic
C20	.01	Mfd.	400 V.	Disc Ceramic
C21	.01	Mfd.	400 V.	Disc Ceramic
C22	.01	Mfd.	400 V.	Disc Ceramic
C23	.01	Mfd.	400 V.	Disc Ceramic
C24	.01	Mfd.	400 V.	Disc Ceramic
C25	.01	Mfd.	400 V.	Disc Ceramic
C26	.01	Mfd.	400 V.	Disc Ceramic
C27	.05	Mfd.	200 V.	Paper Condenser
C28	.05	Mfd.	400 V.	Paper Condenser
C29	.1	Mfd.	400 V.	Paper Condenser
C30	4	Mfd.	50 V.	Electro. Condenser
C31	20	Mfd.	450 V.	Electro. Condenser
C32	20+20	Mfd.	475 V.	Electro. Condenser
CA, B, C, D	Gang Condenser AM-FM			

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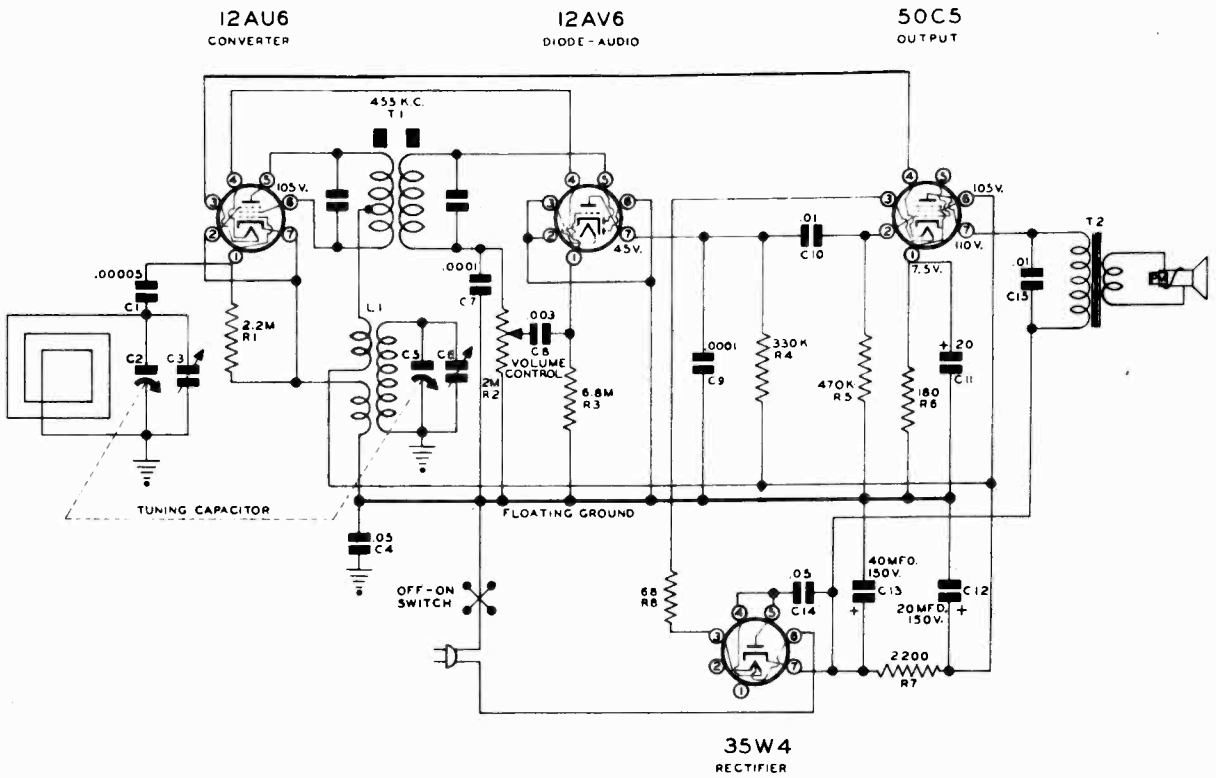

ALIGNMENT PROCEDURE

Step No.	Position of Gang	Signal Generator Frequency	Generator Connection	Dummy Antenna	Adjustment	Type of Adjustment
1.	Open	455 KC.	Rear Gang Terminal	.1 Mfd.	Slugs Top and Bottom in can.	Adjust for Maximum Output
2.	Open	1620 KC.	Dummy Antenna	2 Turns of Hookup Wire 6" in Dia. (Place Approx. a Foot from and in Same Plane as Loop)	Front Gang Trimmer	Adjust for Maximum Output
3.	1400 KC	1400 KC			Rear Gang Trimmer	Adjust for Maximum Output
4.	600 KC	600 KC			—	Check Gang Alignment

Schematic Location	Sonora Part No.	DESCRIPTION
C1	N-6385	Condenser, Ceramic 50 MMFD. 500V.
C4	N-1345	Condenser, Paper .05 MFD. 200V.
C7, C9	N-6015	Condenser, Ceramic 100 MMFD. 500V.
C8	N-2063	Condenser, Paper .003 MFD. 600V.
C10,C15	N-1344	Condenser, Paper .01 MFD. 400V.
C11	N-7153	Electrolytic — 20 MFD. 15V.
C12		Electrolytic — 20 MFD. 150V.
C13		Electrolytic — 40 MFD. 150V.
C14	N-1346	Condenser, Paper .05 MFD. 400V.
R1	N-4277	Resistor 2.2 Megohm ½W 20% Volume Control—2.0 Megohm
R2	N-7142	Resistor 6.8 Megohm ½W 20%
R3	N-4028	Resistor 330,000 Ohm ½W 20%
R4	N-4423	Resistor 470,000 Ohm ½W 20%
R5	N-4027	Resistor 180 Ohm ½W 10%
R6	N-4067	Resistor 2,200 Ohm ½W 10%
R7	N-4896	Resistor 68 Ohm 2.0W 10%
R8	N-6014	Transformer, I.F.
T1	N-7694	Oscillator Coil
L1	N-7725	Loop Antenna Coil
	N-7670	Variable Capacitor
	N-7141	Speaker, 4" PM with Output Transformer
	N-7824	

N-7839

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MODEL 306

POWER SUPPLY - 110 to 120 Volt, 60 Cycle Only.

GROUND - No ground connection should be used.

TUBES - 5 Tubes (inc. rectifier) are used. See label on bottom of cabinet.

TUNING RANGE - 535 to 1620 Kilocycles

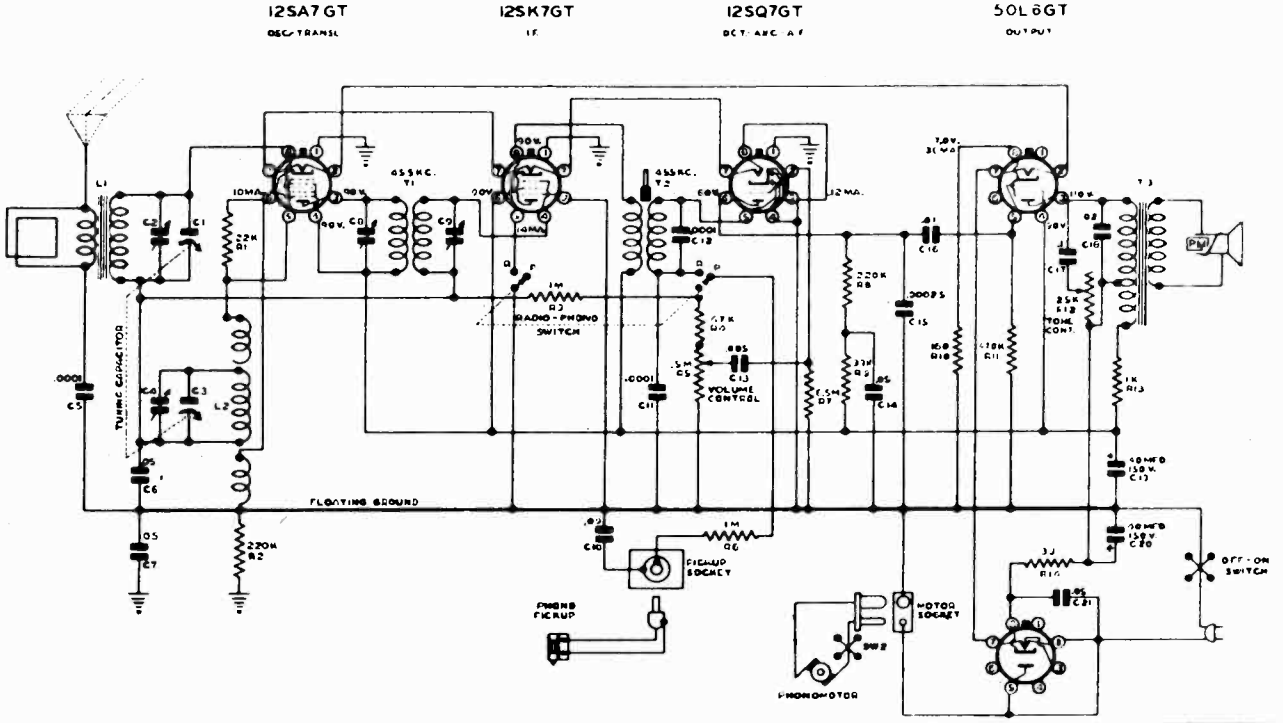
AERIAL SYSTEM - Built-in "Loop" aerial. Provision is made at the rear of cabinet for connecting an external antenna if required.

ALIGNMENT PROCEDURE

STEP NO.	POSITION OF GANG	SIGNAL GENERATOR FREQUENCY	GENERATOR CONNECTION	DUMMY ANTENNA	TYPE OF ADJUSTMENT	ADJUSTMENT
1.	OPEN	455 KC.	REAR GANG TERMINAL	.1 MFD.	T2, C9 & C8	ADJUST FOR MAXIMUM OUTPUT
2.	OPEN	1620 KC.	LOOP	.0002 MFD.	FRONT GANG TRIMMER	ADJUST FOR MAXIMUM OUTPUT
3.	1400 KC.	1400 KC.	LOOP	.0002 MFD.	REAR GANG TRIMMER	ADJUST FOR MAXIMUM OUTPUT
4.	600 KC	600 KC.	LOOP	.0002 MFD.		CHECK GANG ALIGNMENT

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
C19, C20	N-5051	Capacitor - Electrolytic - 40 MFD. 150 V. 40 MFD. 150 V.
C5,C11	N-6015	Capacitor - Ceramic 100 MMFD. 500V. 20%
C12	N-7549	Capacitor - Ceramic 100 MMFD. 500V. 10%
C15	N-6488	Capacitor - Ceramic 250 MMFD. 500V. 20%
C13	N-4894	Capacitor - Paper .005 MFD. 600V.
C16	N-1344	Capacitor - Paper .01 MFD. 400V.
C18	N-1376	Capacitor - Paper .02 MFD. 400V.
C6,C7,C14	N-1345	Capacitor - Paper .05 MFD. 200V.
C21	N-1346	Capacitor - Paper .05 MFD. 400V.
C10	N-4957	Capacitor - Paper .09 MFD. 200V.
C17	N-1623	Capacitor - Paper .1 MFD. 400V.
R5	N-5757	Control - On-Off & Volume
R12	N-6157	Control - Tone
R14	N-4022	Resistor - 33 Ohm - 1/2W. 20%
R10	N-4067	Resistor - 180 Ohm - 1/2W. 10%
R1	N-4025	Resistor - 22,000 Ohm - 1/2W. 20%
R9	N-4064	Resistor - 33,000 Ohm - 1/2W. 20%
R4	N-4063	Resistor - 47,000 Ohm - 1/2W. 20%
R2,R8	N-4026	Resistor - 220,000 Ohm - 1/2W. 20%
R11	N-4027	Resistor - 470,000 Ohm - 1/2W. 20%
R3,R6	N-1262	Resistor - 1.0 Megohm - 1/2W. 20%
R7	N-4028	Resistor - 6.8 Megohm - 1/2W. 20%
R13	N-5358	Resistor - 1,000 Ohm - 1.0W. 10%
T1	N-7676	Transformer - I.F. #1
T2	N-7677	Transformer - I.F. #2
T3	N-4875	Transformer - Output
	N-6149	Coil - Antenna
	N-7139	Coil - Oscillator

RECORD CHANGER: Gen. Instr. Model 700F, See pages RCD.CH.19-1,2 through RCD.CH.19-9.



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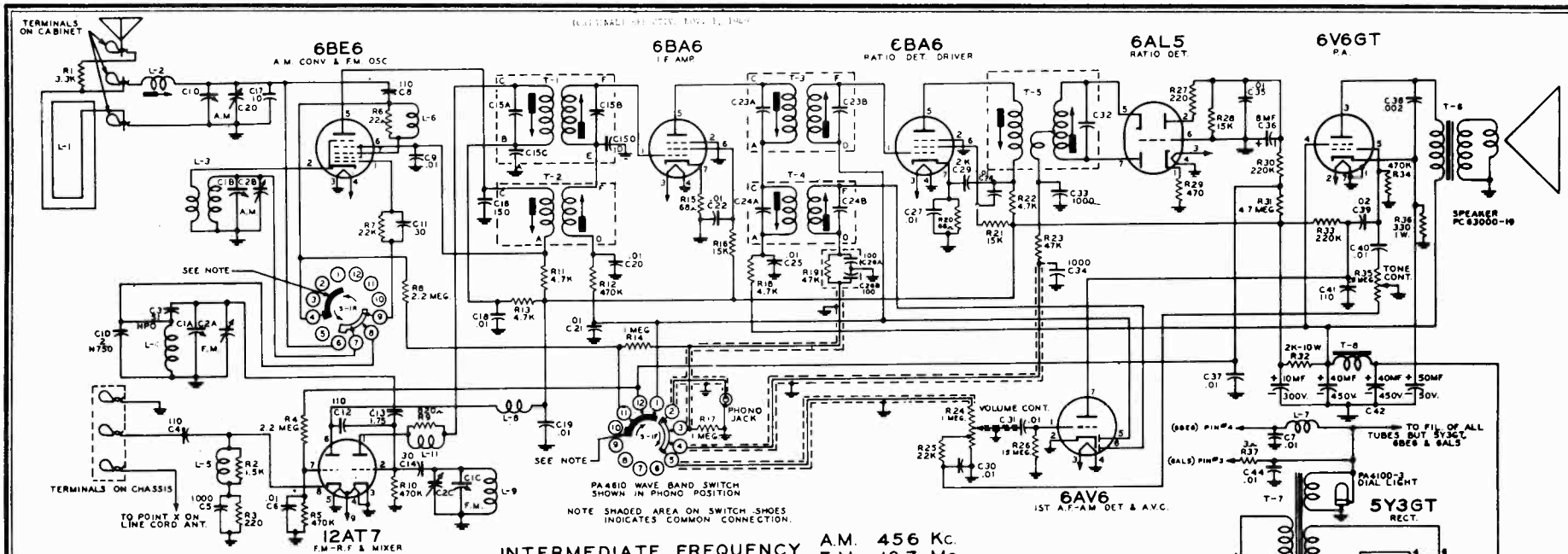
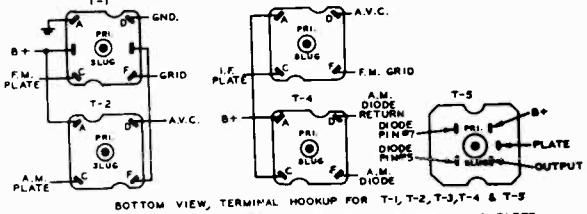


INTERMEDIATE FREQUENCY

A.M. 456 Kc.
F.M. 10.7 Mc

C1A,C1C F.M. GANG CONDENSER C1B,C1D A.M. " " C2C TRIMMER ON F.M. GANG C2B,C2D " " A.M. "		PC65002-1
C2A F.M. OSC. TRIMMER		PA4366
C3 51 MMF. CERAMIC (NPO)	**	CC30A-510K
C4 110 " "		CC30H-111A
C5 1000 MMF. CERAMIC DISC.		HK35G-102
C6 .01 MFD. " "		PA4334-2
C7 .01 MFD. " "		PA4334-2
C8 110 MMF. CERAMIC		CC30H-111A
C9 .01 MFD. CERAMIC DISC.		PA4334-2
C10 2 MMF. CERAMIC (N750)	**	CC30H-020K
C11 30 MMF. CERAMIC		CC30H-300K
C12 110 MMF. CERAMIC		CC30H-111A
C13 1.75 MMF. BIFILAR WIRE CAPACITOR		PA4344
C14 30 MMF. CERAMIC		CC30H-300K
C15A,C (F.M. PRI.) C15B,D (F.M. SEC.) I.F. CAPACITORS	*	
C16 150 MMF. CERAMIC		CC30G-151F
C18 .01 MFD. CERAMIC DISC.		PA4334-2
C19 .01 MFD. 400 V. TUBULAR		PC40HL-103
C20 .01 MFD. CERAMIC DISC.		PA4334-2
C21 .01 MFD. " "		PA4334-2
C22 .01 MFD. " "		PA4334-2
C23A (F.M. PRI.) C23B (F.M. SEC.) I.F. CAPACITORS	*	
C24A (A.M. PRI.) C24B (A.M. SEC.) " "	*	
C25 .01 MFD. CERAMIC DISC.		PA4334-2
C26A,B 100 MMF. C & R UNIT		PA4329-1
C27 .01 MFD. CERAMIC DISC.		PA4334-2
C28 .01 MFD. " "		PA4334-2
C29 .002 MFD. " "		HK35E-202
C30 .01 MFD. " "		PA4334-2
C31 .01 MFD. " "		PA4334-2
C32 33 MMF. MICA CAPACITOR RATIO DET.	*	
C33 1000 MMF. CERAMIC		HK35G-102
C34 1000 MMF. "		HK35G-102
C35 .01 MFD. CERAMIC DISC.		PA4334-2
C36 8 MFD. 50 V. ELECTROLYTIC		PA4303-7
C37 .01 MFD. CERAMIC DISC.		PA4334-2
C38 .002 MFD. 1000 V. TUBULAR		PC40GN-202
C39 .02 MFD. 400 V. "		PC40HL-203
C40 .01 MFD. 400 V. "		PC40HL-103
C41 110 MMF. CERAMIC		CC30H-111A
C42 10-40-40-50 MFD. ELECTROLYTIC		PA4307-4
C43 110 MMF. CERAMIC		CC30H-111A
C44 .01 MFD. CERAMIC DISC.		PA4334-2
R1 3.3 K OHMS	½ W.	BR12S-332
R2 1.5 K " (IN L-5)	2 W	DR12S-152
R3 220 "	½ W.	BR12S-221
R4 2.2 MEG "	" "	BR12S-225
R5 470K "	" "	BR12S-474
R6 22 " (IN L-6)	" "	BR12S-220
R7 22K "	" "	BR12S-223
R8 2.2 MEG "	" "	BR12S-225
R9 820 " (IN L-11)	" "	BR12S-821
R10 470K "	" "	BR12S-474
R11 4.7K "	" "	BR12S-472
R12 470K "	" "	BR12S-474
R13 4.7K "	" "	BR12S-472
R14 1 MEG "	" "	BR12S-105
R15 68 "	" "	BR12S-680
R16 15K "	" "	BR12S-153
R17 1 MEG "	" "	BR12S-105
R18 4.7K "	" "	BR12S-472
R19 47K " C & R UNIT	" "	PA4329-1
R20 68 "	" "	BR12S-680
R21 15K "	" "	BR12S-153
R22 4.7K "	" "	BR12S-472
R23 47K "	" "	BR12S-473
R24 1 MEG " VOLUME CONTROL	½ W.	PA4408-2
R25 22K "	" "	BR12S-223
R26 15 MEG "	" "	BR12S-156
R27 220 "	" "	BR12S-221
R28 15K "	" "	BR12S-153
R29 470 "	" "	BR12S-471
R30 220K "	" "	BR12S-224
R31 4.7 MEG "	" "	BR12S-475
R32 2K " WIRE WOUND	10 W.	PA4200-10
R33 220K "	½ W.	BR12S-224
R34 470K "	" "	BR12S-474
R35 5 MEG " TONE CONTROL		PA4400-10
R36 330 "	1 W	CR12S-331
R37 3 " WIRE WOUND	½ W.	PA4207-1
L1 LOOP ANTENNA		PA5250-4
L2 LOOP LOADING COIL		AA6616-1
L3 B.C. OSC. COIL		AA6665-3
L4 F.M. OSC. COIL		PA5200-7
L5 100 MC. CHOKE COIL (1500Ω FORM)		AA6798-3
L6 " " (22Ω ")		AA6798-5
L7 CHOKE COIL (FILAMENT)		AA6798-6
L8 CHOKE COIL		AA6769-2
L9 F.M.-R.F. COIL		PA5200-6
L10 LINE CORD ANT. CHOKE		AA6664-1
L11 CHOKE COIL		AA6798-7
T1 NO. 1 F.M.-I.F. TRANS.		AA6667-1
T2 NO. 1 A.M.-I.F. TRANS.		AA6668-5
T3 NO. 2 F.M.-I.F. TRANS.		AA6667-3
T4 NO. 2 A.M.-I.F. TRANS.		AA6668-1
T5 RATIO DETECTOR		AA6684-1
T6 OUTPUT TRANS.		AB44061-2
T7 POWER TRANS.		AB44013-1
T8 FILTER CHOKE		AB47004-1

** REPLACE ONLY WITH TEMPERATURE COEFFICIENT AS INDICATED.

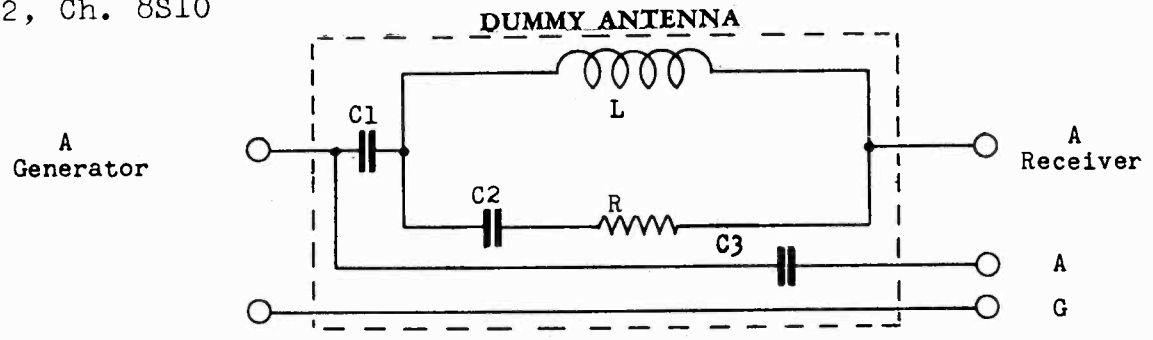


BOTTOM VIEW, TERMINAL HOOKUP FOR T-1, T-2, T-3, T-4 & T-5

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

MODEL 1411A,
Ch. 8110

MODELS 141A, Ch. 8L10; 4970, 4971, 4972, Ch. 8S10



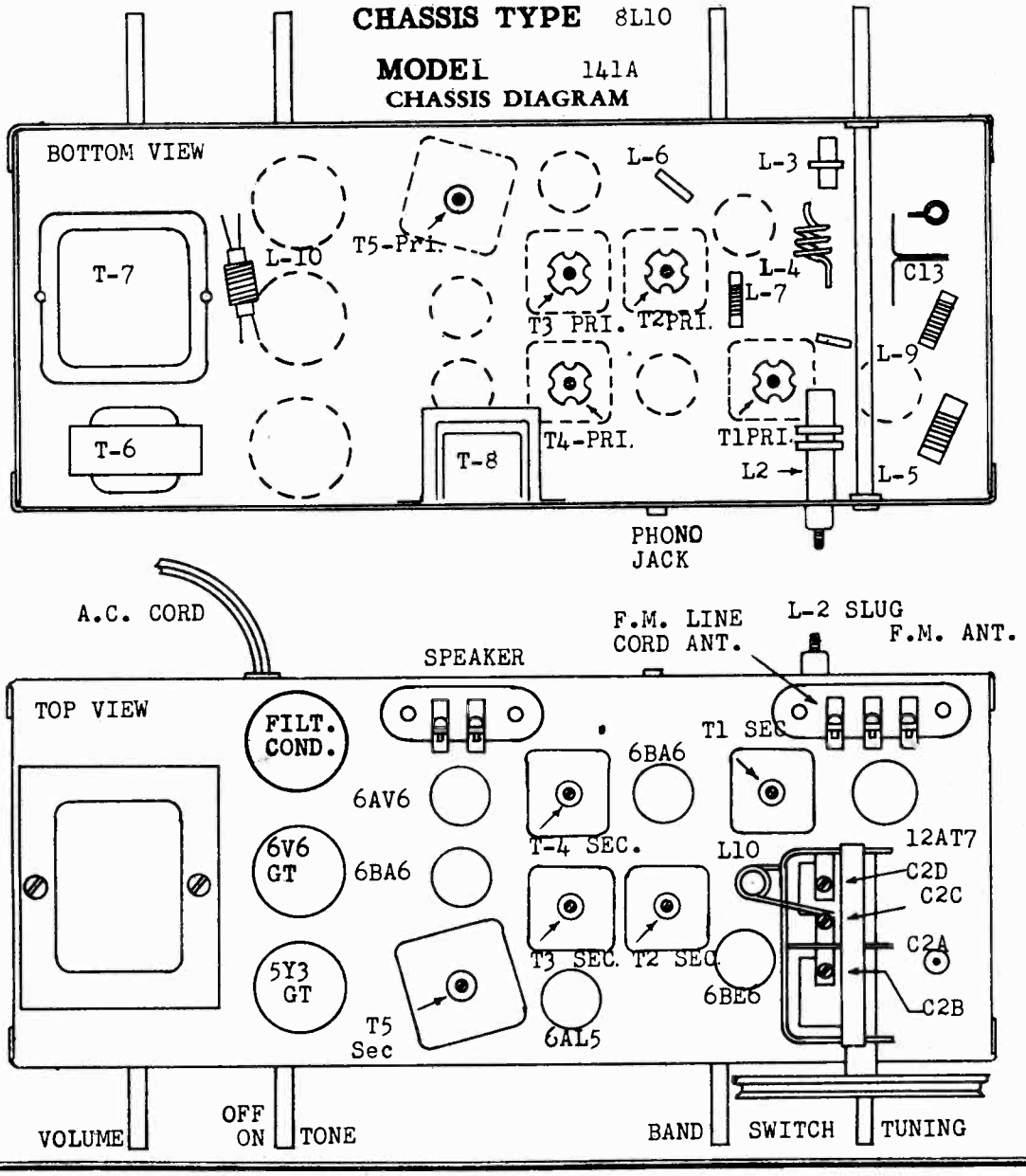
C1 - 200 mmf. Condenser 400 V.D.C.
C2 - 400 mmf. Condenser 400 V.D.C.
C3 - .02 mmf. Condenser 400 V.D.C.
R - 100 ohms Resistor 1/4 Watt
L - Choke Coil

----Case Shield
Choke Coil Specification
Tubing - 3/8" diameter Bakelite
Wire - No. 38 Enameled
Turns - 59 Closely Wound (Impregnated)

NOTE: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

CHASSIS TYPE 8L10

MODEL 141A CHASSIS DIAGRAM



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STEP BY STEP ALIGNMENT PROCEDURE

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND SETTING	TRIMMER OR SLUG	REMARKS
1.	Set dial pointer even with left-hand stop line with condenser gang closed.							
2.	Connect output meter across speaker terminals.							
3.	A.M.-I.F.	Pin #7 of 6BE6 Conv. Tube	.02 MFD. Cond.	456 KC.	A.M.	Open	T4 Sec. Slug	Max. Reading
							T4 Pri. Slug	Max. Reading
							T2 Sec. Slug	Max. Reading
							T2 Pri. Slug	Max. Reading
4.	Repeat operation #3.							
5.	A.M.-R.F.	A.M. Ant. On Cabinet	*	1500 KC.	A.M.	1500 KC.	C2B Osc. Tri.	Peak Accurately
6.				1500 KC.		1500 KC.	C2D Ant. Tri.	Peak Accurately
7.	A.M.-R.F.	On Cabinet	*	600 KC.	A.M.	600 KC.	L-2 Slug	Max. Reading
8.	Repeat operations #5, #6 and #7.							
9.	Check Calibrations at 600,1000 and 1500 KC.							
10.	SPECIAL NOTE: For complete F.M.-I.F. Visual Alignment instructions please refer to pages 7, 8,9,10,11 and 12 of this bulletin.							
11.	F.M.-I.F. Alignment using an A.M. Generator and Output Meter.							
12.	T5 F.M. Ratio Det.	Pin #1 of 2nd 6BA6 Tube	.02 MFD. Cond.	10.7 MC.	F.M.	Open	T5 Sec. Slug	Max. Reading
							T5 Pri. Slug	Max. Reading
13.	NOTE: Operations 11, 13, 14, 15, 18 and 19 must be made with generator output as low as possible, consitent with usable output meter reading.							
14.	T3 2nd. F.M.-I.F.	Pin #1 1st 6BA6 Tube	.02 MFD. COND.	10.7 MC.	F.M.	Open	T3 Sec. Slug	Max. Reading
							T3 Pri. Slug	Max. Reading
15.	T1 1st F.M.-I.F.	Pin #8 on 12AT7 Mixer Tube	.02 MFD. Cond.	10.7 MC.	F.M.	Open	T1 Sec. Slug	Max. Reading
							T1 Pri. Slug	Max. Reading
16.	Adjust secondary slug on T5 ratio detector transformer to minimum deflection or dip on output meter. Under certain conditions it is possible to adjust T5 sec. slug to minimum noise with the receiver tuned to a weak station. This operation is very critical and the receiver must be tuned to the center response only.							
17.	F.M.-R.F. alignment using an A.M. generator with frequencies of 88 to 108 MC. and a vacuum tube voltmeter, or D.C. voltmeter. (20,000 Ohms per volt.)							
18.	Place meter across C36 elect. condenser. (Meter reading approximately 1 volt.)							
19.	F.M.-R.F.	F.M. Ant.	Match Gen. To 300 Ohm	106 MC.	F.M.	106 MC.	C2A Osc. Tri.	Max. Reading
							C2C Ant. Tri.	Peak Accurately
20.	Check Calibration at 88 MC.							

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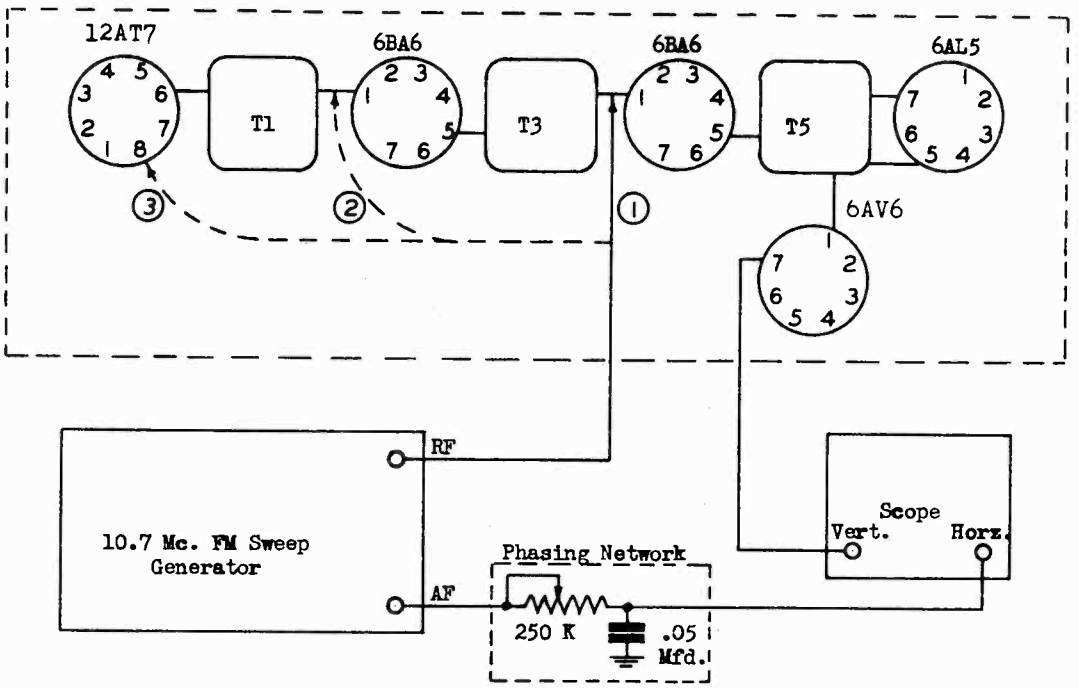
MODELS 141A, Ch. 8L10;
4970, 4971, 4972, Ch. 8S10

VISUAL I. F.-F. M. ALIGNMENT DATA

WARNING: Do not proceed with any of the following alignment instructions unless it is certain that the AM-IF is in accurate alignment. If not, align the AM-IF system according to the step by step alignment procedure.

1. DESCRIPTION OF CIRCUIT USED:

A 6AL5 is employed as a ratio detector. This tube is preceeded by a 6BA6 ratio detector driver and a stage of amplification at 10.7 Mc. also utilizing a 6BA6 tube. The 2nd section of the 12AT7 tube is used as the FM mixer. All IF coupling uses individual slug tuned transformers.



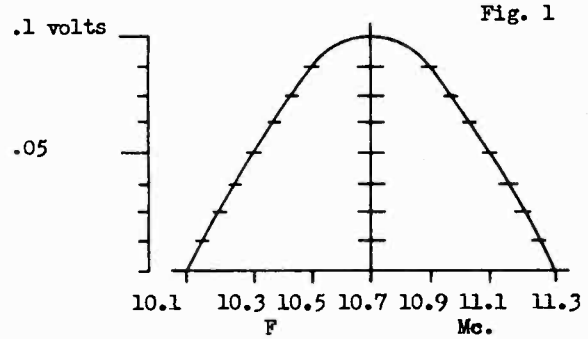
Gen. & Scope Position	Adjust
1	T-5
2	T-3
3	T-1

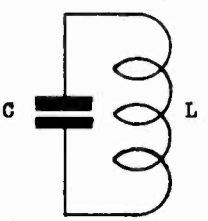
2. THEORY OF VISUAL ALIGNMENT.

One of the characteristics of a tuned circuit is the fact that when it is excited or driven by a generator such as a vacuum tube or another tuned circuit, the voltage developed across it will vary with slight changes in frequency. This voltage will be greatest when the frequency is equal to the resonant frequency of the circuit and will be less if the frequency is higher or lower than the resonant frequency.

Thus if we were to shift the frequency from high to low or low to high across the resonant frequency and make a record of the voltage across the tuned circuit, we could plot the voltage against frequency and obtain a curve which might look like Fig. 1.

Fig. 1





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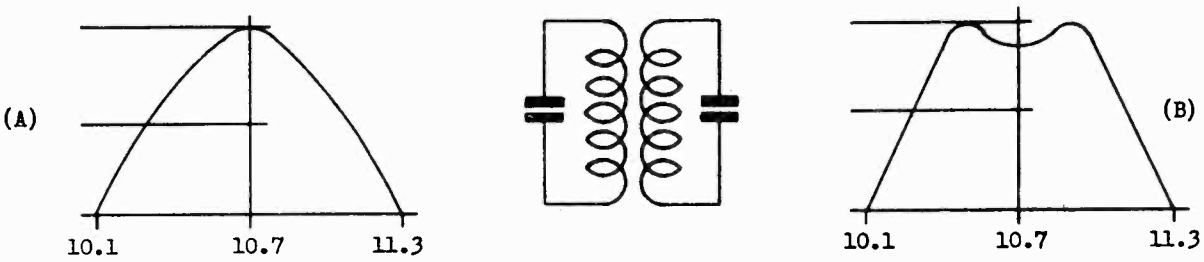
MODELS 141A, Ch. 8L10;
4970, 4971, 4972, Ch. 8S10

VISUAL I. F.-F. M. ALIGNMENT DATA

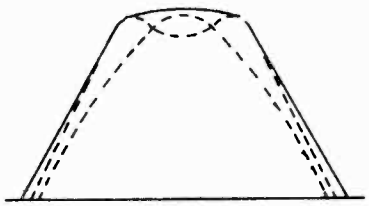
This is the selectivity curve or response curve for the circuit under discussion. This type of circuit may be aligned or adjusted to resonance by simply changing either L or C until maximum voltage is obtained at the resonant frequency. Now if another circuit tuned to the same resonant frequency is coupled to the simple case above, a number of things can happen. First current flowing in one circuit will induce current in the second circuit, the magnitude of this current depending on the degree or amount of coupling between the two circuits. This coupling may be in the form of mutual inductance, mutual capacitance or any impedance common to the two circuits. Now if we repeat the proceedure outlined for obtaining the response curve of a single tuned circuit using the voltage developed across the secondary of the coupled circuit while driving the primary, we may get either of two types of curves depending on the magnitude of the coupling, (a) in Fig. 2 is a typical curve for two circuits coupled below critical coupling and (b) is a representation of the curve for an over coupled circuit.

Fig. 2



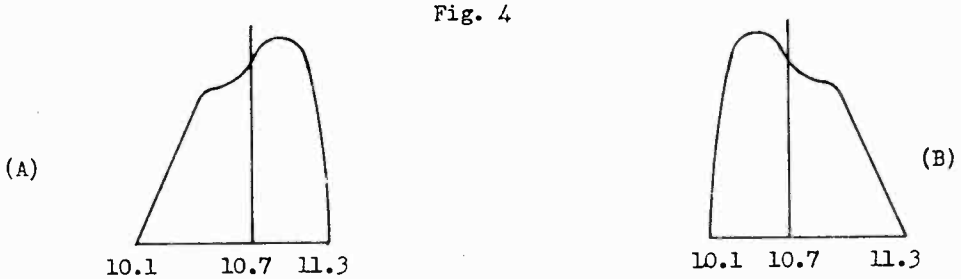
Overcoupled circuits producing a response curve like (b) Fig. 2 are often employed where it is important that the response curve remain approximately flat over a narrow band of frequencies near the resonant frequency. They are also frequently combined with single peaked circuits to produce a response curve like Fig. 3.

Fig. 3



The dotted lines indicate the curves of the individual circuits and the solid curve shows the overall response of the two or more pairs of coupled circuits. Circuits like the above or approaching them in form are desirable in an FM receiver where the pass band should be of the order of 200 Kc. Now from the above it is evident that simple peaking both sides of a circuit coupled below critical for maximum voltage will provide optimum alignment but if this proceedure is followed with an overcoupled circuit it is almost a certainty that the two circuits will not be tuned to the resonant frequency but will instead be aligned so that either one or the other is accentuated. The response curve will then look like Fig. 4 (a) or (b).

Fig. 4



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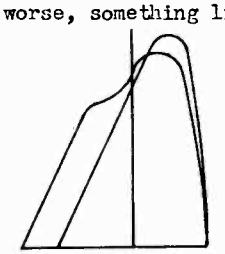
MODELS 141A, Ch. 8L10;
4970, 4971, 4972, Ch. 8S10

VISUAL I. F.-F. M. ALIGNMENT DATA

Now if this overcoupled circuit is combined with a single peaked circuit (where the coupling is below critical), the misalignment becomes worse, something like Fig. 5.

Fig. 5



From the above it appears that to properly align a receiver using overcoupled IF transformers it will be necessary to take a response curve of each stage and align the circuit so that the two peaks are symmetrical, that is, approximately equal in amplitude and displaced equally from the center frequency. To do this with a CW or AM signal would be laborious and time consuming whereas the use of visual equipment makes it nearly as simple as adjusting a simple single peaked amplifier.

Visual alignment test equipment performs the operation of plotting the response curve almost exactly as described above except that instead of manually changing the generator frequency, recording the voltage and then plotting the results, these operations are performed automatically and simultaneously by a combination of electronic circuits. The operation is briefly as follows.

In the signal generator a low AC voltage is applied to a reactance tube modulator which shifts the oscillator frequency from low to high or from high to low at a rate determined by the frequency of the AC voltage and by an amount determined by the AC voltage. The frequency at any instant is dependant on the AC voltage present at that instant of time. An oscilloscope is provided which may be considered a voltmeter used to read the voltage across the tuned circuit, provided a detector is used to convert the RF to a low audio frequency. This voltage is then applied to the vertical plates and results in a vertical displacement of the spot on the screen. Some of the voltage used to shift the oscillator frequency is also applied to the horizontal plates of the oscilloscope providing a means of displacing the spot horizontally. It is now evident that since for any given AC voltage only one frequency may be obtained and since that AC voltage will result in an exact amount of spot deflection on the scope we can read the voltage across the circuit under examination by noticing the position of the spot at this exact instant.

Now if we consider the frequency as shifting from low to high 60 times per second and remember that the spot is moving across the screen of the scope 60 times per second at exact synchronisation with the change in frequency it is only necessary to apply the voltage from our circuit to the vertical plates to obtain a replica of the response curve on the face of the cathode ray tube. This curve will be repeated 60 times per second if our sweep frequency is 60 cycles. Adjustments to the circuit may now be made and the effect on the response curve noted instantaneously.

Although it is possible to observe the selectivity curves as shown in Fig. 1, 2, and 3 on the scope by the use of an auxiliary special detector coupled to the plate of the last IF tube, it is much more convenient to observe the effects of IF alignment upon the shape of the ratio detector output trace. When this is done the auxiliary detector is not necessary and a direct connection of the scope into the receiver circuits will provide all the necessary connections.

If the overall selectivity curve is not "flat-topped" (solid line in Fig. 3) the ratio detector curve cannot be linear (straight) throughout the center section, symmetrical and have sufficient band width (Fig. 6).

Under these conditions it would not be possible to receive a signal without distortion and higher than normal noise, the degree of distortion and abnormal noise dependent upon the extent to which the center of the ratio detector trace departs from a straight line and the extent to which the entire trace departs from true symmetry.

After a pattern similar to Fig. 6 is obtained with connection #1 shown in the block diagram, the generator lead may be moved ahead through the IF system one tube at a time and the intervening transformer aligned for maximum output but at all times a curve very similar to Fig. 6 must be maintained.

3. EQUIPMENT REQUIRED.

(a) A sweep signal generator with a center frequency of 10.7 Mc. and a total sweep width of at least 400 Kc. Examination of the block diagram will reveal a variable resistor-capacitor circuit inserted in the lead between the FM sweep generator and the horizontal amplifier of the oscilloscope. This control should be adjusted so that the dual trace observed on the oscilloscope will blend into a single trace and thereby eliminate any confusion due to the two traces.

(b) An Oscilloscope with either a 3" or 5" tube equipped with both vertical and horizontal amplifiers.

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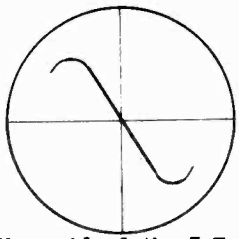
VISUAL I. F.-F. M. ALIGNMENT DATA

4. ALIGNMENT OF THE 10.7 I.F.

Turn the wave band switch to F.M. and the generator to 10.7 Mc. Connect the F.M. signal generator output lead to the grid of the ratio detector driver tube and the scope to the 1st audio plate. Now proceed to align the ratio detector transformer for maximum linearity and output, being careful to maintain as symmetrical a trace as possible. Note that the adjustment of the secondary circuit, controls to a large extent, the linearity and symmetry of the pattern, and adjustment of the primary will influence the gain of the circuit. Fig. 6 represents a linear detector curve properly aligned.

It is important that the generator sweep a sufficiently wide band of frequencies so that the curves on both ends of the straight portion can be seen. Maximum linearity of alignment will result when these curves are symmetrically shaped and as previously stated this will result in minimum distortion and noise.

Fig. 6



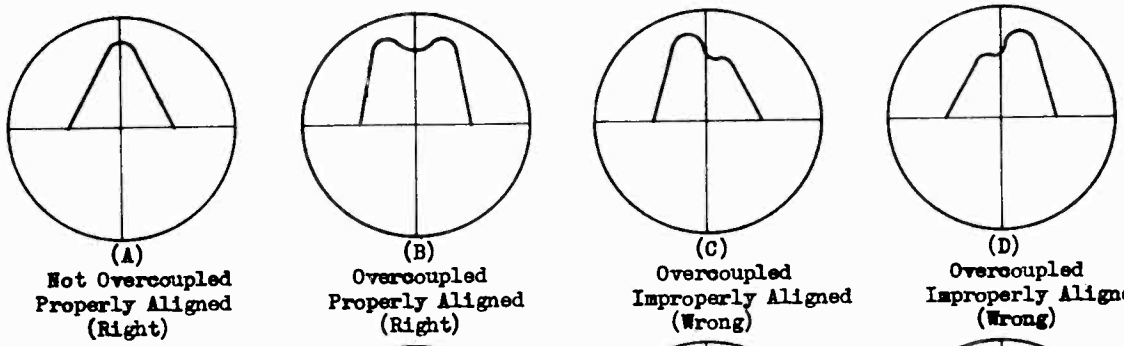
Connect the generator output lead to the grid of the I.F. amplifier. Align primary and secondary of the I.F. transformer being careful to maintain the same basic ratio detector trace as just described.

Observe that by alternately adjusting the primary and secondary, the vertical amplitude can be increased without the response curve becoming distorted. At all times it is important to reduce the signal generator output to maintain the scope picture on the screen. This will avoid overload and possible misalignment therefrom.

Move the generator lead to the grid of the converter tube and align No. 1 I.F. transformer following the same proceedure as above.

Fig. 7, (A), (B), (C), and (D) represent typical selectivity curves of an overall I.F. Amplifier. Fig. 7, (AA), (BB), (CC), and (DD) represent the corresponding ratio detector curves.

Fig. 7



(A) Not Overcoupled Properly Aligned (Right)

(B) Overcoupled Properly Aligned (Right)

(C) Overcoupled Improperly Aligned (Wrong)

(D) Overcoupled Improperly Aligned (Wrong)

(AA) Narrow Bandpass

(BB) Proper Alignment

(CC) Overcoupled

(DD) IF Transformer Improperly Aligned

Should the trace appear unsatisfactory, a very slight readjustment of the detector secondary alignment may be made at this time as the need for any but a slight correction is an indication of incorrect alignment in one of the other stages. This is permissible only if the degree of correction necessary is slight. If this is not the case the entire alignment procedure should be repeated.

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MODELS 141A, Ch. 8L10;
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WHEN ORDERING PARTS ALWAYS SPECIFY PART NUMBER AND MODEL FOR WHICH PART IS INTENDED.

DESCRIPTION		PART NUMBER
	COILS	
L-1	Loop Ant. Assembly	PA5250-4
L-2	Loop Loading Coil	AA6616-1
L-3	A.M. Osc. Coil	AA6665-3
L-4	F.M. Osc. Coil	PA5200-7
L-5	100 Mc. Choke Coil	AA6798-3
L-6	Choke Coil	AA6798-5
L-7	Choke Coil	AA6798-6
L-8	Choke Coil	AA6769-2
L-9	F.M.-R.F. Coil	PA5200-6
L-10	Line Cord Ant. Choke	AA6664-1
L-11	Choke Coil	AA6798-7

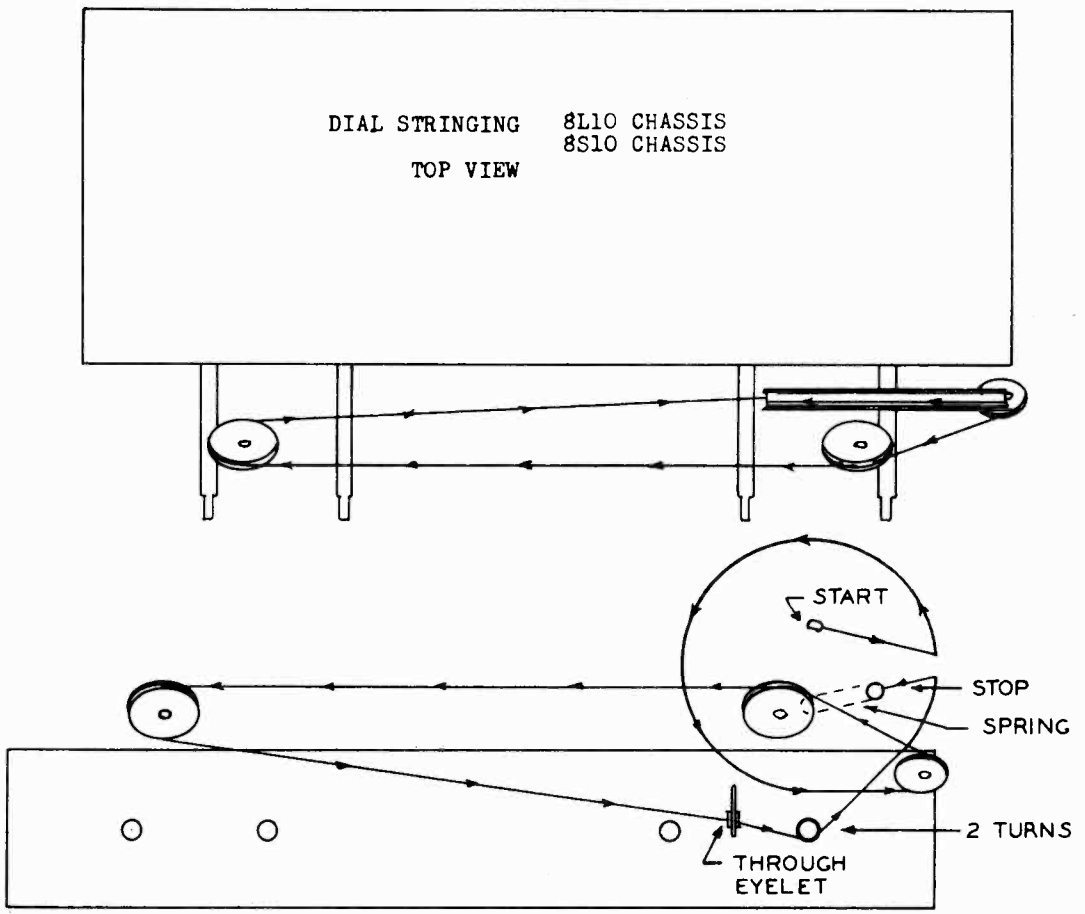
CONDENSERS & MISCELLANEOUS	
Condenser - 2 Gang Variable	PC65002-1
Condenser - (C42) 10-40-40-50 Mfd. Electrolytic	PA4307-4
Condenser - (C36) 8 Mfd. 50 Volt Electro.	PA4303-7
C & R Unit - (C26A & B with R19)	PA4329-1
Control - (R24) 1 Megohm Volume	PA4408-2
Control - (R35) .5 Megohm Tone & A.C. Switch	PA4400-10
Control - Panel	PC63071
Dial Chart	PB30013
Dial Light Bulb	PA4100-3
Knobs - (4-Black)	PA5625-1
Switch - Wave Band	PA4610
*Speaker - (6" x 9" Oval)	PC63000-19

TRANSFORMERS

T1	Transformer - No. 1 F.M. - I.F. Assembly	AA6667-1
T2	Transformer - No. 1 A.M. - I.F. Assembly	AA6668-5
T3	Transformer - No. 2 F.M. - I.F. Assembly	AA6667-3
T4	Transformer - No. 2 A.M. - I.F. Assembly	AA6668-1
T5	Transformer - Ratio Detector Assembly	AA6684-1
T6	Transformer - Output	AB44061-2
T7	Transformer - Power	AB44013-1
T8	Choke - Filter	AB47004-1

* Complete speakers may be returned to factory Service Department for repair or replacement.

DIAL STRINGING



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MODELS 141A, Ch. 8L10;
4970, 4971, 4972, Ch. 8S10

VOLTAGE CHART

Line Voltage: 117 Volts AC

Postion of volume control: Full with set tuned to quiet channel. Position of Band Switch A.M.

TUBE	FUNCTION	Voltage of Sockets Prongs to Ground See Prong Nos. on Schematic.								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
6BE6	A.M. Conv. & F.M. Osc.	-2.5	0	0	6.3*	100	100	**		
12AT7	F.M. - R.F. & Mixer	115	-.6	0	0	0	145	-1	1.6	6.3
6BA6	I.F. Amp.	-.1	0	6.3*	0	190	100	1.0		
6BA6	Ratio Det. Driver	-.5	0	6.3*	0	110	100	.85		
6AL5	Ratio Det.	0	-.25	5.6*	0	0	0	0		
6AV6	1st A.F.-A.M. Det. & A.V.C.	-.1	0	6.3*	0	-.1	-.1	75		
6V6GT	Power Amplifier	0	0	220	230	0	145	6.3*	12	
5Y3GT	Rectifier	0	270		260*		260*		270	

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Alsways use meter scale which will give greatest deflection within scale limits. All D.C. measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.

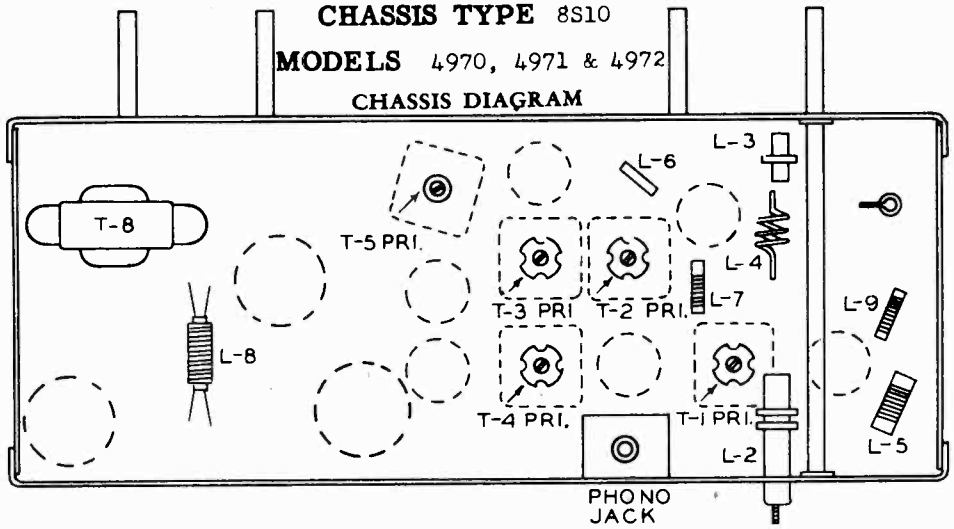
* AC Volts.

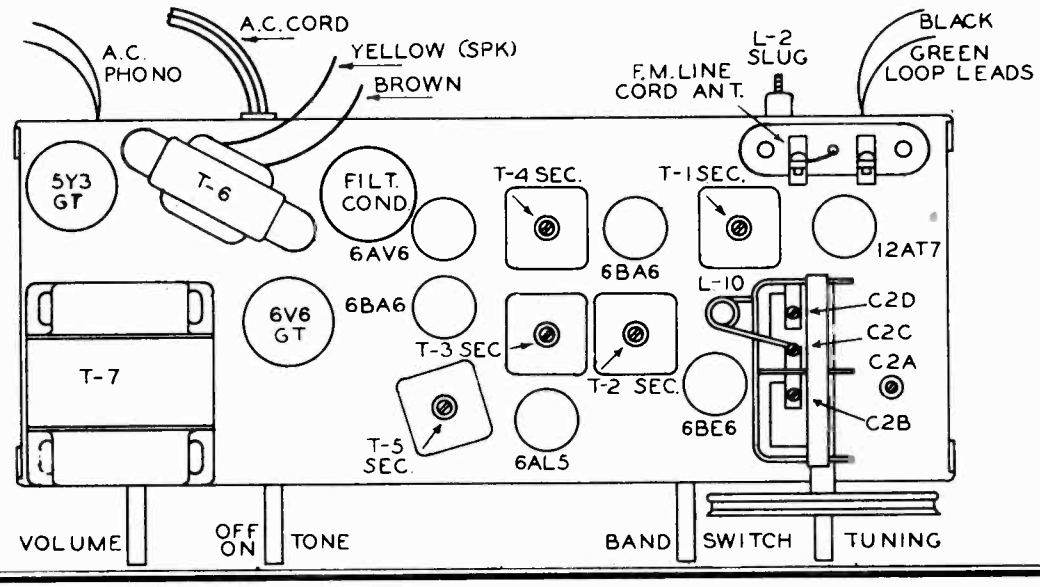
** Cannot be measured with 20,000 ohms per volt voltmeter.

CHASSIS TYPE 8S10

MODELS 4970, 4971 & 4972

CHASSIS DIAGRAM





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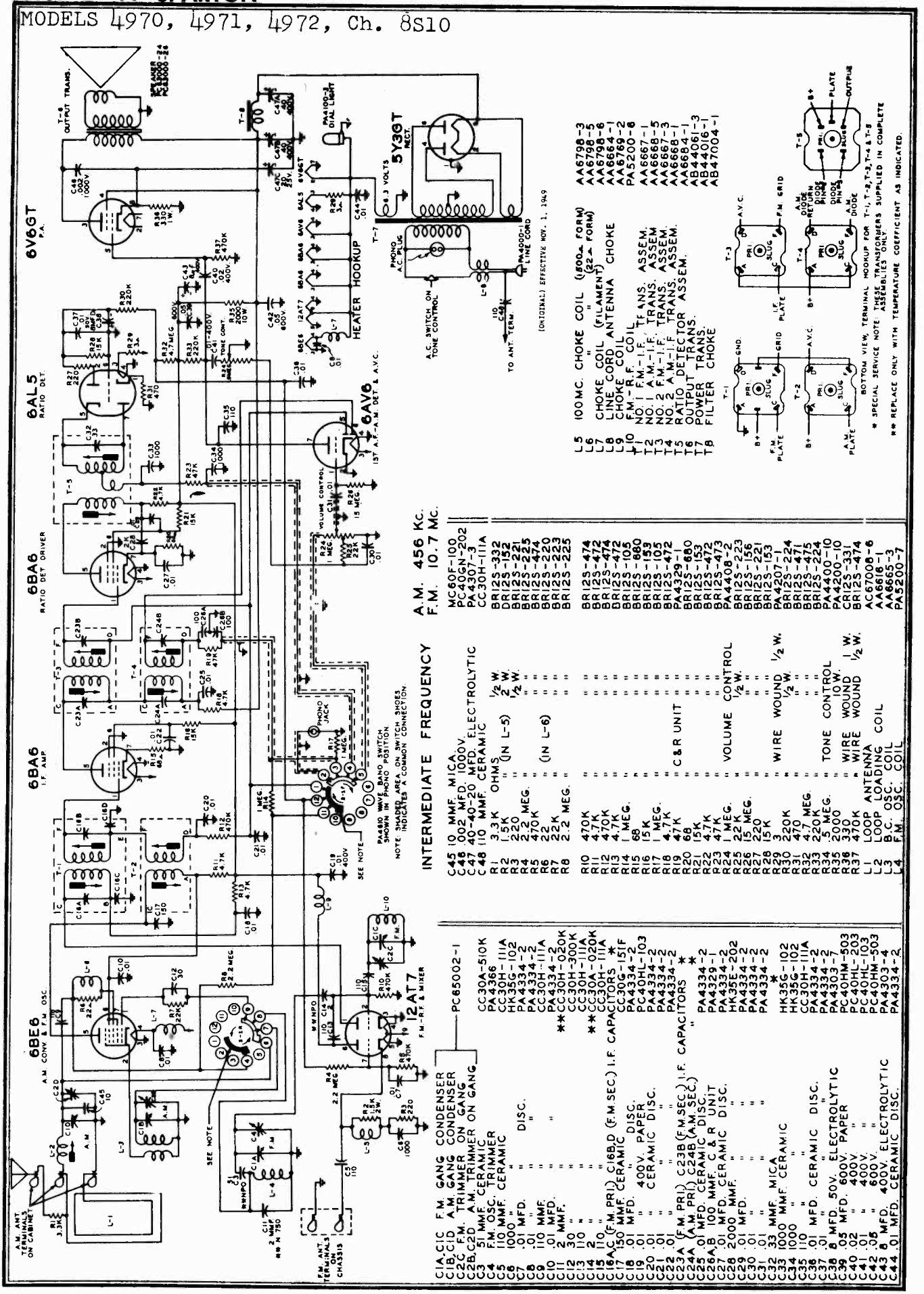
MODELS 4970, 4971, 4972, Ch. 8S10



L5	100 MC. CHOKE COIL (1800Ω FORM)	AA6798-3
L6	" " (FILAMENT) (22Ω FORM)	AA6798-5
L7	CHOKE COIL ANTENNA CHOKE	AA6798-6
L8	LINE CORD	AA6664-1
L9	CHOKE COIL	AA6769-2
L10	F.M.-R.F. COIL	PA5200-6
T1	NO. 1 F.M.-I.F. TRANS. ASSEM.	AA6667-1
T2	NO. 1 A.M.-I.F. TRANS. ASSEM.	AA6668-5
T3	NO. 2 F.M.-I.F. TRANS. ASSEM.	AA6667-3
T4	NO. 2 A.M.-I.F. TRANS. ASSEM.	AA6668-1
T5	RATIO DETECTOR ASSEM.	AA6684-1
T6	OUTPUT TRANS.	AB44061-3
T7	POWER TRANS.	AB44016-1
T8	FILTER CHOKE	AB47004-1

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

** REPLACE ONLY WITH TEMPERATURE COEFFICIENT AS INDICATED.

PA4300 WAVE BAND SWITCH SHOWN IN PHONO POSITION
NOTE: SHADED AREA ON SWITCH SHOES INDICATES A COMMON CONNECTION

INTERMEDIATE FREQUENCY — A.M. 456 Kc. F.M. 10.7 Mc.

C45	10 MMF. MICA	MC60F-100
C46	.002 MFD. 1000V.	PC40GN-202
C47	40-40-20 MFD. ELECTROLYTIC	PA4307-3
C48	110 MMF. CERAMIC	CC30H-111A
R1	3.3 K OHMS	BR12S-332
R2	1.5K " (IN L-5)	DR12S-152
R3	220 "	BR12S-221
R4	2.2 MEG. "	BR12S-225
R5	470K "	BR12S-474
R6	22 " (IN L-6)	BR12S-220
R7	22K "	BR12S-223
R8	2.2 MEG. "	BR12S-225
R10	470K "	BR12S-474
R11	4.7K "	BR12S-472
R12	4.7K " C & R UNIT	BR12S-474
R13	4.7K "	BR12S-472
R14	1 MEG. "	BR12S-105
R15	68 "	BR12S-680
R16	15K "	BR12S-153
R17	1 MEG. "	BR12S-105
R18	4.7K "	BR12S-472
R19	47K "	PA4329-1
R20	68 "	BR12S-680
R21	15K "	BR12S-153
R22	4.7K "	BR12S-472
R23	1 MEG. " VOLUME CONTROL ½ W.	BR12S-473
R24	2.2 MEG. " ½ W.	PA4408-2
R25	22K "	BR12S-223
R26	15 MEG. "	BR12S-156
R27	220 "	BR12S-221
R28	15K "	BR12S-153
R29	* WIRE WOUND ½ W.	PA4207-1
R30	3 "	BR12S-224
R31	470 "	BR12S-471
R32	4.7 MEG. "	BR12S-475
R33	220K "	BR12S-224
R34	.5 MEG. " TONE CONTROL 10 W.	PA4400-10
R35	2000 " WIRE WOUND 1 W.	PA4200-10
R36	330 " WIRE WOUND ½ W.	CR12S-331
R37	470K "	BR12S-474
L1	LOOP ANTENNA	AC67006-6
L2	LOOP LOADING COIL	AA6618-1
L3	B.C. OSC. COIL	AA6665-3
L4	F.M. OSC. COIL	PA5200-7

C1A,C	F.M. GANG CONDENSER	PC65002-1
C1B,D	A.M. GANG CONDENSER	
C2C	F.M. TRIMMER ON GANG	CC30A-510K
C2D	A.M. TRIMMER ON GANG	CC30H-111A
C3	5 MMF. CERAMIC	PA4366
C4	F.M. OSC. TRIMMER	CC30H-111A
C5	110 MMF. CERAMIC	HK35G-102
C6	1000 " "	PA4334-2
C7	.01 MFD. " DISC.	PA4334-2
C8	110 MMF. "	CC30H-111A
C9	.01 MFD. "	PA4334-2
C10	.01 MMF. "	**CC30H-020K
C11	2 MMF. "	CC30H-300K
C12	30 " "	CC30H-111A
C13	110 " "	**CC30A-020K
C14	2 " "	CC30H-111A
C15	110 " "	CC30G-151F *
C16A,C	(F.M. PRI.) C16B,D (F.M. SEC.) I.F. CAPACITORS *	PA4334-2
C17	150 MMF. CERAMIC DISC.	PC40HL-103
C18	.01 MFD. " "	PA4334-2
C19	.01 " 400V. PAPER	PA4334-2
C20	.01 " CERAMIC DISC.	PA4334-2
C21	.01 " " "	PA4334-2
C22	.01 " " "	
C23A	(F.M. PRI.) C23B (F.M. SEC.) I.F. CAPACITORS *	PA4329-2
C24A	(A.M. PRI.) C24B (A.M. SEC.) " " *	PA4334-2
C25	.01 MFD. CERAMIC DISC.	PA4329-1
C26A,B	100 MMF. C & R UNIT	PA4334-2
C27	.01 MFD. CERAMIC DISC.	HK35E-202
C28	2000 MMF. " "	PA4334-2
C29	.01 MFD. " "	PA4334-2
C30	.01 " " "	PA4334-2
C31	.01 " " "	
C32	33 MMF. MICA	HK35G-102
C33	1000 MMF. CERAMIC	HK35G-102
C34	1000 " "	CC30H-111A
C35	110 " "	PA4334-2
C36	.01 MFD. CERAMIC DISC.	PA4334-2
C37	.01 " " "	PA4303-7
C38	8 MFD. 50V. ELECTROLYTIC	PC40HM-503
C39	.05 MFD. 600V. PAPER	PC40HL-203
C40	.02 " 400V. "	PC40HL-103
C41	.01 " 400V. "	PC40HM-503
C42	.05 " 600V. "	PA4303-4
C43	8 MFD. 400V. ELECTROLYTIC	PA4334-2
C44	.01 MFD. CERAMIC DISC.	

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MODELS 141X, 142X,
1040X, 1041X, Ch. 8M10

MODEL 141X
142X

MODEL 1040X
1041X

VOLTAGE CHART

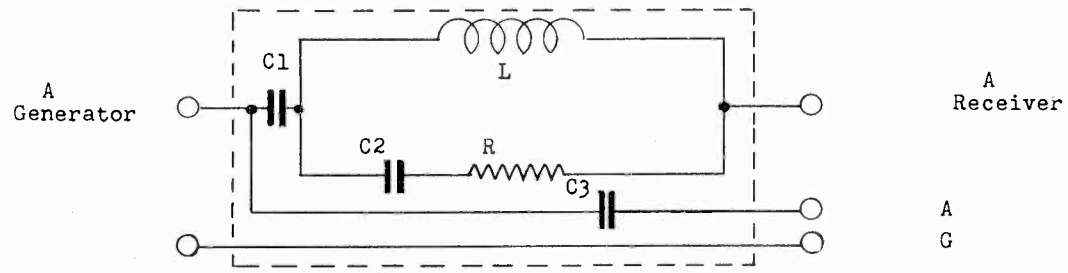
Line Voltage: 117 Volts AC — Position of volume control: Full with set tuned to quiet channel. Position of band switch A.M.

TUBE	FUNCTION	Voltage of Sockets Prongs to Ground See Prong Nos.on Schematic.								
		No.1	No. 2	No. 3	No. 4	No. 5	No.6	No.7	No. 8	No. 9
6BE6	A.M. Conv. & F.M. Osc.	-2.5	0	0	6.3*	90	80	**		
12AT7X	F.M. -R.F. & Mixer	135	-.6	0	0	0	150	-1	1.2	6.3*
6BA6	I. F. Amp.	-.1	0	6.3*	0	235	100	1.0		
6BA6X	Ratio Det. Driver	-.5	0	6.3*	0	95	90	1.2		
6AL5	Ratio Det.	0	-.25	5.6*	0	0	0	0		
6AV6	1st A.F.-A.M. Det.& A.V.C.	-.1	0	6.3*	0	-.1	-.1	95		
6V6GT	Power Amplifier	0	0	250	260	0	240	6.3*	14	
5Y3GT	Rectifier	0	270		260*		260*		270	

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greater deflection within scale limits. All D. C. measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.

* AC Volts
** Cannot be measured with 20,000 ohms per volt voltmeter.
X Band switch on F.M.

DUMMY ANTENNA



C1 - 200 mmf. Condenser 400 V.D. C.
C2 - 400 mmf. Condenser 400 V.D.C.
C3 - .02 mmf. Condenser 400 V.D.C.
R - 100 ohms Resistor 1/4 Watt
L - Choke Coil

----Case Shield
Choke Coil Specification
Tubing - 3/8" diameter Bakelite
Wire- No. 38 Enameled
Turns- 59 Closely Wound (Impregnated)

NOTE: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

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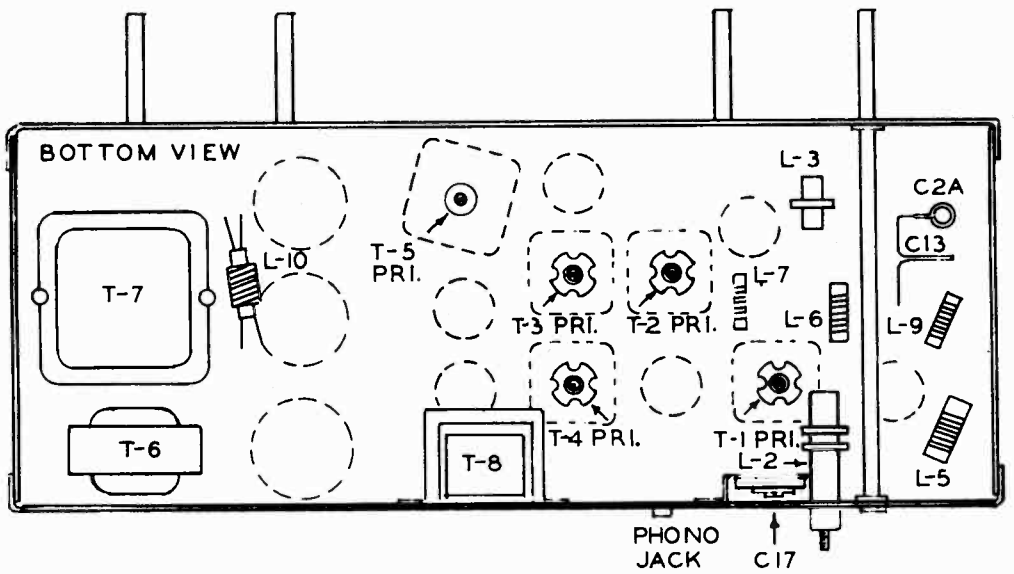
MODELS 141X, 142X,
1040X, 1041X, Ch. 8M10

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND SETTING	TRIMMER OR SLUG	REMARKS
1.	Set Dial pointer even with left-hand stop line with condenser gang closed.							
2.	Connect output meter across speaker terminals.							
3.	A.M.-I.F.	Pin #7 of 6BE6 Conv. Tube	.02 MFD Cond.	456 KC.	A.M.	Open	T4 Sec. Slug	Max. Reading
							T4 Pri. Slug	Max. Reading
							T2 Sec.Slug	Max. Reading
							T2 Pri. Slug	Max. Reading
4.	Repeat operation #3.							
5.	A.M.-R.F.	A.M. Ant. On Cabinet	*	1500 KC.	A.M.	1500 KC.	C2B Osc. Tri.	Peak Accurately
6.				1500 KC.		1500 KC.	C17 Ant.Tri.	Peak Accurately
7.	A.M.-R.F.	On Cabinet	*	600 KC.	A.M.	600 KC.	L-2 Slug	Max.Reading
8.	Repeat operations #5,#6 and #7.							
9.	Check Calibrations at 600,1000 and 1500 KC.							
10.	SPECIAL NOTE: For complete F.M.- I.F. Visual Alignment instructions please refer to pages 9.10.11.12.13 and 14 of Bulletin 11,Manual 6.							
11.	F.M.-I.F. Alignment using an A.M. Generator and Output Meter.							
12.	T5 F.M. Ratio Det.	Pin #1 of 2nd 6BA6 Tube	.02 MFD. Cond.	10.7 MC.	F.M.	Open	T5 Sec. Slug	Max.Reading
							T5 Pri. Slug	Max.Reading
13.	NOTE: Operations 11.12.14.15.18 and 19 must be made with generator output as low as possible,consistent with usable output meter reading.							
14.	T3 2nd. F.M.-I.F.	Pin #1 1st 6BA6 Tube	.02 MFD. COND.	10.7 MC.	F.M.	Open	T3 Sec. Slug	Max.Reading
							T3 Pri. Slug	Max.Reading
15.	T1 1st F.M.-I.F.	Pin #8 on 12AT7 Mixer Tube	.02 MFD. COND.	10.7 MC.	F.M.	Open	T1 Sec. Slug	Max.Reading
							T1 Pri. Slug	Max.Reading
16.	Adjust secondary slug on T5 ratio detector transformer to minimum deflection or dip on output meter. Under certain conditions it is possible to adjust T5 sec.slug to minimum noise with the receiver tuned to a weak station. This operation is very critical and the receiver must be tuned to the center response only.							
17.	F.M-R.F. alignment using an A.M. Generator with frequencies of 88 to 108 MC.and a vacuum tube voltmeter or D. C. voltmeter. (20.000 Ohms per volt).							
18.	Place meter across C36 elect. condenser. (Meter reading approximately 1 volt)							
19.	F.M.-R.F.	F.M. Ant.	Match Gen. To 300 Ohms	106 MC	F.M.	106 MC.	C2A Osc. Tri.	Max.Reading
							C2C Ant. Tri.	Peak Accurately
20.	Check Calibration at 88 MC.							

*Use standard dummy antenna as described

CHASSIS DIAGRAM



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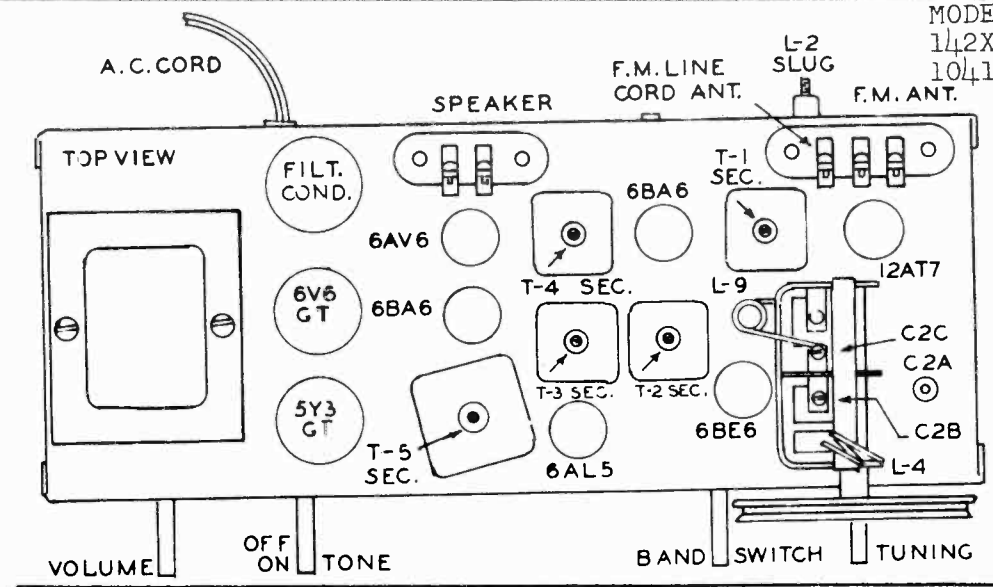
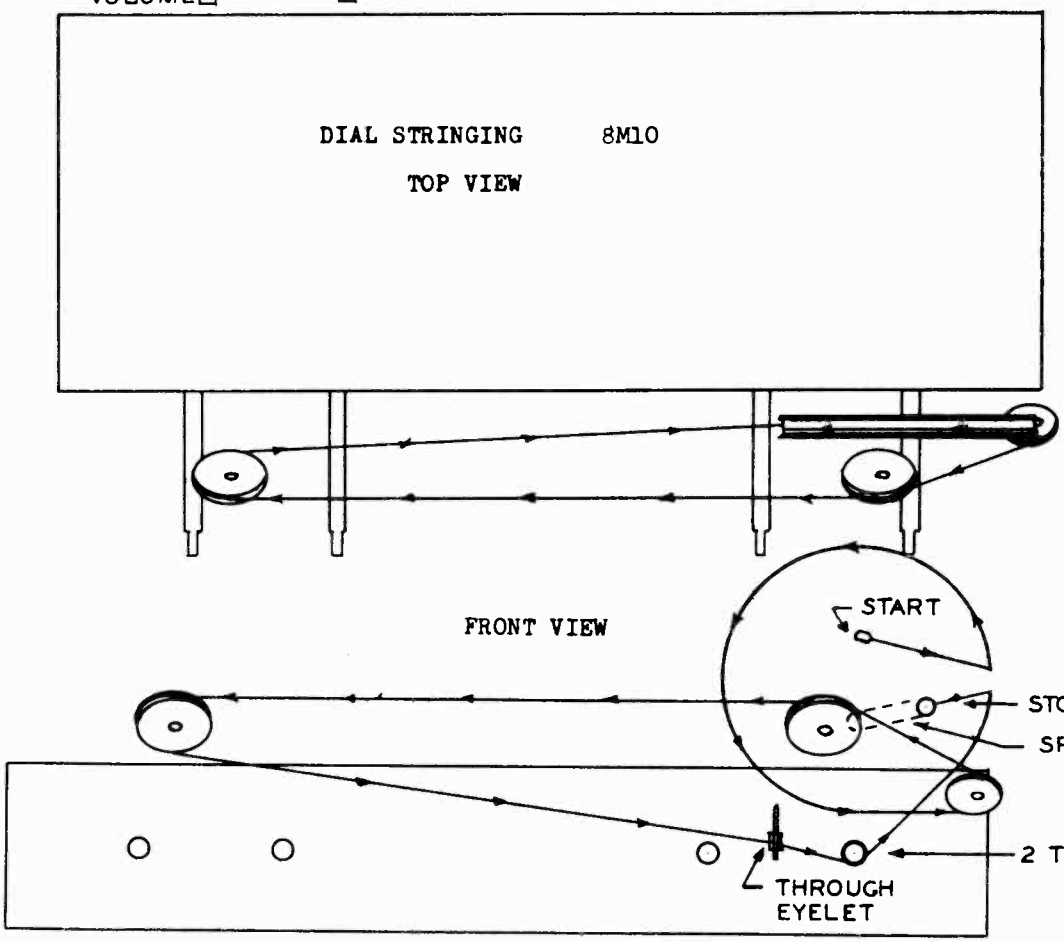
MODELS 141X, 142X, 1040X, 1041X, Ch. 8M10



DIAL STRINGING 8M10

TOP VIEW



Wave Band Switch	PA4614
*Speaker (Model 1085,1086)	PC3000-12
*Speaker (Models 141X, 142X)	PC63000-19
*Speaker (Models 1040X, 1041X)	PC63000-20
Escutcheon-(Black) (142X,1041X, 1086)	PB40150
Escutcheon-(Maroon)(141X,1040X, 1085)	PB40150-1
Panel(Black)(142X,1041X, 1086)	PC63071
Panel(Maroon)(141X,1040X,1085)	PC63071-1
Knob(142X,1041X,1086)	PA5625-1
Knob(141X,1040X,1085)	PA5654
Washer-Paper (4 Each Model)	PA709-1

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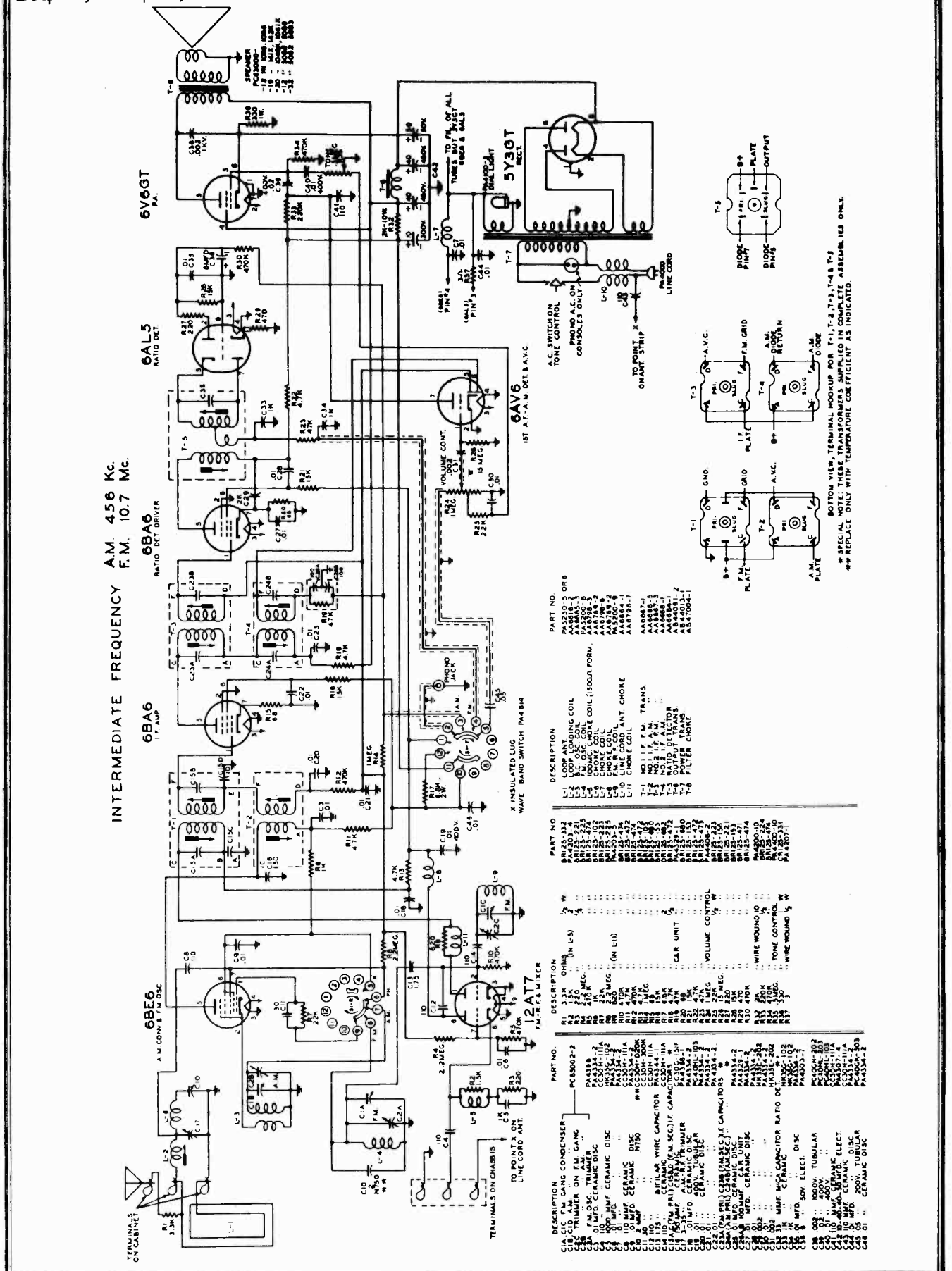
MODELS 141X, 142X,
1040X, 1041X, Ch. 8M10



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VOLTAGE CHART

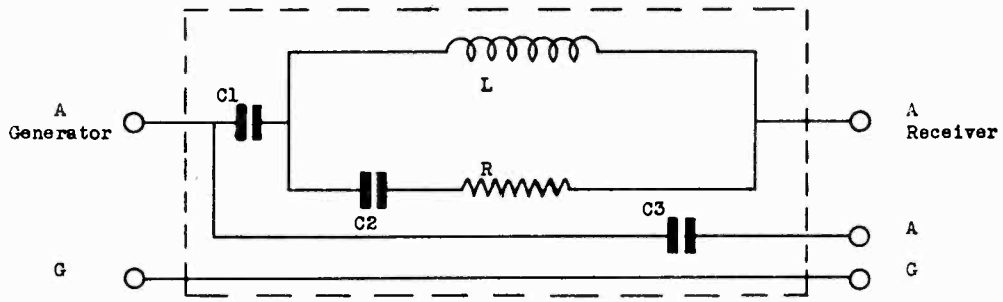
MODELS 1051, 1052, Ch. 6B9

Line Voltage: 117 Volts AC — Position of Volume Control: Full with set tuned to quiet channel. Position of Band Switch: B.C.

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

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
* AC Volts.
** Cannot be measured with 20,000 ohms per volt voltmeter.

DUMMY ANTENNA



C1 - 200 mmf. Condenser 400 V.D.C.
C2 - 400 mmf. Condenser 400 V.D.C.
C3 - .02 mmf. Condenser 400 V.D.C.
R - 100 Ohms Resistor 1/4 Watt
L - Choke Coil

----Case Shield
Choke Coil Specification
Tubing - 3/8" Diameter Bakelite
Wire - No. 38 Enameled
Turns - 59 closely wound (Impregnated)

NOTE: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

STEP BY STEP ALIGNMENT PROCEDURE

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING CONDENSER SETTING	TRIMMERS	REMARKS
1	Set dial pointer even with left-hand stop line with gang closed.							
2	I.F.	Pin #7 on 12BE6 conv.	.02 MFD Cond.	456 KC.	B.C.	Open	C17A & C17B	Peak Accurately
3							C15A & C15B	Peak Accurately
4	I.F. Rej.	Antenna	.02 MFD	456 KC.	B.C.	Closed	C7 Trim	Adj. to Min.
5	B.C.	Antenna	*	1500 KC.	B.C.	1500 KC	C5 OSC. Trim	Peak Accurately
							C2 ANT. Trim	Peak Accurately
6	Band			600 KC.	B.C.	600 KC	C4 OSC. Pad.	**
7	Repeat Operations 5 and 6							
8	Check Calibration at 600KC., 1000KC. and 1500KC.							
9	S.W.	Antenna	*	18 MC.	S.W.	18 MC.	C6 OSC. Trim	Peak Accurately
10	Band						C3 ANT. Trim	**
11	Repeat Operations 9 & 10							
12	Check Operations at 18MC., 9MC. and 6 MC.							
13	Check Operations 1 to 10 inclusive.							

NOTES: * Use dummy Antenna as shown below. (STD.)
** Rock dial while adjusting for maximum output.

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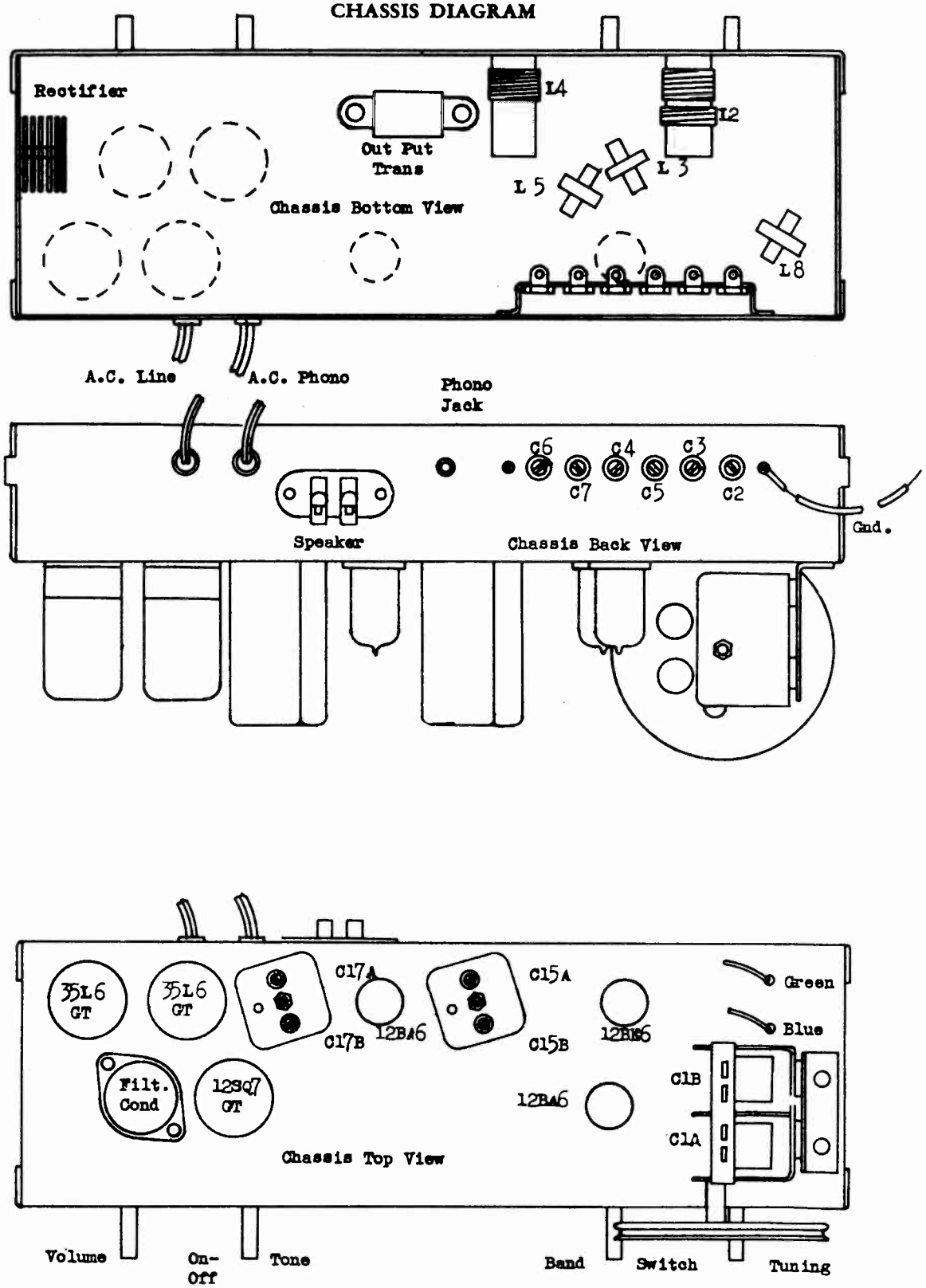
MODELS 1051,
1052, Ch. 6B9

CHASSIS DIAGRAM



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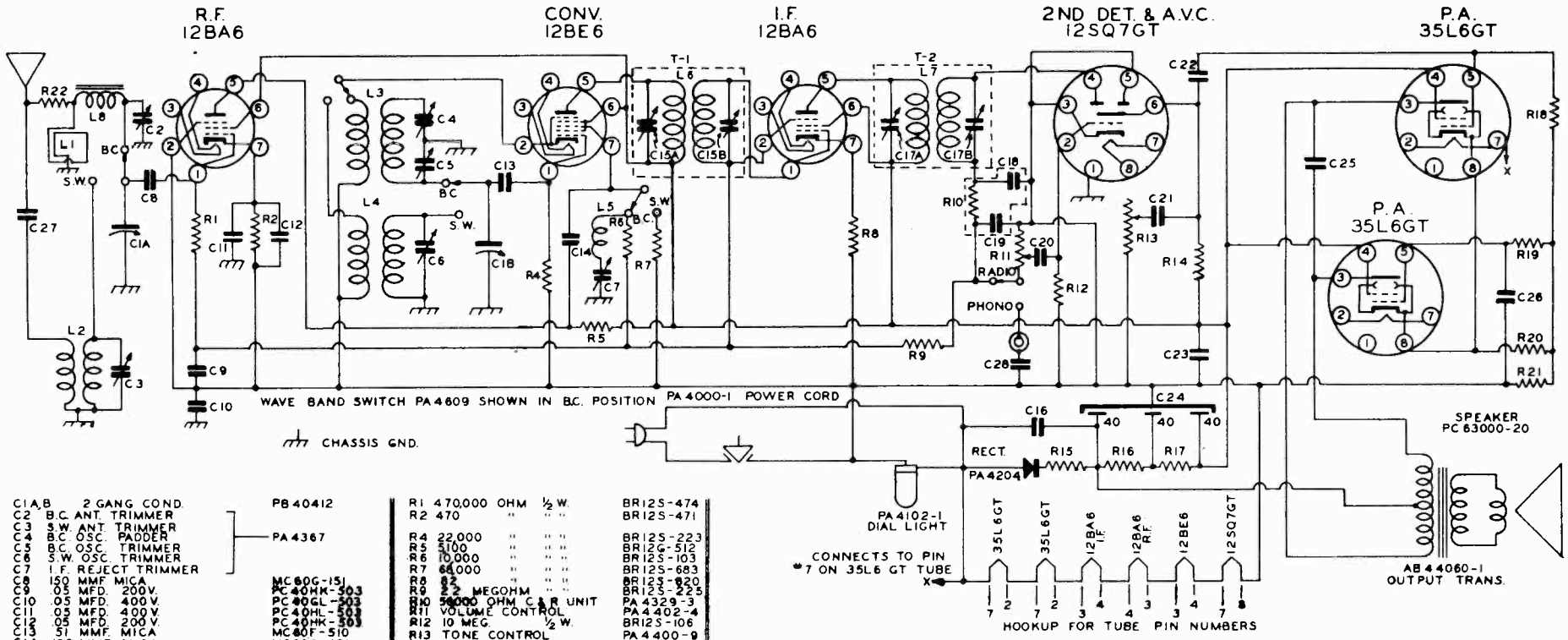
SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 6B9
INTERMEDIATE FREQUENCY 456 KC.

BOTTOM VIEW OF ALL SOCKET CONNECTIONS

(ORIGINAL) SEPT. 10, 1948



C1A,B 2 GANG COND.		PB40412
C2 B.C. ANT. TRIMMER		
C3 S.W. ANT. TRIMMER		
C4 B.C. OSC. PADDER		PA4367
C5 B.C. OSC. TRIMMER		
C6 S.W. OSC. TRIMMER		
C7 I.F. REJECT TRIMMER		
C8 150 MMF. MICA		MC60G-151
C9 .05 MFD. 200V.		PC40HK-503
C10 .05 MFD. 400V.		PC40GL-503
C11 .05 MFD. 400V.		PC40HL-503
C12 .05 MFD. 200V.		PC40HK-503
C13 51 MMF. MICA		MC60F-510
C14 100 MMF. MICA		MC60G-101
C15 A,B NO.1 I.F. TRIMMER		
C16 .05 MFD. 400V.		PC40HL-503
C17 A,B NO.2 I.F. TRIMMER		
C18 100 MMF.	C & R UNIT	PA4329-3
C19 100 MMF.		
C20 .01 MFD. 200V.		PC40HK-103
C21 .005 MFD. 400V.		PC40GL-502
C22 .01 MFD. 200V.		PC40HK-103
C23 .1 MFD. 200V.		PC40HK-104
C24 40-40-40 ELECTROLYTIC		PA4300-9
C25 .006 MFD. 1000V.		PC40GN-602
C26 .01 MFD. 200V.		PC40HK-103
C27 .82 MMF. MICA		MC60F-820
C28 .05 MFD. 400V.		PC40GL-503

R1 470,000 OHM	½ W.		BR12S-474
R2 470	"	"	BR12S-471
R4 22,000	"	"	BR12S-223
R5 5100	"	"	BR12G-512
R6 10,000	"	"	BR12S-103
R7 68,000	"	"	BR12S-683
R8 82	"	"	BR12S-820
R9 2.2 MEGOHM	"	"	BR12S-225
R10 50000 OHM C & R UNIT			PA4329-3
R11 VOLUME CONTROL			PA4402-4
R12 10 MEG.	½ W.		BR12S-106
R13 TONE CONTROL			PA4400-9
R14 270,000 OHM	½ W.		BR12S-274
R15 27	"	2 W.	DR12S-270
R16 120	"	1 W.	CR12S-121
R17 1200	"	1 W.	CR12S-122
R18 1 MEG.	"	½ W.	BR12S-105
R19 1 "	"	"	BR12G-105
R20 100	"	1 W.	CR12S-101
R21 100	"	1 W.	CR12S-101
R22 2700	"	½ W.	BR12S-272

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

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

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

MODELS 1051, 1052, Ch. 6B9

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DESCRIPTION

Your new automobile receiver is a 5-tube (plus rectifier) superheterodyne, designed to operate from the 6 volt storage battery in your car. It is a universal type of receiver for mounting underneath the dash panel. It has a self-contained PM speaker, and covers the frequency range 540 to 1600 K.C. Two simple controls are provided for operating the receiver. (See Fig. 1)

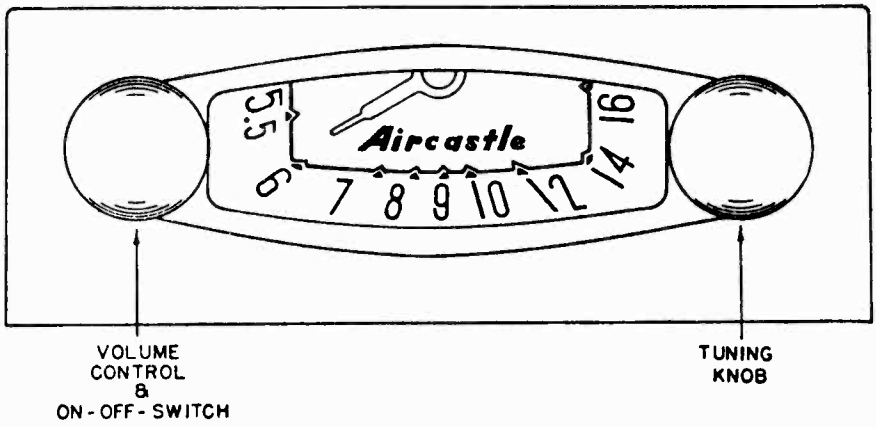

Fig. 1 Front View

SUGGESTIONS FOR ELIMINATING POSSIBLE MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise. (The following steps may not be necessary in all cases. Install your radio and operate it before making changes.)

GENERATOR CONDENSER

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Detach the high tension wire where it goes into the top of the distributor cap and cut two inches off the end. Screw the piece you cut off into one end of the distributor suppressor and then screw the other end of the suppressor on the long wire which leads to the coil. Insert the wire back into the distributor cap.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional .5 MFD condenser. It must be installed from the battery side of the ignition coil to the closest ground on the ment panel.

Short wires are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension wire from the coil to the distributor.

they run from the engine compartment up to the instrument panel. These wires should be placed in a flexible wire shield and the shield grounded to frame or motor. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension wires.

BONDING OF FIRE WALL

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

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MODEL 602-170144

HIGH AND LOW TENSION WIRES

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These wires will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, and generator condenser. By referring to Figure 2 and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 7/32" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed to the correct angles, as illustrated in Figure 2, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

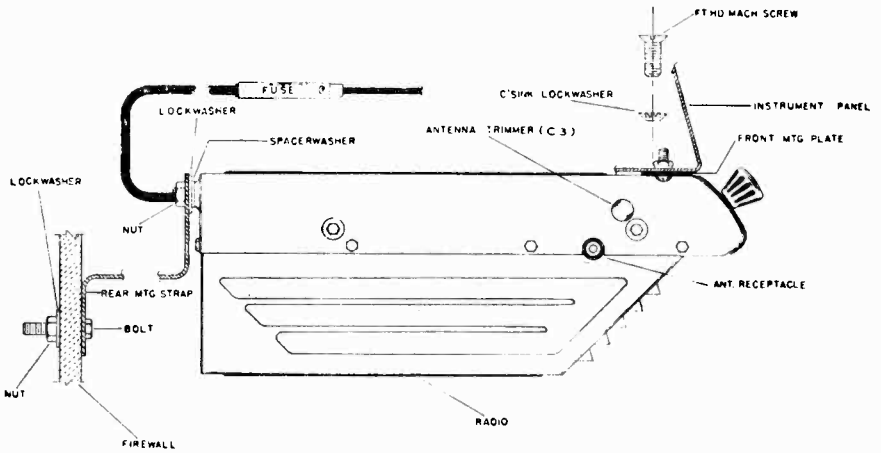

Fig. 2 Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

S84-413 SUPPRESSION KIT & MISC. PARTS ASSEMBLY

1—S84-233	"A" lead assembly
1—A43-10	Fuse
2—A52-295	Control knobs
1—A81-13	Sleeve (for fuse)
1—S84-193	Suppression Kit consisting of:
	1—.5 MFD Condenser
	1—Distributor Suppressor
	20"—Wire Braid

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 1100 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 3) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

S84-192 MOUNTING PARTS KIT

1	1/4" Bolt	2	External Tooth Lock Washers
2	1/4" Lock Washers	2	Internal Tooth Lock Washers
2	1/4" Hexagon Nuts	2	10-32 Hexagon Nuts
2	10-32 x 5/8" Screws	1	Washer-Spacer
2	10-32 x 3/8" Screws		

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression & Misc. Parts Kit, part No. S84-413, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-158.

NOTE: For shipping, the two control knobs have been removed from the tuning and volume control shafts. To install the knobs, line up the flat side of the knob spring (inside knob), with the flat side of the control shaft and push the knob forward until it stops.

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MODEL 602-170144

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	6.2 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	455 KC
Speaker	4" P. M.
Power Output	1.2 watts, undistorted 2.5 watts, maximum
Sensitivity	10 microvolt average for 1 watt output
Selectivity	50 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

A 6X5GT Rectifier is used.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

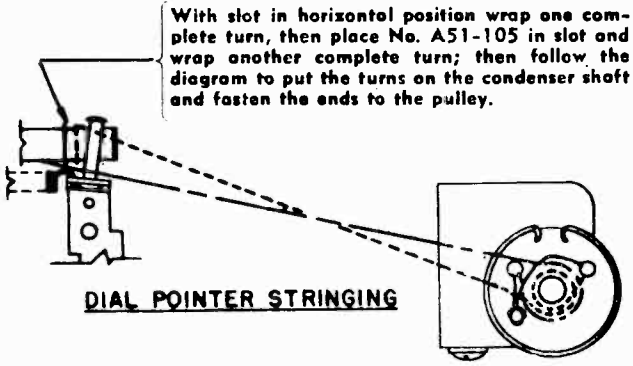
INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

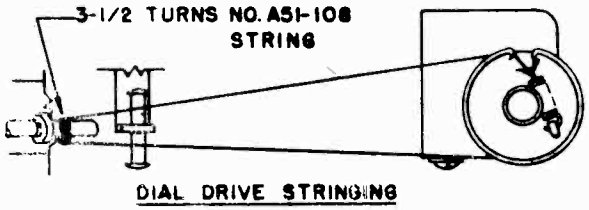
CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.



DIAL POINTER STRINGING



DIAL DRIVE STRINGING

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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD.

For alignment points refer to Figures 5 and 6.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	1600 KC	75 MMFD.	Ant. lead	C1B	Maximum	Oscillator
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C1A	Maximum	Antenna

NOTE: The antenna trimmer condenser, C3, (see Fig. 2) should be adjusted after the radio is installed in the car. Tune the receiver to a weak station at about 1100 KC and adjust this trimmer for maximum volume.

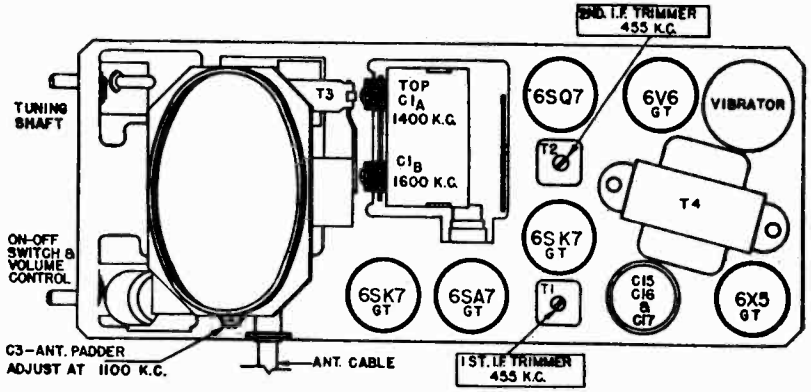

Fig. 5. Tube, Rectifier and Trimmer Locations

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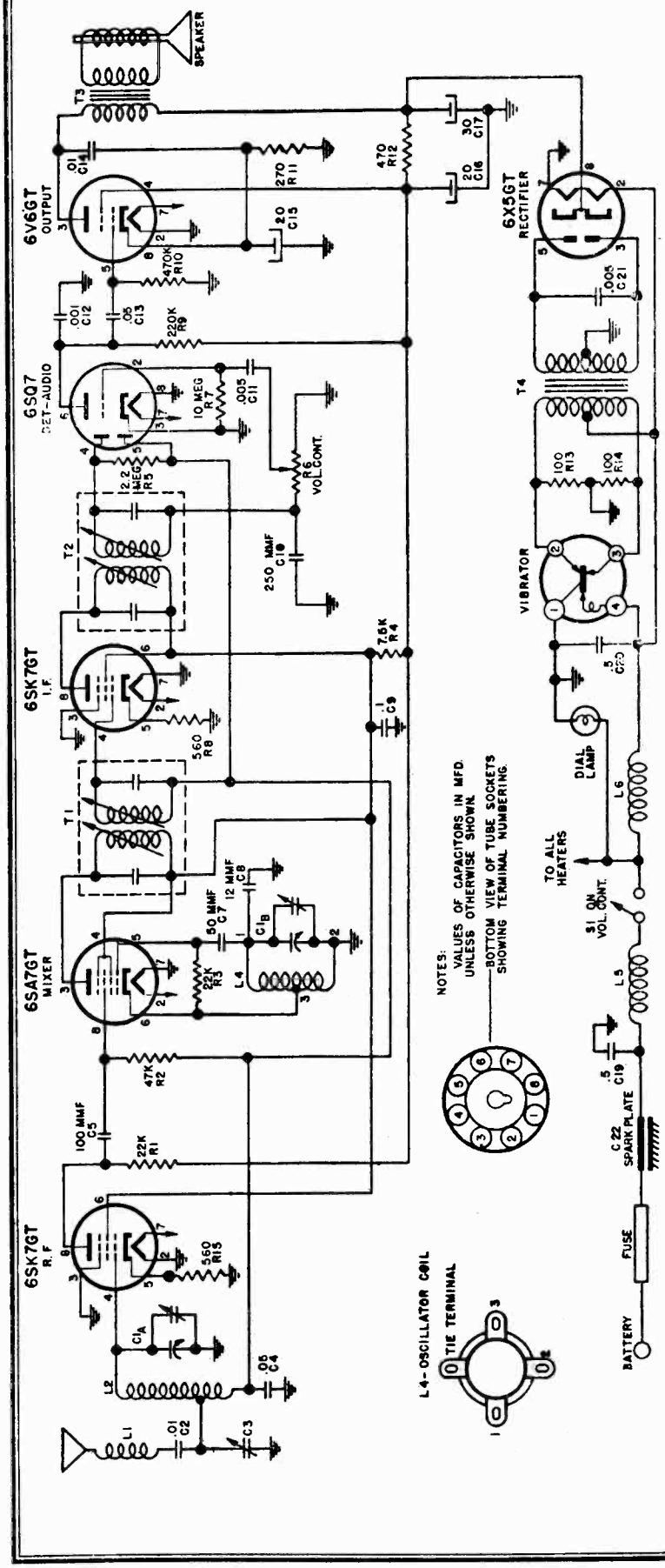

Fig 6. Schematic Diagram

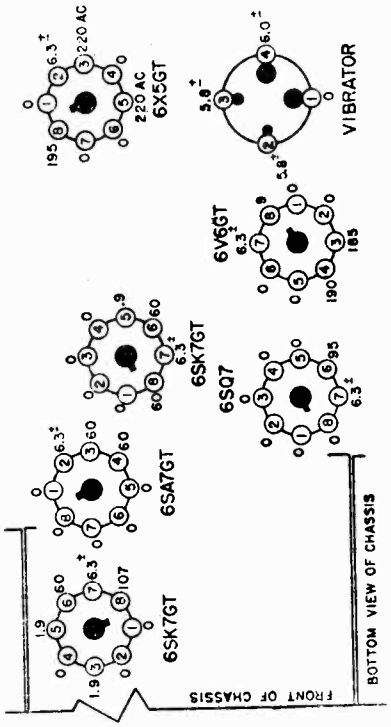

Fig.4. Socket Voltages

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MODEL 602-170144

PARTS LIST

Schematic Diagram Reference	Part No.	Description
CONDENSERS		
C1A, C1B	B19-201	Variable condenser
C2, C14	A16-192	.01 MFD 400 volt condenser
C3	A20-145	Trimmer condenser
C4	A16-189	.05 MFD 400 volt condenser
C5	A15-196	100 MMFD ceramic condenser
C7	A15-204	50 MMFD ceramic condenser
C8	A15-205	12 MMFD ceramic condenser, temp. comp.
C9	A16-187	.1 MFD 400 volt condenser
C10	A15-176	250 MMFD mica condenser
C11	A16-190	.005 MFD 600 volt condenser
C12	A16-195	.001 MFD ceramic condenser
C13	A16-193	.05 MFD 600 volt condenser
C15	A18-289	20 MFD 25 volt electrolytic condenser
C16		20 MFD 350 volt electrolytic condenser
C17		30 MFD 350 volt electrolytic condenser
C19, C20	A16-184	.5 MFD 100 volt condenser
C21	A16-185	.005 MFD 1600 volt oil filled condenser
RESISTORS		
R1, R3	A60-659	22K ohm ½ watt 20% resistor
R2	A60-685	47K ohm ½ watt 20% resistor
R4	A60-769	7.5K ohm 2 watt 10% resistor
R5	A60-726	2.2 megohm ½ watt 20% resistor
R6	A24-177	Volume control, 500,000 ohm, with switch
R7	A60-728	10 megohm ½ watt 20% resistor
R8, R15	A60-758	560 ohm ½ watt 10% resistor
R9	A60-667	220K ohm ½ watt 20% resistor
R10	A60-731	470K ohm ½ watt 20% resistor
R11	A60-771	270 ohm ½ watt 10% resistor
R12	A60-770	470 ohm ½ watt 10% resistor
R13, R14	A60-752	100 ohm ½ watt 10% resistor
COILS AND TRANSFORMERS		
L1	A10-527	Antenna Loading Coil
L2	B10-511	Antenna Coil
L4	A10-512	Oscillator Coil
L5	A33-229	Choke, "A" Line
L6	A33-228	Choke, vibrator hash
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer
T3	B80-242	Output Transformer (Part of Speaker, not furnished separately)
T4	B80-243	Power transformer
DIAL PARTS		
	A11-303	Bracket, Dial Scale
	B11-328	Bracket, String Guide
	A72-29	Bushing, Tuning Shaft Bearing
	A70-130	Clip, Spring, for Tuning Shaft
	A58-55	Dial Pointer
	B67-551	Dial Scale
	A28-101	Gasket for Speaker
	A52-304	Knob
	A11-329	Link, String Guide
	A89-10	Pilot Light, Type G.E. No. 422
	A65-37	Rivet, Shoulder, for Dial Pointer Stringing
	A65-42	Rivet, Shoulder, for String Guide Brkt. and Link
	A65-12	Rivet, Shoulder, for Dial Drive Stringing
	A75-70	Shaft, tuning
	A75-74	Shaft, for Dial Pointer
	A70-132	Spring, for Pilot Light Socket
	A70-135	Spring, Dial Drive String Tension
	A70-142	Spring, Pointer Drive String Tension
	A51-105	String, Pointer Travel, 17"
	A51-108	String, Condenser Drive, 19"
MISCELLANEOUS		
	S84-233	"A" lead assembly
	A83-421	Clip, I.F. Transformer Mounting
	A83-517	Clip, Oscillator Coil Mounting
	A43-10	Fuse, 15 Amp.
	A47-112	Grommet, rubber, (Spkr. & Gang mounting)
	B31-134	Mounting strap, rear
	B31-158	Mounting Plate, Front
	S84-192	Mounting parts kit
	A87-38	Receptacle, Antenna Cable
	B79-379	Speaker, 4" P.M. (includes Output Transformer)
	S84-322	Suppression Kit Assembly
	A34-105	Vibrator
	A83-519	Wiper, grounding, for case covers

Note: Tubular condensers must be high temperature (85°C) wax type.

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INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, and generator condenser. By referring to Figures 1 and 2, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 7/32" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed to the correct angles, as illustrated in Figure 2, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

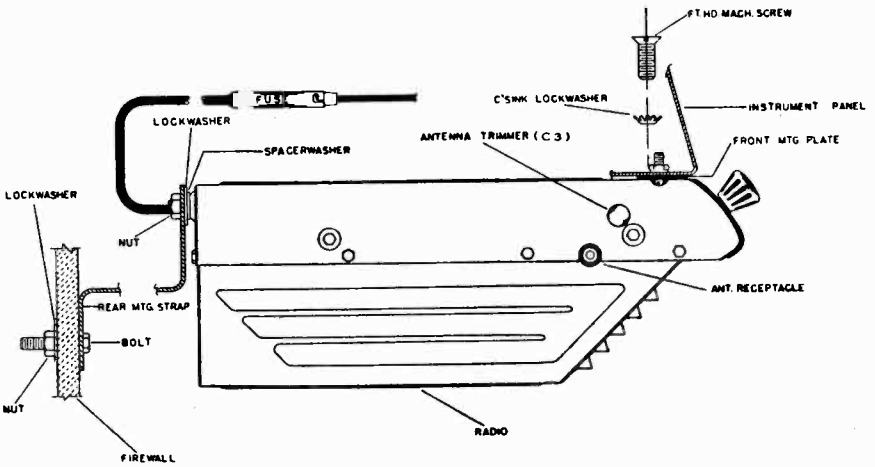

Fig. 2. Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 1100 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 2) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression & Misc. Parts Kit, part No. S84-445, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-158.

NOTE: For shipping, the two control knobs have been removed from the tuning and volume control shafts. To install the knobs, line up the flat side of the knob spring (inside knob), with the flat side of the control shaft and push the knob forward until it stops.

S84-192 MOUNTING PARTS KIT

1 1/4" Bolt	2 External Tooth Lock Washers
2 1/4" Lock Washers	2 Internal Tooth Lock Washers
2 1/4" Hexagon Nuts	2 10-32 Hexagon Nuts
2 10-32 x 5/8" Screws	1 Washer-Spacer
2 10-32 x 3/8" Screws	

S84-445 SUPPRESSION KIT & MISC. PARTS ASSEMBLY

1—S84-233	"A" lead assembly
1—A43-10	Fuse
2—A52-314	Control knobs
1—A81-13	Sleeve (for fuse)
1—S84-322	Suppression Kit consisting of:
	1—.5 MFD Condenser
	1—Distributor Suppressor
	20"—Wire Braid

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MODEL 602-18214

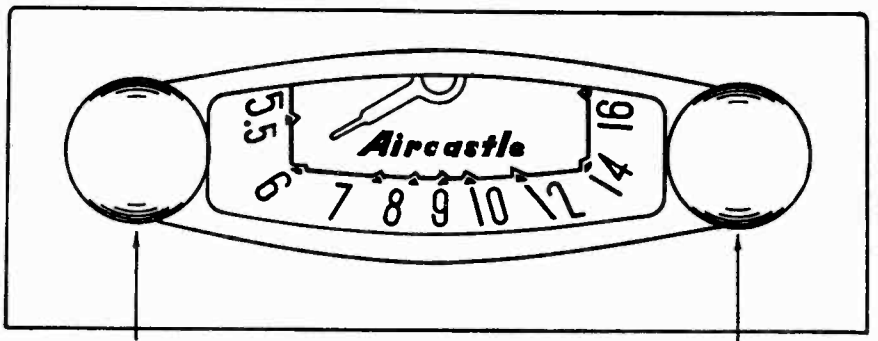

Fig. 1 Front View

SUGGESTIONS FOR ELIMINATING POSSIBLE MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise. (The following steps may not be necessary in all cases. Install your radio and operate it before making changes.)

GENERATOR CONDENSER

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

DISTRIBUTOR SUPPRESSOR

Detach the high tension wire where it goes into the top of the distributor cap and cut two inches off the end. Screw the piece you cut off into one end of the distributor suppressor and then screw the other end of the suppressor on the long wire which leads to the coil. Insert the wire back into the distributor cap.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional .5 MFD condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short wires are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension wire from the coil to the distributor.

HIGH AND LOW TENSION WIRES

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These wires will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. These wires should be placed in a flexible wire shield and the shield grounded to frame or motor. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension wires.

BONDING OF FIRE WALL

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A ¼" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

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MODEL 602-182144

ELECTRICAL SPECIFICATIONS

Power Supply.....6.3 volts DC
Current.....6.2 amp. average
Frequency Range.....540 to 1600 KC
I. F. Frequency.....455 KC
Speaker.....4" P. M.
Power Output.....1.2 watts, undistorted
2.5 watts, maximum
Sensitivity.....10 microvolt average for 1 watt output
Selectivity...50 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—LF. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

A 6X5GT Rectifier is used.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

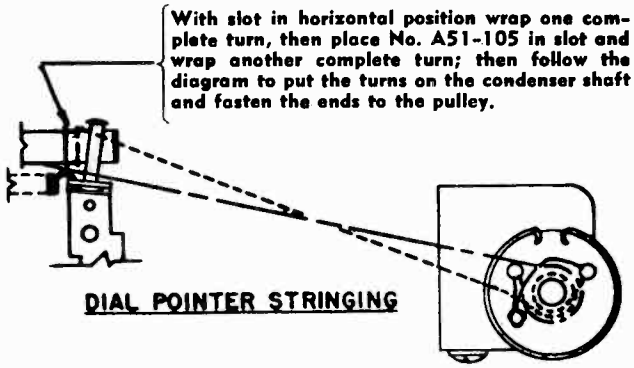
INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

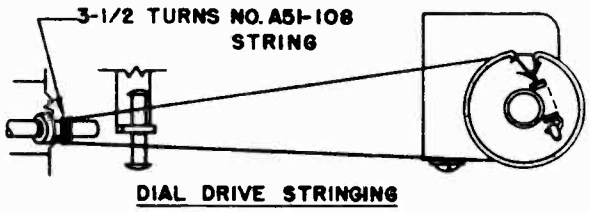
The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.





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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD.

For alignment points refer to Figures 5 and 6.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	455 KC	75 MMFD.	Ant. lead	L3	Minimum	Wave trap
Fully Open	1600 KC	75 MMFD.	Ant. lead	C1B	Maximum	Oscillator
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C3	Maximum	Antenna

NOTE: The antenna trimmer condenser, C3, (see Fig. 2) should be adjusted after the radio is installed in the car. Tune the receiver to a weak station at about 1100 KC and adjust this trimmer for maximum volume.

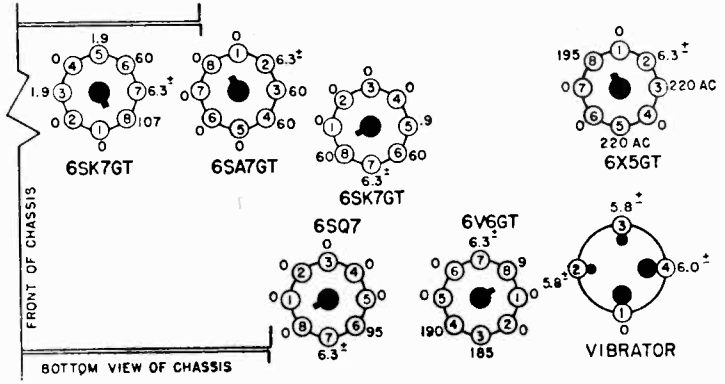

Fig.4. Socket Voltages

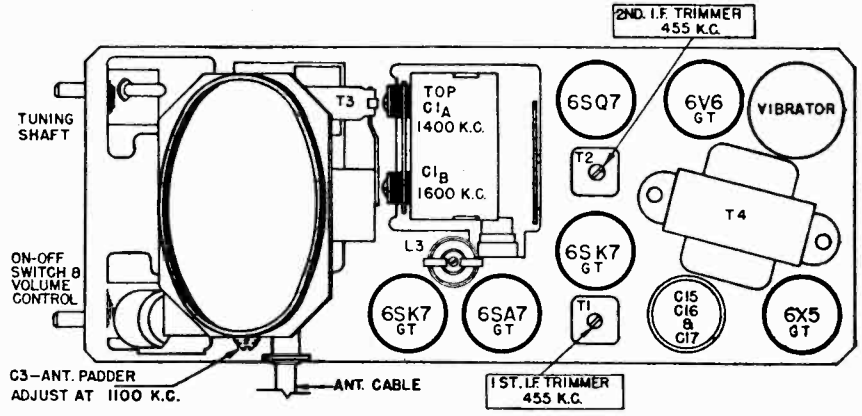

Fig. 5. Tube, Rectifier and Trimmer Locations

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MODEL 602-182144

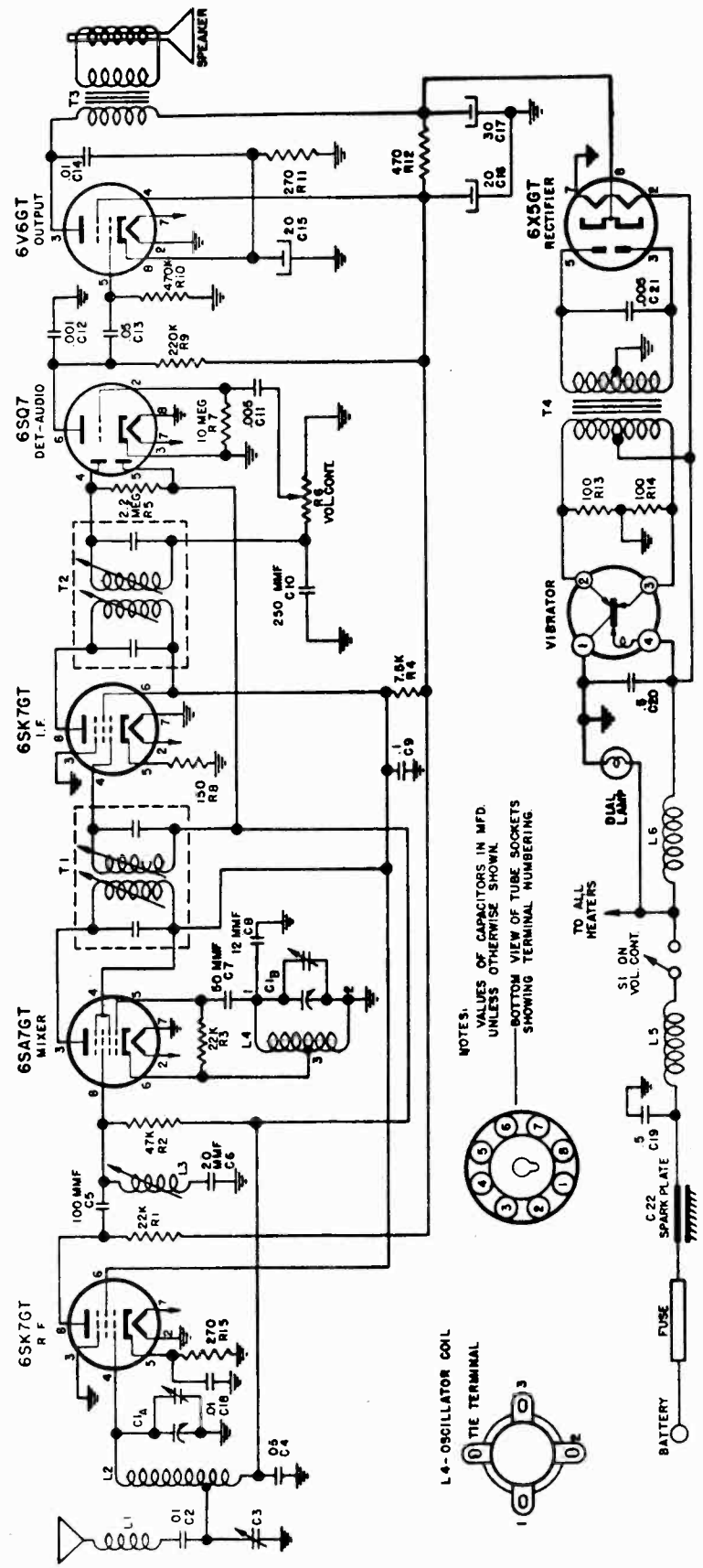

Fig 6. Schematic Diagram

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MODEL 602-1821/44

Schematic Diagram Reference	Part No.	Description
		CONDENSERS
C1A, C1B	B19-201	Variable condenser
C2, C14, C18	A16-192	.01 MFD 400 volt condenser
C3	A20-145	Trimmer condenser
C4	A16-189	.05 MFD 400 volt condenser
C5	A15-196	100 MMFD ceramic condenser
C6	A15-202	20 MMFD ceramic condenser
C7	A15-204	50 MMFD ceramic condenser
C8	A15-205	12 MMFD ceramic condenser, temp. comp.
C9	A16-187	.1 MFD 400 volt condenser
C10	A15-176	250 MMFD mica condenser
C11	A16-190	.005 MFD 600 volt condenser
C12	A16-195	.001 MFD ceramic condenser
C13	A16-193	.05 MFD 600 volt condenser
C15 C16 C17	A18-289	20 MFD 25 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 30 MFD 350 volt electrolytic condenser
C19, C20	A16-184	.5 MFD 100 volt condenser
C21	A16-185	.005 MFD 1600 volt oil filled condenser
		RESISTORS
R1, R3	A60-659	22K ohm ½ watt 20% resistor
R2	A60-685	47K ohm ½ watt 20% resistor
R4	A60-769	7.5K ohm 2 watt 10% resistor
R5	A60-726	2.2 megohm ½ watt 20% resistor
R6	A24-182	Volume control, 500,000 ohm, with switch
R7	A60-728	10 megohm ½ watt 20% resistor
R8	A60-767	560 ohm ½ watt 10% resistor
R9	A60-667	220K ohm ½ watt 20% resistor
R10	A60-731	470K ohm ½ watt 20% resistor
R11, R15	A60-771	270 ohm ½ watt 10% resistor
R12	A60-770	470 ohm ½ watt 10% resistor
R13, R14	A60-752	100 ohm ½ watt 10% resistor
		COILS AND TRANSFORMERS
L1	A10-527	Antenna Loading Coil
L2	B10-511	Antenna Coil
L3	A10-510	I.F. Trap Coil
L4	A10-512	Oscillator Coil
L5	A33-229	Choke, "A" Line
L6	A33-228	Choke, vibrator hash
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer
T3	B80-242	Output Transformer (Part of Speaker, not furnished separately)
T4	B80-243	Power transformer
		DIAL PARTS
	A11-303	Bracket, Dial Scale
	B11-328	Bracket, String Guide
	A72-36	Bushing, Tuning Shaft Bearing
	A70-130	Clip, Spring, for Tuning Shaft
	A58-55	Dial Pointer
	B67-551	Dial Scale
	A28-101	Gasket for Speaker
	A52-314	Knob
	A11-329	Link, String Guide
	A89-10	Pilot Light, Type G.E. No. 422
	A65-37	Rivet, Shoulder, for Dial Pointer Stringing
	A65-42	Rivet, Shoulder, for String Guide Brkt. and Link
	A65-12	Rivet, Shoulder, for Dial Drive Stringing
	A75-83	Shaft, tuning
	A75-74	Shaft, for Dial Pointer
	A70-132	Spring, for Pilot Light Socket
	A70-135	Spring, Dial Drive String Tension
	A70-142	Spring, Pointer Drive String Tension
	A51-105	String, Pointer Travel, 17"
	A51-108	String, Condenser Drive, 19"
		MISCELLANEOUS
	S84-233	"A" lead assembly
	A83-421	Clip, I.F. Transformer Mounting
	A83-517	Clip, Oscillator Coil Mounting
	A43-10	Fuse, 15 Amp.
	A47-112	Grommet, rubber, (Spkr. & Gang mounting)
	B31-134	Mounting strap, rear
	B31-158	Mounting Plate, Front
	S84-192	Mounting parts kit
	A87-38	Receptacle, Antenna Cable
	B79-360	Speaker, 4" P.M. (includes Output Transformer)
	S84-322	Suppression Kit Assembly
	A34-105	Vibrator
	A83-519	Wiper, grounding, for case covers

Note: Tubular condensers must be high temperature (85°C) wax type.

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DESCRIPTION

Your New Aircastle Radio is a 4-Tube Superhetrodyne receiver designed to cover a frequency range of from 540 kilocycles to 1725 kilocycles (K.C.). The tubes used are--

1A7 GT--Osc. Converter
1N5 GT--I.F. Amplifier
1H5 GT--AVC Det. Audio Amplifier
3Q5 GT--Power Output

INSTALLATION

This receiver has been designed to operate on a self-contained battery containing both the 'B' battery (90 Volts) and the 'A' Battery (1½ Volts) Aircastle No. 1491.

After inserting the battery plug of the receiver into the socket on the battery, the battery may be placed inside the cabinet in the space provided.

Anyone of the following batteries may also be used with this receiver: Eveready No. 748, General No. 60D1-11 L, Burgess No. 17G-D60, Ray-O-Vac No. AB 82.

For best results an outside antenna about 75-100 feet long, including the lead-in, should be used. It should be erected as high as possible, and as far away from surrounding objects as practical. When the receiver is used close to powerful broadcasting stations it may be desirable to use a shorter antenna. (For most ordinary instalations use Aircastle House Mast Aerial No. 1396.)

To obtain the best possible performance a good ground should be used. This can be a water pipe, or a galvanized pipe driven into the ground. It should be connected to the ground lead (black) of the receiver. Connect the antenna wire to the other lead coming from the receiver.

OPERATION

Turn the 'On-Off' Switch and Volume Control (left-hand Control) to the right about half its range. This supplies power to the receiver. Now select the desired station by rotating the 'Station Selector', (right-hand Control). For best tone, always tune the desired station with the Volume turned low. This enables you to get the exact point where the station comes in best. Then adjust the Volume Control to the desired level.

ALIGNMENT PROCEDURE

Volume control--Maximum: all adjustments.
Connect ground lead of signal generator to chassis.
Connect dummy antenna in series with output lead of signal generator.
Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.
Output meter.
Non-metallic screwdriver.
Dummy antennas--.1 mfd., .00025 mfd.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	1A7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	455 KC	.1	1A7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	1725 KC	.00025	Antenna Lead	C1B	Oscillator
Tune in signal from generator	1400 KC	.00025	Antenna Lead	C1A	Antenna

VOLTAGE CHART

All voltages measured with a 1000 ohm per volt meter on the 150 volt scale. For the following voltages the "B" battery section of the power pack should read 90 volts under load, the "A" section 1½ volts.

TUBE	PIN NUMBERS							
	1	2	3	4	5	6	7	8
1A7	0	1.5	85	37	0	85	0	0
1N5	0	1.5	85	85	0	0	0	0
1H5	0	1.5	17	0	0	0	0	0
3Q5	0	1.5	83	85	0	5	1.5	

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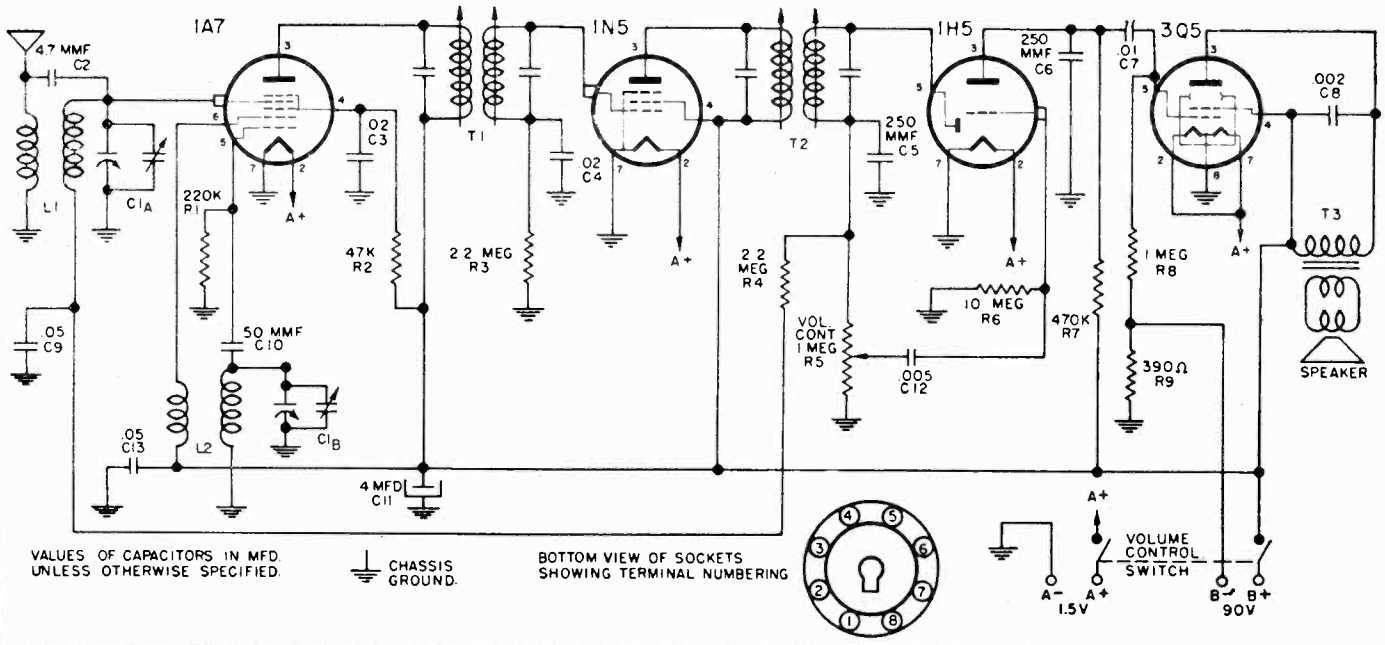
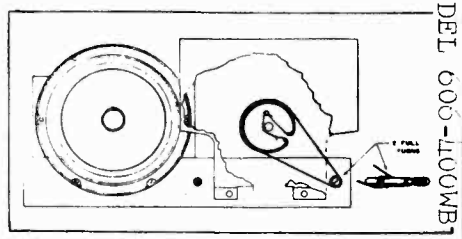


FIG. 1 SCHEMATIC DIAGRAM



Dial Mechanism

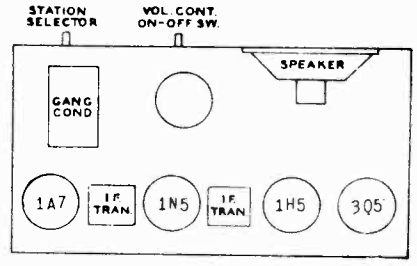


FIG. 2 TUBE AND TRIMMER LOCATIONS

HOW TO ORDER REPAIR PARTS

Always give the part No. (No. printed on the part if different from that shown on this list), and the name of the part. When number is not available give complete description of the part. Be sure to always give the Model No. and Catalog No. The Model No. will be found on either the metal plate at the rear of the chassis or on a printed label which may be found on the chassis or cabinet.

Circuit Diagram Reference	Part No.	Description
C1A, C1B	B19-188	Variable Condenser
C2	A83-355	4.7 MMFD Condenser
C3, C4	A16-150	.02 MFD 400 volt condenser
C5, C6	A15-176	250 MMFD mica condenser
C7	A16-156	.01 MFD 400 volt condenser
C8	A16-155	.002 MFD 600 volt condenser
C9, C13	A16-152	.05 MFD mica condenser
C10	A15-175	50 MMFD mica condenser
C11	A18-273	4 MFD 150 volt electrolytic condenser
C12	A16-153	.005 MFD 600 volt condenser
R1	A60-667	220K ohm ½ watt resistor
R2	A60-685	47K ohm ½ watt resistor
R3, R4	A60-684	2.2 megohm ½ watt resistor
R5	A24-170	Volume control, 1 megohm
R6	A60-663	10 megohm, ½ watt resistor
R7	A60-662	470K ohm ½ watt resistor
R8	A60-668	1 megohm ½ watt resistor
R9	A60-665	390 ohm ½ watt resistor
L1	A10-485	Antenna coil
L2	A10-505	Oscillator coil
T1, T2	A10-506	1st and 2nd I.F. transformer
T3	B80-232	Output transformer
	B79-352	Speaker, 5" P.M.
	A75-60	Tuning Shaft
	A45-118	Battery plug
	B67-515	Dial scale
	58-31	Dial pointer
	48-21	Dial crystal
	D42-437	Cabinet walnut, wood
	A52-245	knob, walnut

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TECHNICAL INFORMATION FOR SERVICE

ALIGNMENT PROCEDURE

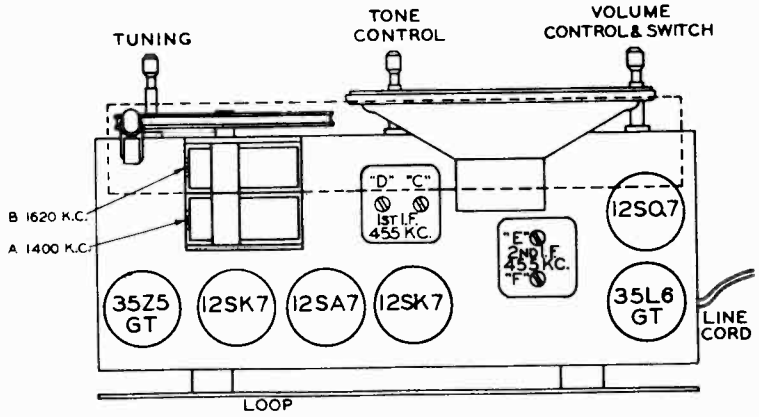
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control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

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

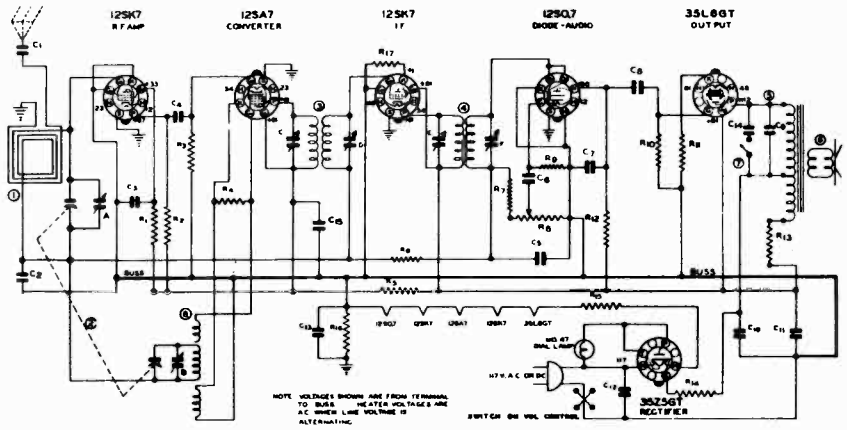
I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective position on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mtd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

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

TUBE LOCATION CHART



SCHEMATIC DIAGRAM AND PARTS LIST



Circuit Diagram Reference	Part No.	Description
C1, C8, C9	N-1344	Condenser, Paper .01 MFD. 400V.
C2	N-1345	Condenser, Paper .05 MFD. 200V.
C4	N-2383	Condenser, Mica 150 MMFD. 500V. 20%
C5	N-1374	Condenser, Mica 100 MMFD. 500V. 20%
C6	N-4894	Condenser, Paper .005 MFD. 600V.
C7	N-4890	Condenser, Paper .0005 MFD. 600V.
C10} C11}	N-5051	Electrolytic {40 MFD. 150V.} {40 MFD. 150V.}
C12, C14	N-1346	Condenser, Paper .05 MFD. 400V.
C13	N-5160	Condenser, Paper .2 MFD. 200V.
C15	N-1351	Condenser, Paper .1 MFD. 200V.
R1, R3, R7	N-4063	Resistor 47,000 Ohm ½W. 20%
R2	N-4896	Resistor 2,200 Ohm ½W. 10%
R4	N-5351	Resistor 22,000 Ohm ½W. 20%
R5	N-4066	Resistor 470 Ohm ½W. 10%
R6	N-1262	Resistor 1.0 Megohm ½W. 20%
R8	N-5026	Resistor 0.5 Megohm Volume Control
R9	N-4061	Resistor 4.7 Megohm 0.5W. 20%
R10	N-4027	Resistor 470,000 Ohm ½W. 20%
R11	N-4067	Resistor 180 Ohm ½W. 10%
R12, R16	N-4026	Resistor 220,000 Ohm ½W. 20%
R13	N-4900	Resistor 1200 Ohm 1.0W. 10%
R14	N-4022	Resistor 33 Ohm ½W. 20%
R15	N-4628	Resistor 33 Ohm 1.0W. 10%
R17	N-5857	Resistor 82 Ohm ½W. 10%
1	N-5765	Antenna Loop Coil
2	N-7106	Variable Condenser
3	N-4872	1st I.F. Transformer
4	N-5571	2nd I.F. Transformer
5	N-4875	Output Transformer
6	N-4868	5" P.M. Speaker
7	N-4942	Tone Switch
8	N-7139	Oscillator Coil
	# 222	Cabinet — Ivory Plastic
	# 248	Cabinet — Walnut Plastic

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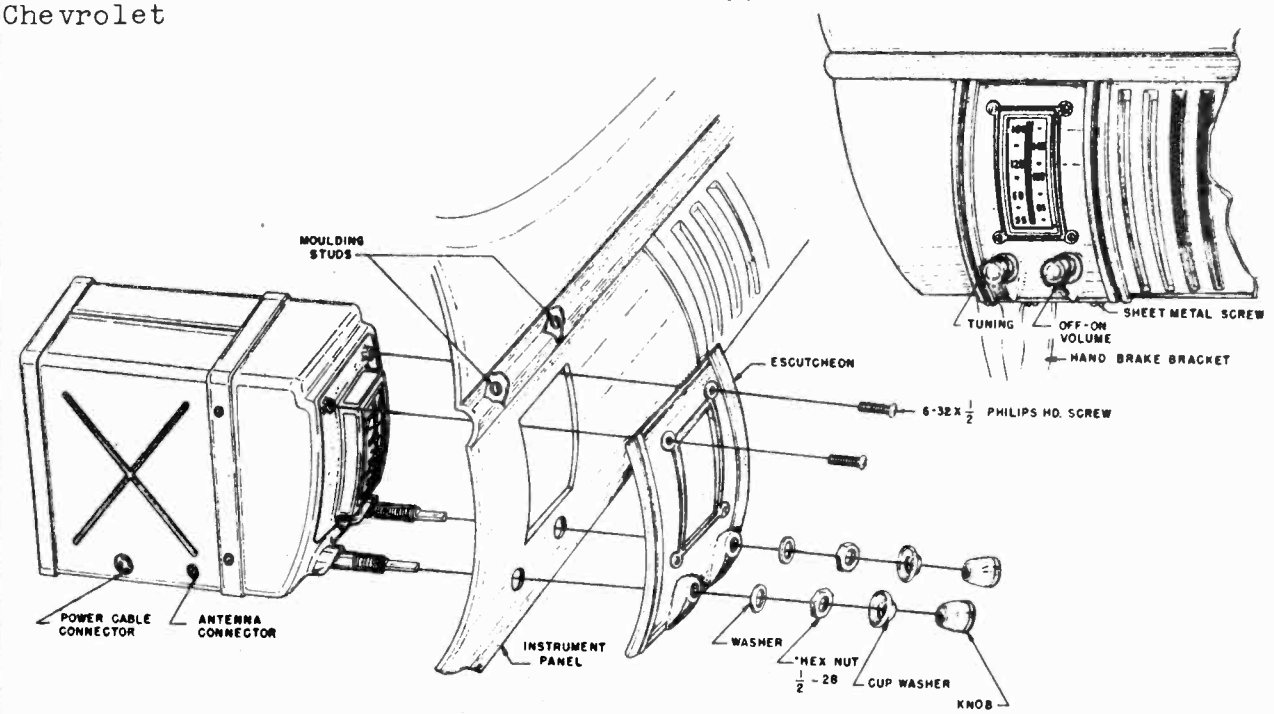
MODEL 610.C300,
Chevrolet

INSTALLATION



R.F. TUNING UNIT DETAIL MOUNTING ASSEMBLY

Fig. 1

R. F. TUNING UNIT

1. Loosen nuts on the two moulding studs located behind the instrument panel cover plate.
2. Remove sheet metal screw from the lower edge of the instrument panel cover plate and the two screws and washers attaching the hand brake to the instrument panel. Keep these parts.
3. Remove instrument panel cover plate and discard.
4. Tighten nuts on the two moulding studs located behind the instrument panel cover plate.
5. Drop vent controls by removing screws, lockwashers, and flat washers securing these controls to the instrument panel. This will facilitate installation of both receiver units. Save parts removed.
6. Install R.F. Tuning Unit behind instrument panel so that mounting bushings and tuningshafts protrude through the instrument panel.
7. Slide plastic escutcheon over mounting bushings and secure with flat washers, nuts, cup washers, and knobs as shown in Fig. 1
8. Secure top part of plastic escutcheon to R.F. Tuning Unit with two No. 6-32 x ½" long Philips Head screws.

POWER SUPPLY UNIT

1. Insert a thin blade screwdriver or a flat strip of metal through the Radio Grille and slit fiberboard Radio Grille screen. Reach in back of Radio Grille and remove screen by grasping slit edge. Discard fiberboard screen.
2. Remove 10-32 nuts and washers from the moulding studs behind the Radio Grille.
3. Remove 10-32 nuts, screws, and washers securing the lower tabs of the Radio Grille to the instrument panel.
4. Install Power Supply Unit behind Radio Grille and position into place so that holes in top of unit slide over moulding studs as shown in Fig. 2.

NOTE: It may be more convenient, in car models with air conditioner heaters, to remove the vibrator before installing this unit. The vibrator can be replaced after the power unit is mounted.

5. Replace 10-32 nuts and washers on moulding studs.
6. Replace lower grille tab 10-32 mounting screws, nuts, and washers so that screws secure the lower grille tabs and Power Supply Unit to the instrument panel.
7. Connect cable from Power Supply Unit to R.F. Tuning Unit.
8. Replace vent controls.
9. Replace screws and washers securing hand brake.

Connect battery lead to terminal on *Ignition Switch.*

Plug Antenna cable into receiver.

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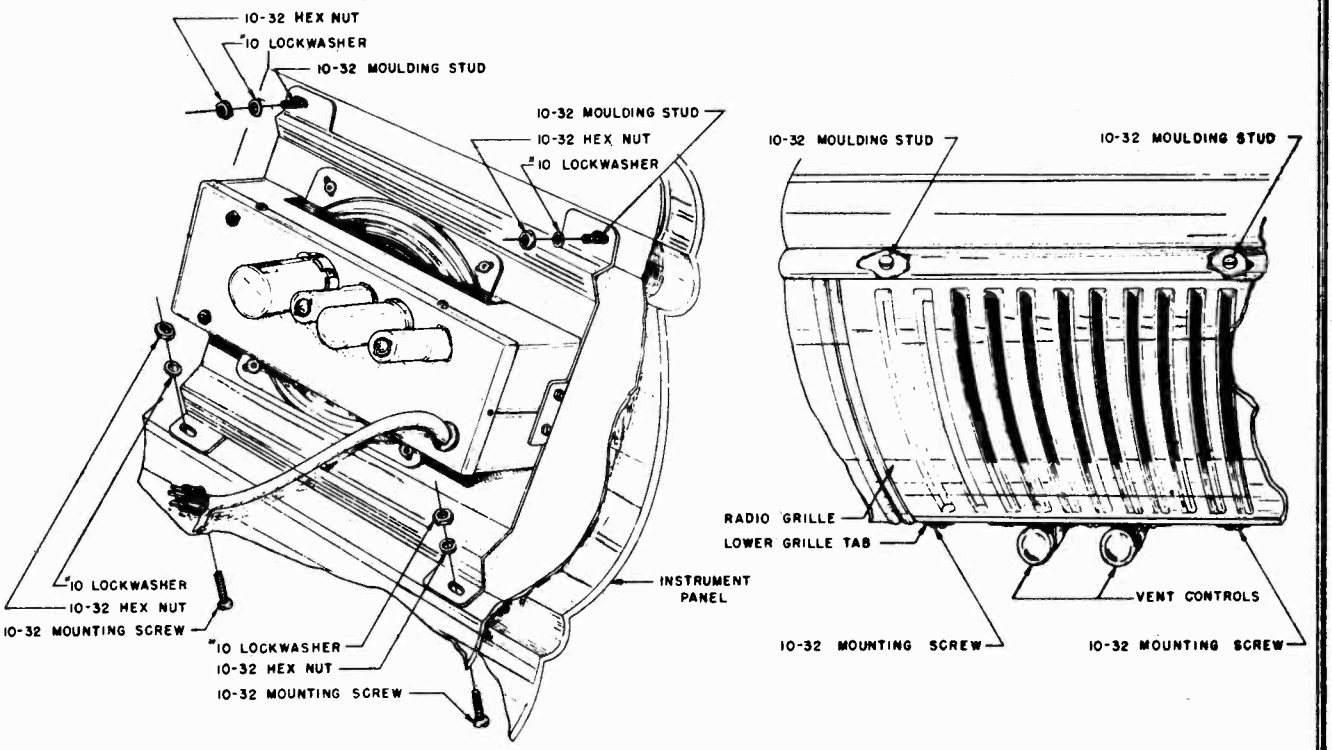
MODEL 610.C300,
Chevrolet



POWER SUPPLY UNIT DETAIL MOUNTING ASSEMBLY

Fig. 2

MOTOR NOISE ELIMINATION

SUPPRESSION KIT

A suppression kit is shipped with this receiver. It contains the following parts:

1 Generator Condenser.

1 Distributor Suppressor.

GENERATOR CONDENSER

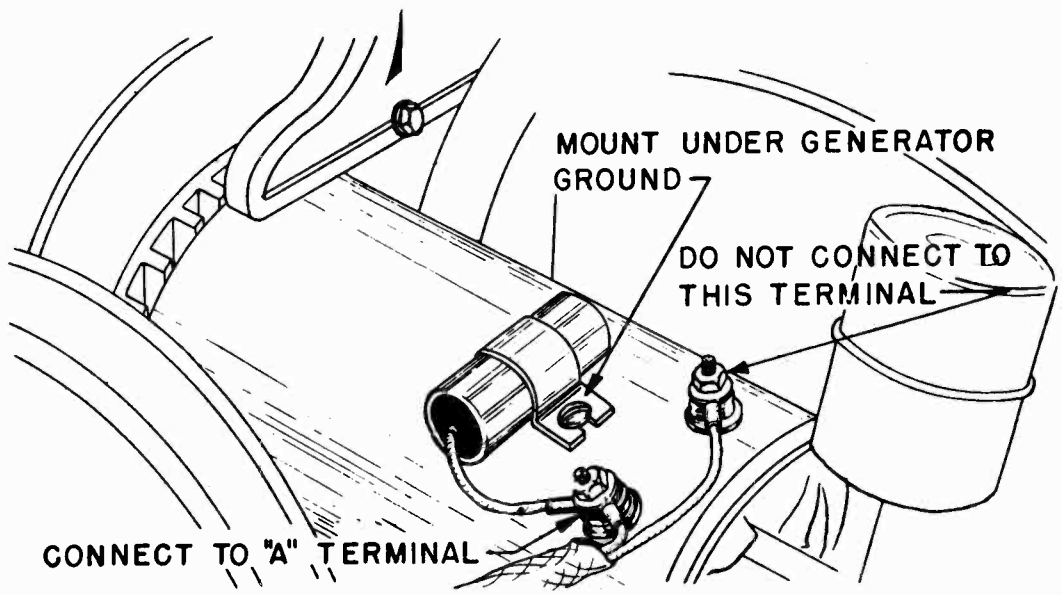


Fig. 3

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MODEL 610.C300, Chevrolet

DISTRIBUTOR SUPPRESSOR

Disconnect the center lead in the distributor head of the motor. Cut lead approximately 2 inches back from metal tip end. Screw suppressor into cut end of long lead. Screw cut end of short lead into suppressor. Plug lead, with attached suppressor, back into distributor head.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

AMMETER CONDENSER

A .5 MFD by-pass condenser should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

HOW TO ORDER PARTS

Always give the part No. (No. printed on the part if different from that shown on this list), and the name of the part. When No. is not available, give complete description of part. Be sure to always give the Model No. and Catalog No. The Model No. will be found on either the metal plate at the rear of the chassis or on a printed label which may be on the chassis or cabinet.

SERVICE DATA FOR PROFESSIONAL SERVICE MEN

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 Volts DC
Current	5.5 Amp. average
Frequency Range	538-1600 KC
Speaker	5¼" PM
Power Output	2 watts, undistorted 3 watts, maximum
Sensitivity	2-3 microvolts average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:
1—6BA6—RF Amplifier
1—6BE6—Converter
1—6BA6—I. F. Amplifier
1—6AT6—Detector—AVC—1st Audio
1—6AQ5—Power Output
1—6X4—Rectifier

SERVICE NOTES

Voltage taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 Ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 5).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components such as tubes, condensers, resistors, etc. are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "Alignment Procedure". After realignment has been completed repeat the procedure as final check.

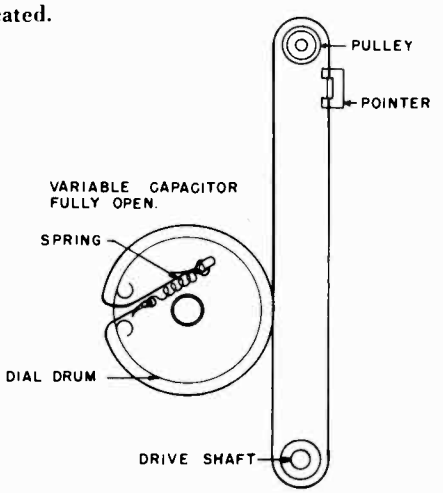

Fig. 4 DIAL CORD DRIVE (REAR VIEW)

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MODEL 610.C300,
Chevrolet

ALIGNMENT PROCEDURE

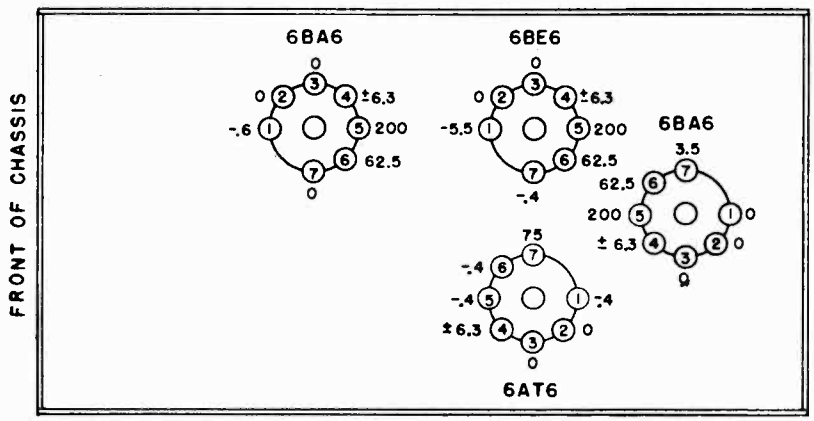
Volume control—Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas—.1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

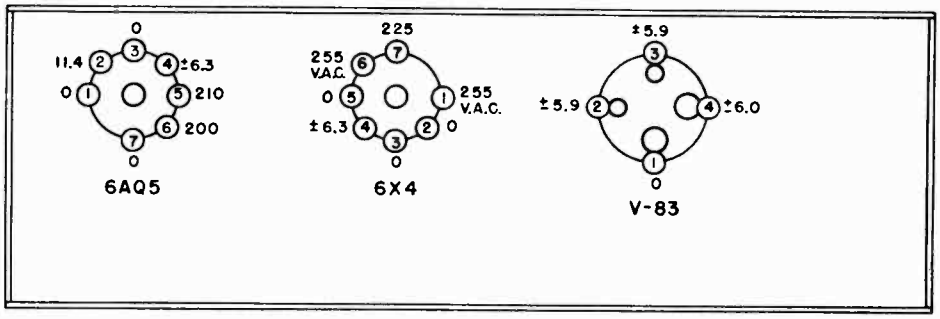
Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connector*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in Signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna

8) Repeat steps 4 and 5

BOTTOM VIEW OF CHASSIS



BOTTOM VIEW OF POWER PACK



SOCKET VOLTAGES

Fig. 5

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MODEL 610.C300

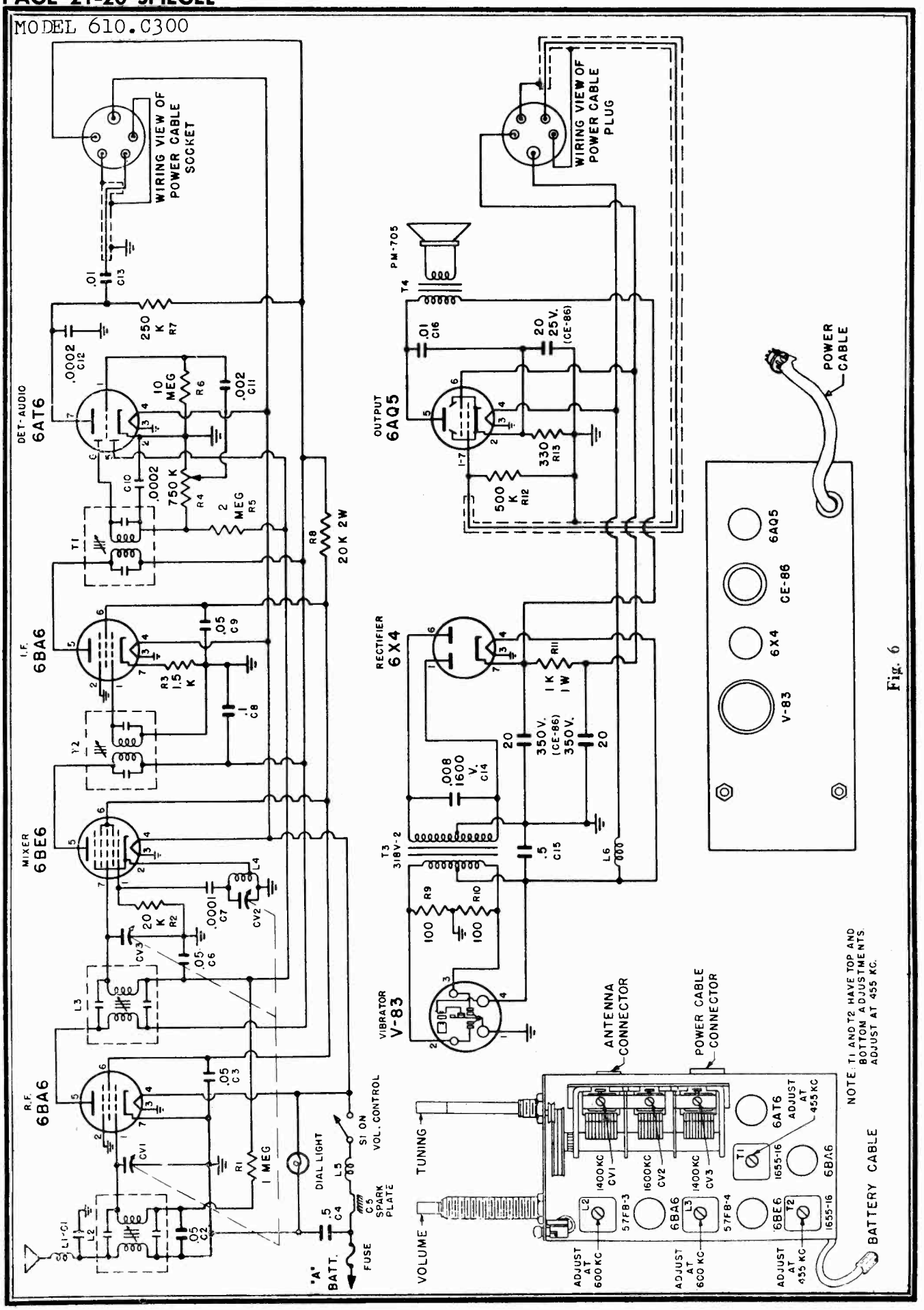

Fig. 6

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MODEL 610.C300, Chevrolet

PARTS AND PRICE LIST

CONDENSERS

Schematic Diagram Reference	*Part No.*	*Description*
C2, C3, C6, C9	C207	.05 MFD 200 volt condenser
C4, C15	C209	.5 MFD 100 volt condenser
C7	CC200	100 MMFD ceramic condenser
C8	C210	.1 MFD 400 volt condenser
C10, C12	CC201	200 MMFD ceramic condenser
C13, C16	C206	.01 MFD 600 volt condenser
C14	C205	.008 MFD 1600 volt condenser
C11	C211	.002 MFD 400 volt condenser
CE-86	CE-86	20 MFD 350 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
CV1-CV2-CV3	CV-300	3 section variable tuning

RESISTORS

R1	R309	1 megohm ½ watt 20% resistor
R2	R306	20K ohm ½ watt 20% resistor
R3	R314	1.5K ohm ½ watt 20% resistor
R4	RV-300	Volume control ¾ megohm with switch
R5	R310	2 megohm ½ watt 20% resistor
R6	R311	10 megohm ½ watt 20% resistor
R7	R307	250K ohm ½ watt 20% resistor
R8	R313	20K ohm 2 watt 20% resistor
R9, R10	R301	100 ohm ½ watt 20% resistor
R11	R312	1K ohm 1 watt 20% resistor
R12	R308	500K ohm ½ watt 20% resistor
R13	R303	330 ohm ½ watt 20% resistor

COILS AND TRANSFORMERS

L1-C1	L200	Motor noise elimination unit
L2	57FB-3	Antenna coil
L3	57FB-4	R.F. coil
L4	L201	R.F. oscillator coil
L5	L203	Choke, "A" line
L6	L202	Choke, vibrator hash
T1	1655-16	2nd IF transformer
T2	1655-16	1st IF transformer
T3	TV-100 or 318V-2	Vibrator transformer
T4		Output transformer (Part of speaker not furnished separately)

DIAL PARTS

D300	Dial Scale
PS300	Dial Pointer
DS300	Drive Shaft Assembly
H201	Grommet, rubber drive
T51	Pilot Light
H214	Pilot Light Socket
H203	Pulley, idler
H204	Spring, Dial drive String Tension
H215	String, dial drive

MISCELLANEOUS

A300	"A" lead assembly
H301	Case, less covers for Power Supply Unit
H300	Case, complete with covers for R.F. tuning unit
H207	Clip, Anti-rattle
H208	Clip, coil mounting
H302	Cover, power supply unit mounting (with speaker louvres)
A201	Fuse 15 Amp.
504PC-300	Power Cable Assembly (complete with plug)
H212	Receptacle, Antenna cable
504-FC	Socket, power cable
PM-705	Speaker, 5¼" PM (includes output transformer)
V-83	Vibrator
H310	Knob
H311	Cup washer
H312	Plastic Escutcheon

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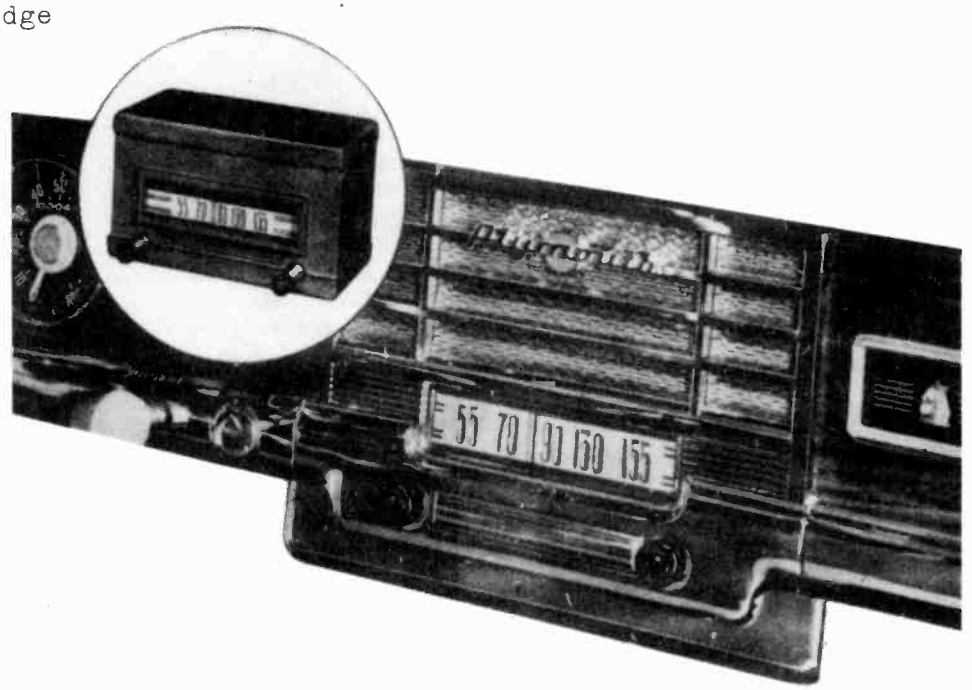
MODEL 610.D200,
Plymouth, Dodge



INSTALLATION

PLYMOUTH P18 SPECIAL DELUXE

1. Remove four screws securing Radio Grill in place and remove Radio Grill.
2. Remove dummy plates covering radio dial and control openings.
3. Enlarge holes in radio control cover plate to ½ inch.
4. Remove knobs, cup washers, hex nuts and washers from control shafts and mounting bushings.
5. Secure two mounting brackets to Radio Grill with ⅜ inch long 10-32 self-tapping screws and cup washers as shown in detail assembly drawing.
6. Place radio control cover plate over mounting bushings.
7. Position receiver behind Radio Grill so that mounting bushings and shafts protrude through the grill.
8. Attach receiver by replacing washers and hex nuts on mounting bushings.
9. Replace cup washers and knobs over shafts.
10. Secure receiver to mounting brackets with two No. 8 self-tapping wing nuts.
11. Insert radio with attached grill through front opening on instrument panel.
12. Replace grill mounting screws.
13. Connect battery lead to terminal marked "ACC" on ignition switch.
14. Plug antenna cable into receiver.

DODGE "CORONET"

Install in the same manner as outlined for the P18 DeLuxe Plymouth except do not remove radio grill.

PLYMOUTH P17, P18 4-DOOR DELUXE AND P18 CLUB COUPE DELUXE DODGE "WAYFARER" AND "MEADOWBROOK"

These models are not equipped by the car manufacturers with a radio grill or a radio control cover plate.

The following parts must be obtained from any authorized Plymouth or Dodge dealer before an installation can be made in any of these cars.

Plymouth P17, P18 4-Door DeLuxe, P18 Club Coupe DeLuxe
- Radio Grill No. 1299913
- Radio control cover No. 1248700

Dodge "Meadowbrook" or "Wayfarer"
- Radio Grill No. 1301360
- Radio control cover No. 1255080

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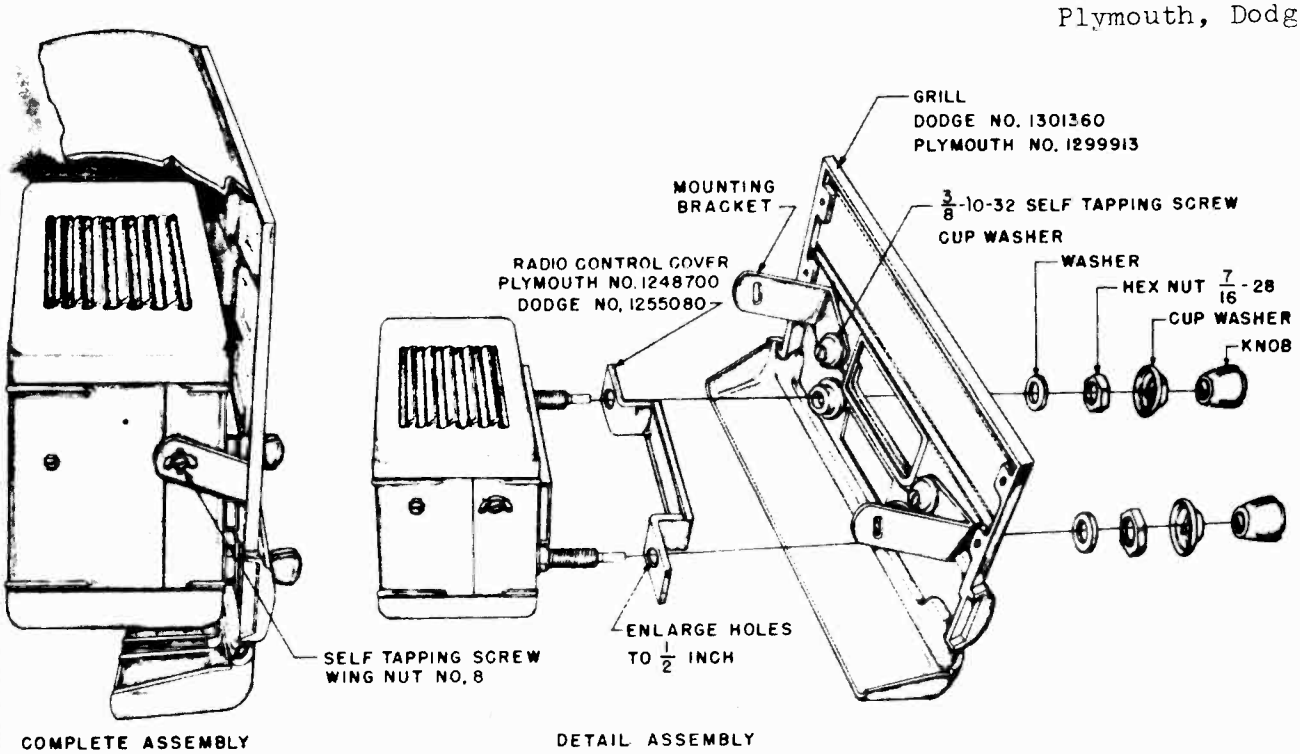
Plymouth, Dodge



ACCESSORIES FURNISHED FOR INSTALLATION

MOUNTING PARTS KIT

The following mounting hardware parts are shipped attached to the receiver. (See detail assembly drawing FIG. 2)

2 Washers
2 7/16-28 hex nuts
2 Cup washers
2 Knobs
2 Mounting Brackets
2 No. 8 self-tapping wing nut screws

An envelope containing additional mounting hardware is supplied with this receiver. It contains the following parts:

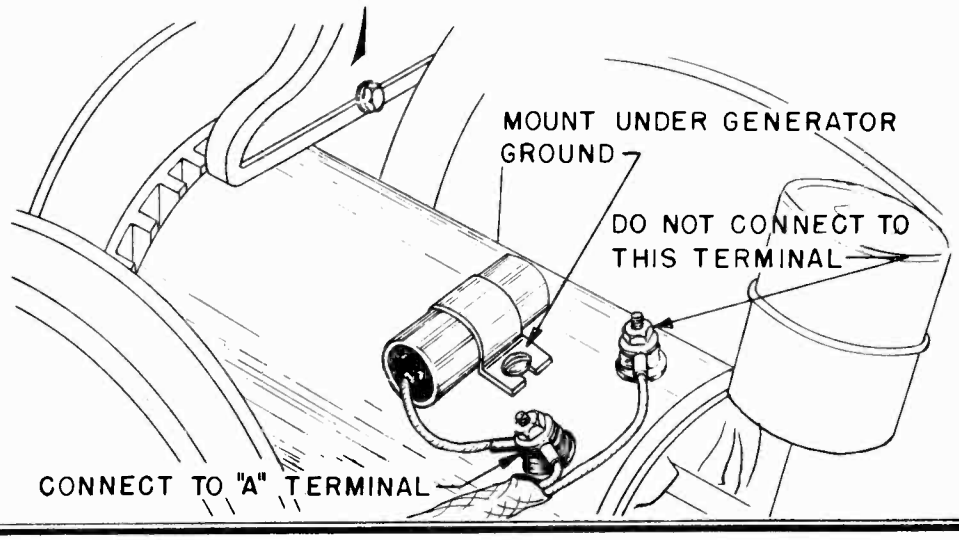
2 3/8 10-32 self-tapping screws
2 Cup washers

SUPPRESSION KIT

1 Distributor Suppressor
1 .5 MFD Generator Condenser

MOTOR NOISE ELIMINATION

GENERATOR CONDENSER



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MODEL 610.D200,
Plymouth, Dodge

DISTRIBUTOR SUPPRESSOR

NOTE: 1950 Dodge and Plymouth automobiles do *not* require distributor suppressors.

1949 DODGE AND PLYMOUTH

Remove metal tip from the distributor center tower lead and screw lead into the suppressor. Plug suppressor with attached lead back into distributor head.
The generator condenser and distributor suppressor should eliminate all objectionable motor noise in most cases. If the motor noise persists the following steps should be taken. Check operation of radio as each step is made.

WHEEL STATIC

Wheel static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present, it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

AMMETER CONDENSER

A .5 MFD by-pass condenser should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby.

ELECTRICAL ACCESSORIES

In some cases, it may be found that car accessories such as electric heaters, lighters, automatic relays or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of interference is found. The condenser then should be permanently mounted in this location.

ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary to proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas—.1 MFD., 100 MMFD.
For alignment points refer to *Schematic Diagram*

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connector*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T4 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T3 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	T2	Maximum	RF Stage
7) Tune in Signal from generator	600 KC	100 MMFD	Ant. lead	T1	Maximum	Antenna
8) Repeat steps 4 and 5						

HOW TO ORDER REPAIR PARTS

Always give the part No. (No. printed on the part if different from that shown on this list), and the name of the part. When No. is not available, give complete description of part. Be sure to always give the Model No. and Catalog No. The Model No. will be found on either the metal plate at the rear of the chassis or on a printed label which may be on the chassis or cabinet.

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MODEL 610.D200,
Plymouth, Dodge

PARTS AND PRICE LIST

CONDENSERS

Schematic Diagram Reference	*Part No.*	*Description*
C2, C3, C4	C207	.05 MFD 200 volt condenser
C5	CC200	100 MMFD ceramic condenser
C6, C13, C14	CC201	200 MMFD ceramic condenser
C7	C203	.002 MFD 200 volt condenser
C8, C9	C206	.01 MFD 600 volt condenser
C10, C11	C209	.5 MFD 100 volt condenser
C12	C205	.008 MFD 1600 volt condenser
CE-86	CE-86	20 MFD 350 volt electrolytic condenser 20 MFD 350 volt electrolytic condenser 20 MFD 25 volt electrolytic condenser
CV-200	CV-200	3 section variable tuning condenser

RESISTORS

R1	R309	1 megohm ½ watt 20% resistor
R2	R306	20K ohm ½ watt 20% resistor
R3	R305	2K ohm ½ watt 20% resistor
R4	R310	2 megohm ½ watt 20% resistor
R5	R311	10 megohm ½ watt 20% resistor
R6	R307	250K ohm ½ watt 20% resistor
R7	R308	500K ohm ½ watt 20% resistor
R8	R303	330 ohm ½ watt 20% resistor
R9	R313	20K ohm 2 watt 20% resistor
R10, R11	R301	100 ohm ½ watt 20% resistor
R12	R312	1K ohm 1 watt 20% resistor
RV-200	RV-200	Volume control ¾ megohm with switch

COILS AND TRANSFORMERS

L1-C1	L200	Motor noise elimination unit
L2	57FB-3	Antenna Coil
L3	57FB-4	RF coil
L4	L201	RF Oscillator coil
L5	L202	Choke, vibrator hash
L6	L203	Choke, "A" line
T1	1655-16	1st IF transformer
T2	1655-16	2nd IF transformer
T3		Output transformer (Part of speaker not furnished separately)
T4	TV-200	Vibrator transformer

DIAL PARTS

D200	Dial Scale
PS200	Dial Pointer
DS200	Drive shaft assembly
H201	Grommet, rubber drive
T51	Pilot light
H202	Pilot light socket
H203	Pulley, idler
H204	Spring, Dial Drive Spring Tension
H205	String

MISCELLANEOUS

A200	"A" lead assembly
H206	Case (less covers)
H207	Clip, anti-rattle
H208	Clip, coil mounting
H209	Cover, bottom case
H210	Cover, top case (with speaker louvres)
A201	Fuse, 15 Amp.
H211	Grommet, rubber, gang mounting
H212	Receptacle, antenna cable
PM-200	Speaker 4" x 6" PM (includes output transformer)
V-83	Vibrator

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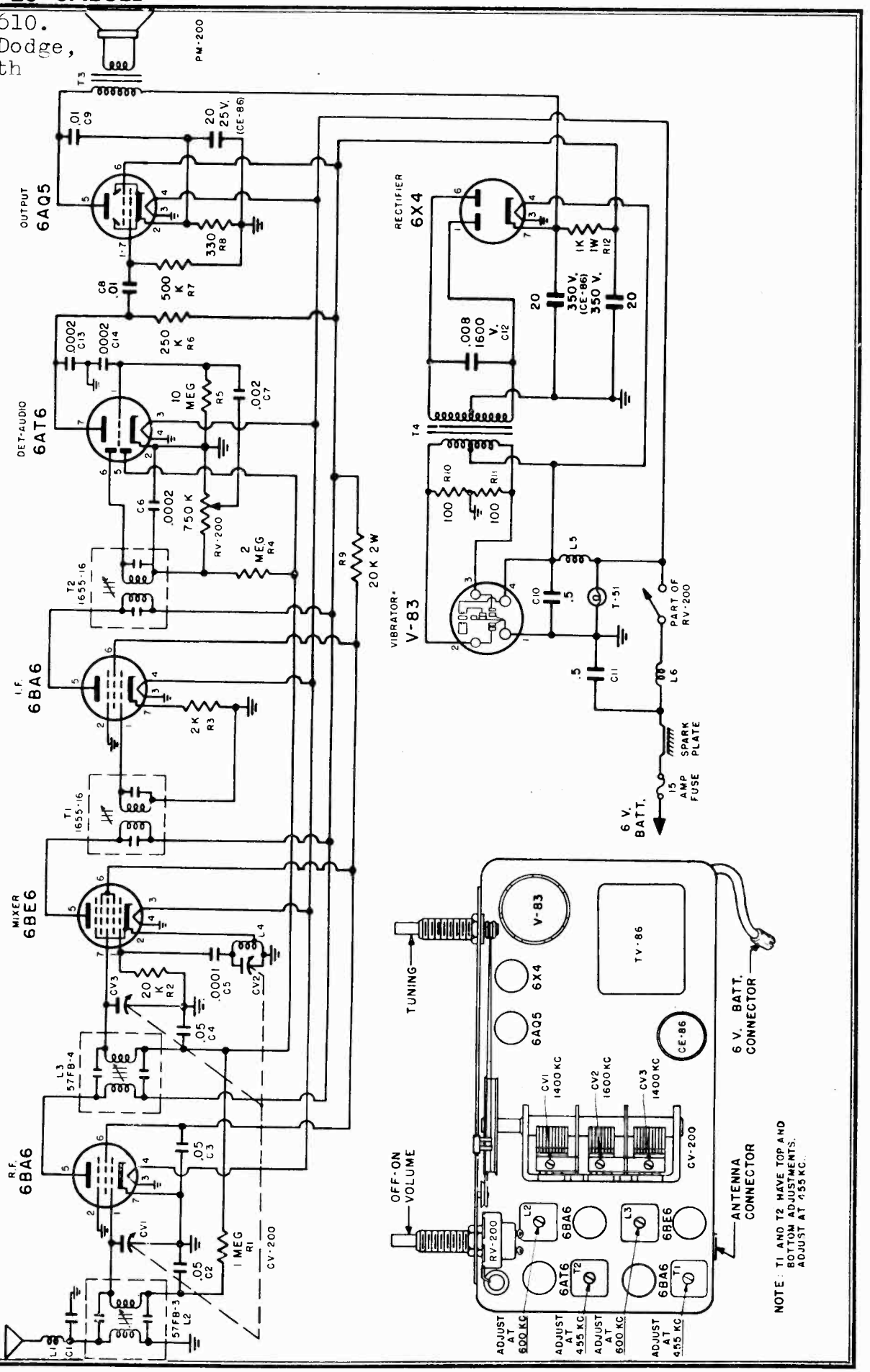
MODEL 610.
D200, Dodge,
Plymouth



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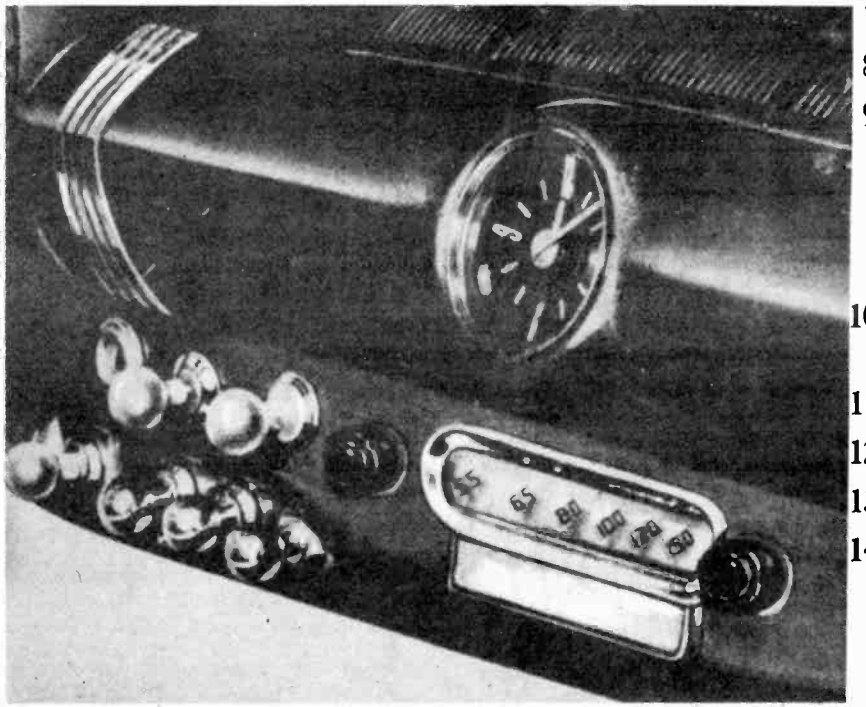

INSTALLATION

1. Remove two speed nuts securing radio opening cover plate to instrument panel.
2. Remove cover plate.
3. Place speaker and power pack unit over four threaded stud bolts located on the underside of the instrument panel. (Position power pack unit so that power cable is located on the right hand side.) See Fig. 1.
4. Secure power pack into position with four 8-32 wing nuts supplied in kit of mounting hardware.
5. Remove knobs, cup washers and hex mounting nuts from tuning unit. *Do not remove* escutcheon.
6. Place tuning unit behind instrument panel so that mounting bushings and shafts protrude through the front panel.
7. Attach tuning unit with a hex nut on each mounting bushing.
8. Replace cup washers and knobs over shafts.
9. Secure a supporting bracket (2 supplied in kit of hardware) to each side of the power pack unit by means of two No. 8 self tapping screws. Use end of supporting bracket with round hole. If more convenient, these brackets may be attached before power pack unit is positioned in place.
10. Swing supporting brackets so that slotted holes are in line with the holes on each side of the tuning unit.
11. Secure to tuning unit with two No. 8 self tapping screws.
12. Insert power cable plug into socket on rear of tuning unit.
13. Plug antenna cable into tuning unit.
14. Connect "A" lead to accessory terminal marked RAD. GA, on the ignition switch.

PARTS AND PRICE LIST

CONDENSERS

SCHEMATIC DIAGRAM REFERENCE	PART NO.	DESCRIPTION
C2, C3, C6, C9	C207	.05 MFD 200 volt condenser
C4, C15	C209	.5 MFD 100 volt condenser
C7	CC200	100 MMFD ceramic condenser
C8	C210	.1 MFD 400 volt condenser
C10, C12	CC201	200 MMFD ceramic condenser
C13, C16	C206	.01 MFD 600 volt condenser
C14	C205	.008 MFD 1600 volt condenser
CE-86	CE-86	20 MFD 350 volt electrolytic conden. 20 MFD 350 volt electrolytic conden. 20 MFD 25 volt electrolytic conden.
CV-300	CV-300	3 section variable tuning

RESISTORS

R1	R309	1 megohm ½ watt 20% resistor
R2	R306	20 K ohm ½ watt 20% resistor
R3	R314	1.5 K ohm ½ watt 20% resistor
R4	RV-300	Volume control 3/4 megohm with switch
R5	R310	2 megohm ½ watt 20% resistor
R6	R311	10 megohm ½ watt 20% resistor
R7	R307	250 K ohm ½ watt 20% resistor
R8	R313	20K ohm 2 watt 20% resistor
R9, R10	R301	100 ohm ½ watt 20% resistor
R11	R312	1K ohm 1 watt 20% resistor
R12	R308	500K ohm ½ watt 20% resistor
R13	R303	330 ohm ½ watt 20% resistor

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COILS AND TRANSFORMERS

L1-C1	L200	Motor noise elimination unit
L2	57FB-3	Antenna coil
L3	57FB-4	R.F. coil
L4	L201	R.F. oscillator coil
L5	L203	Choke, "A" line
L6	L202	Choke, vibrator hash
T1	1655-16	1st IF transformer
T2	1655-16	2nd IF transformer
T3	TV100 or 318V-2	Vibrator transformer Output transformer (Part of speaker not furnished separately)

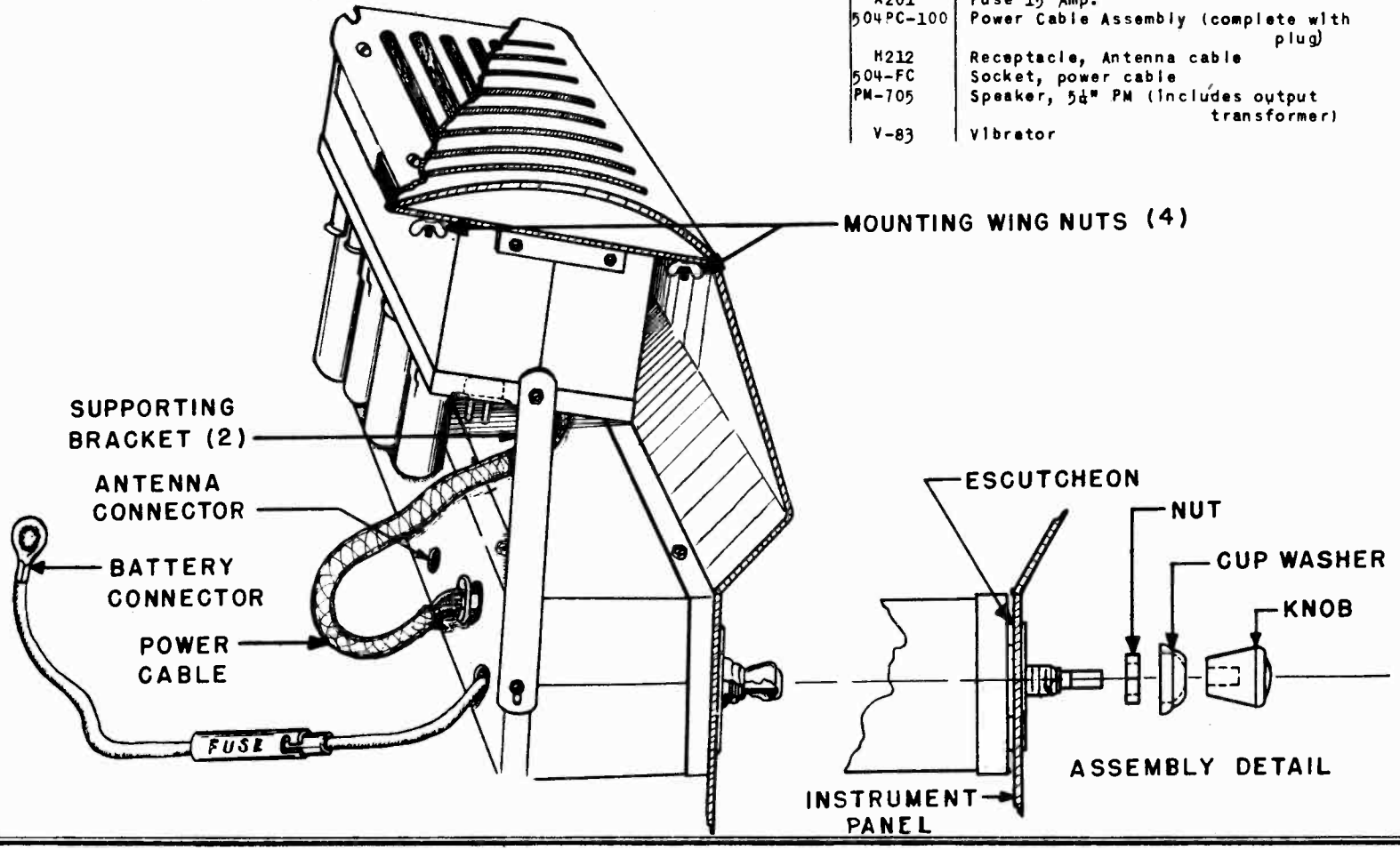
DIAL PARTS

F-100	Dial Scale
PS-800	Dial Pointer

H201	Grommet, rubber drive
T51	Pilot Light
H214	Pilot Light Socket
H203	Pulley, idler
H204	Spring, Dial drive String Tension
H215	String, dial drive

MISCELLANEOUS

A100	"A" lead assembly
H101	Case, less covers for Power Supply unit
H100	Case, complete with covers for R.F. tuning unit
H207	Clip, Anti-rattle
H208	Clip, coil mounting
H102	Cover, power supply unit mounting (with speaker louvres)
A201	Fuse 15 Amp.
504PC-100	Power Cable Assembly (complete with plug)
H212	Receptacle, Antenna cable
504-FC	Socket, power cable
PM-705	Speaker, 5¼" PM (includes output transformer)
V-83	Vibrator



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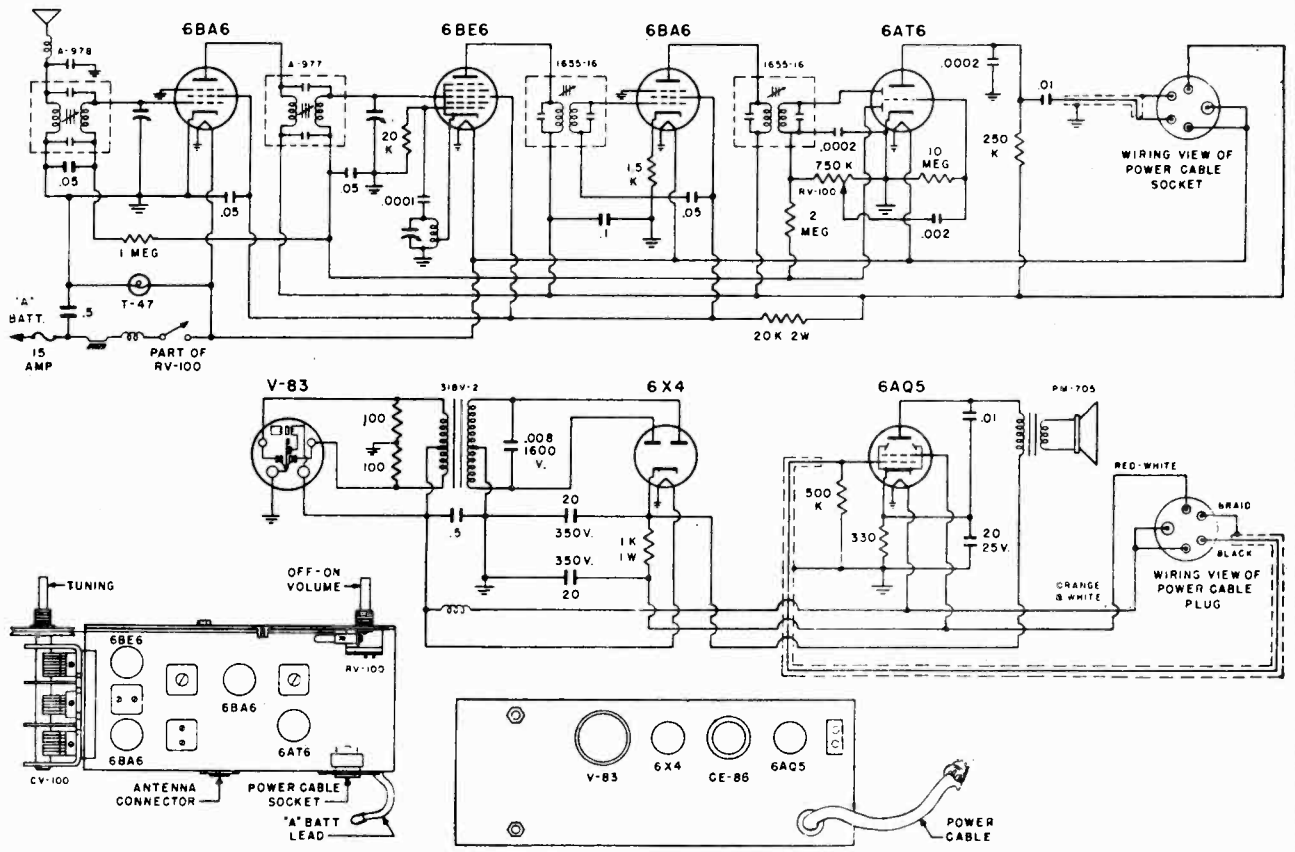
MODEL 610.F100,
Ford



ALIGNMENT PROCEDURE

Volume control— Maximum, all adjustments.
No signal applied to antenna.
Power input—6.3 volts.
Connect dummy antenna in series with output lead of signal generator.
Connect ground lead of signal generator to chassis.
Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:
Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.
Non-metallic screwdriver.
Output meter. (1.8 volt for 1 watt output.)
Dummy antennas—.1 MFD., 100 MMFD.
For alignment points refer to Schematic Diagram.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connector*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
1) Fully open	455 KC	.1 MFD	6BE6 Grid	T2 Top & bottom	Maximum	Output I.F.
2) Fully open	455 KC	.1 MFD	6BE6 Grid	T1 Top & bottom	Maximum	Input I.F.
3) Fully open	1600 KC	100 MMFD	Ant. lead	CV2	Maximum	Oscillator
4) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV3	Maximum	RF Stage
5) Tune in signal from generator	1400 KC	100 MMFD	Ant. lead	CV1	Maximum	Antenna
6) Tune in signal from generator	600 KC	100 MMFD	Ant. lead	L3	Maximum	RF Stage
7) Tune in Signal from generator	600 KC	100 MMFD	Ant. lead	L2	Maximum	Antenna
8) Repeat steps 4 and 5						

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TECHNICAL INFORMATION FOR SERVICE

ALIGNMENT PROCEDURE

I. F. Alignment

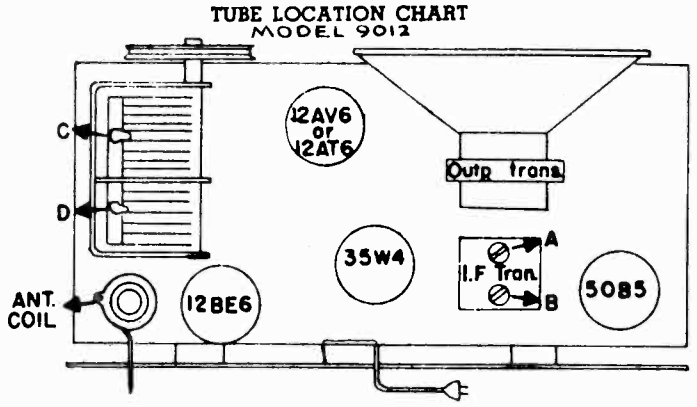
1. Set variable condenser to high frequency end of dial.
2. Connect suitable output meter to voice coil of speaker.
3. Connect signal generator to grid of BE6 through .05 condenser. Connect ground side of generator to B-.
4. Adjust trimmers A and B for maximum output at 455 Kc.
5. Repeat trimmer adjustment for peak sensitivity.

R. F. Alignment

1. Set variable condenser to extreme high frequency end of dial.
2. Connect signal generator to antenna input terminal on antenna coil through 50 mmf. condenser.
3. Set generator to 1720 Kc.
4. Set trimmer C to 1720 Kc.
5. Set generator to 1400 Kc. and tune receiver dial to maximum response.
6. Adjust trimmer D for maximum output at 1400 Kc.
7. Check tracking and make necessary compensations.

PARTS LIST

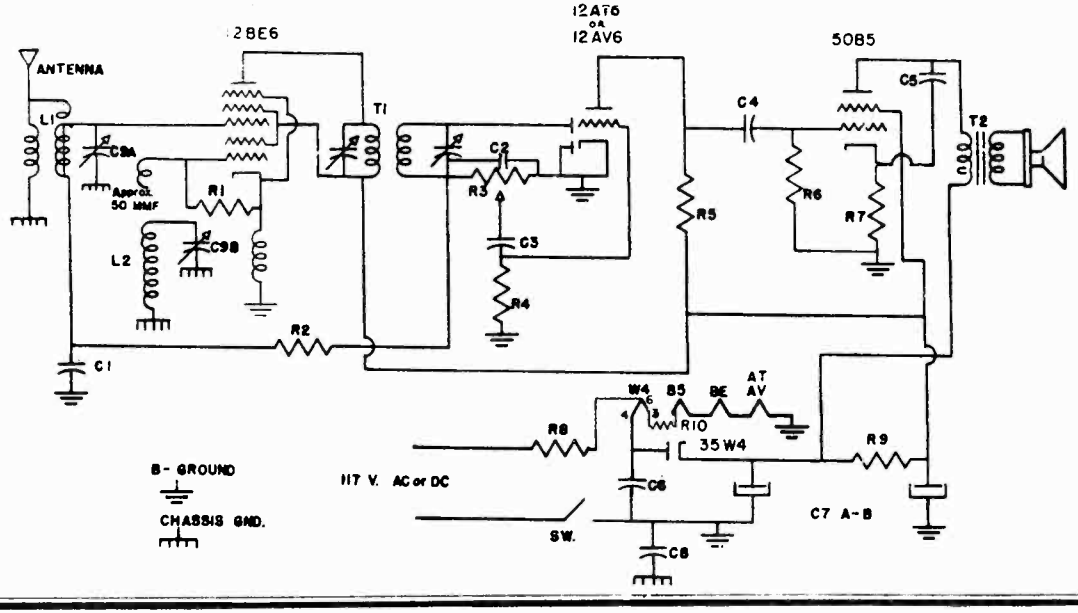
	PART	DESCRIPTION
C7	CLP-10017	Cond. electrolytic, 30-20 mfd. 150 V.
C2	CMP-15251	Cond. mica, .00025 mfd. 500 V.
C1	CPP-12203	Capacitor paper tubular .02 mfd. 200 V.D.C.
C3,4	CPP-12502	Capacitor paper tubular .005 mfd. 200 V (D.C.)
C6,8	CPP-12503	Capacitor paper tubular .05 mfd. 200 V (D.C.)
C5	CPP-14103	Capacitor paper tubular .01 mfd. 400
C9A-B	CVP-100018A	Condenser variable, osc. 162 19 plates, 450 mfd.
R4	RC-31005	Resistor carbon 10 meg, ½ watt
R1	RC-31002	Resistor carbon 10,000 ohm, ½ watt
R7	RC-31500	Resistor carbon 150 ohm, ½ watt
R2	RC-32204	Resistor carbon 2.2 meg, ½ watt, 20%
R5,6	RC-34703	Resistor carbon 470,000 ohm, ½ watt, 20%
R8	RC-40220	Resistor carbon 22 ohm, 1 watt
R9	RC-31001	Resistor carbon 1000 ohm, ½ watt
R10	RC-40470	Resistor carbon 47 ohm, 1 watt 20%
T2	SRP-10007	Speaker, 3 inch transformer mounted
L2	TRC-10017	Oscillator coil, 5 lug
L1	TRF-10018	Antenna coil
T1	TS-10039	I.F. transformer (automatic No. 1455-11)
R3	VC-12106E	Volume control with switch 1 meg-¼ inch shaft
	XC-10020	Back cover plate, cardboard, non-waxed
	DS-10112	Dial scale and nameplate
	HF-1003	Washer, white felt ¼ inch I.D.x5/80. D.x1/16 thick
	HX-10027	"T" fastner (to fit .150 hole)
	K-10036W	Knob, set screw Ivory or Walnut
	K-10042W	Knob push-on with pointer Ivory or Walnut
	ZP-10025WorU	Cabinet



CIR. SYM.	PART NO.	DESCRIPTION
R1	RC-31002	RESISTOR CARBON 10,000 Ohm 1/2 W
R2	RC-32204	" " 2.2 MEG Ohm 1/2 W
R3	VC-12106-E	VOLUME CONTROL 1 MEG WITH SWITCH
R4	RC-31005	RESISTOR CARBON 10 MEG Ohm 1/2 W
R5, 6	RC-34703	" " 470,000 Ohm 1/2 W
R7	RC-31500	" " 150 Ohm 1/2 W
R8	RC-40220	" " 22 Ohm 1 W
R9	RC-31001	" " 1000 Ohm 1/2 W
T1	TS-10039	TRANSFORMER I.F.
T2	SR-10007	TRANSFORMER OUTPUT & SPEAKER
R10	RC-40470	RESISTOR CABBON 47 Ohm- 1 W

CIR. SYM.	PART NO.	DESCRIPTION
C1	CP-12203	CONDENSER PAPER .02 MFD 200 V.
C2	CM-25251	" MICA 250 MMF
C3, 4	CP-12502	" PAPER .005 MFD 200 V.
C5	CP-14103	" PAPER .01 MFD 400 V.
C6, 8	CP-12503	" PAPER .05 MFD 200 V.
C7	CL-10017	" ELECT. 30/20 MFD 150 V.
C9A-B	CV-10018A	" VARIABLE
L1	TRF-10018	ANTENNA COIL
L2	TRC-10017	OSCILLATOR COIL, 5 LUG

CHASSIS MODEL 9012



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INSTALLATION

This radio comes to you complete with all hardware necessary for mounting, and also with a distributor suppressor, ammeter condenser and generator condenser. By referring to Figures 1 and 2, and following the instructions outlined below, you will find that it is very simple to install.

First determine where the receiver is to be mounted by holding it with the hands in the approximate location in the car. Using the front mounting bracket as a template, mark and drill two 5/8" holes in the instrument panel flange. Now secure the mounting bracket to the radio receiver with the screws provided, and then mount the front of the radio to the instrument panel, using the bolts, lock washers and nuts provided for this purpose. The back of the radio is supported by means of the rear mounting strap. The mounting strap should be formed to the correct angles, as illustrated in Figure 2, so that it can then be fastened to the fire wall. After marking and center-punching the fire wall at the correct location, drill with a 3/8" drill. The mounting strap is then secured to the radio and fastened to the fire wall of the car with the 1/4" bolt, lock washer and nut furnished with the receiver.

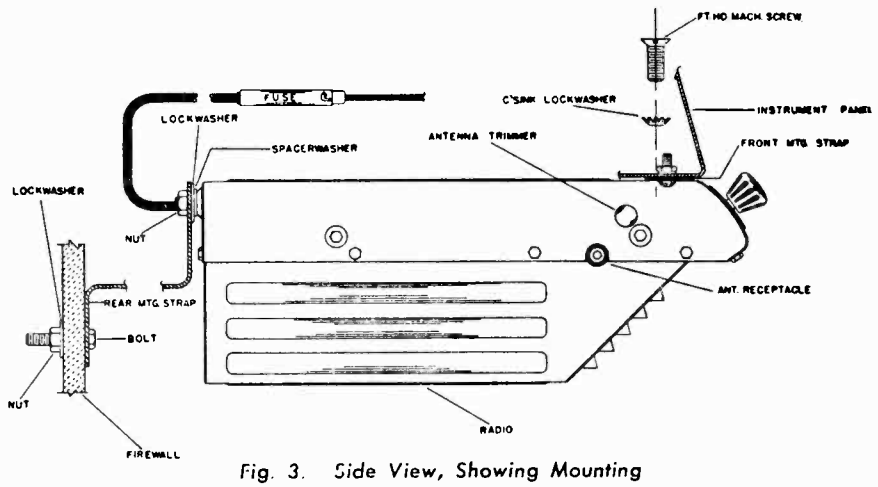

Fig. 3. Side View, Showing Mounting

CONNECTING THE RADIO

The antenna cable should be connected to the radio by inserting the jack into the socket provided on the side of the radio. Connect the battery cable to the hot side of the ammeter behind the instrument panel. The fuse should then be inserted into the cable receptor.

FINAL ADJUSTMENTS

The input circuit has been especially designed to be used with a low capacity antenna, of the fish pole or whip type.

To adjust the antenna trimmer condenser, carefully tune the receiver to a weak station at approximately 1100 kilocycles (K.C.). Remove the snap button covering the antenna trimmer (See Figure 3) and adjust the trimmer for maximum volume. A small screw driver will be needed for this purpose.

ACCESSORIES FURNISHED FOR INSTALLATION

All of the parts that are needed for installing this receiver are furnished in the Mounting Parts Kit, part No. S84-192, and the Suppression & Misc. Parts Kit, part No. S84-344, as listed below. Also supplied are the rear mounting strap, part No. B31-134, and the front mounting plate, part No. A31-148.

NOTE: For shipping, the two control knobs have been removed from the tuning and volume control shafts. To install the knobs, line up the flat side of the knob spring, (inside knob) with the flat side of the control shaft and push the knob forward until it stops.

S84-192 MOUNTING PARTS KIT

1 1/4" Bolt	2 External Tooth Lock Washers
2 1/4" Lock Washers	2 Internal Tooth Lock Washers
2 1/4" Hexagon Nuts	2 10-32 Hexagon Nuts
2 10-32 x 5/8" Screws	

S84-344 SUPPRESSION KIT & MISC. PARTS ASSEMBLY

1—S84-233	"A" lead assembly
1—A43-10	Fuse
2—A52-295	Control knobs
1—A81-13	Sleeve (for fuse)
1—S84-193	Suppression Kit consisting of:
	2—.5 MFD Condensers
	1—Distributor Suppressor
	20"—Wire Braid

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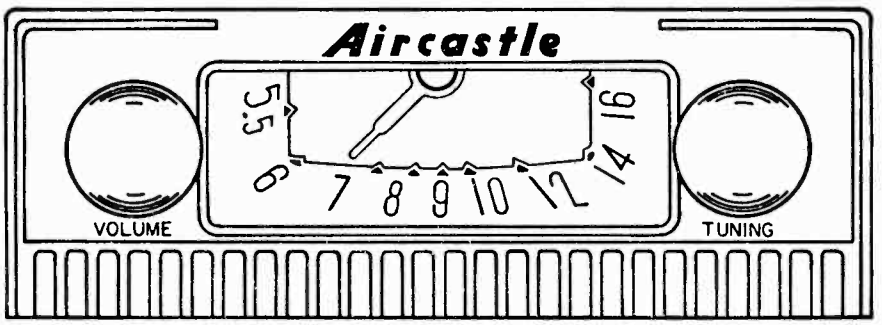

Fig. 1 Front View

SUGGESTIONS FOR ELIMINATING POSSIBLE MOTOR NOISE

IMPORTANT: Special care should be taken when mounting the radio to make sure all paint, grease, rust, etc., is removed from all three mounting points. A good electrical contact at these points will aid materially in eliminating motor noise. (The following steps may not be necessary in all cases. Install your radio and operate it before making changes.)

GENERATOR CONDENSER

The generator condenser must be connected to the battery terminal of the generator in all cases. If your car is equipped with a generator using an automatic regulator, make sure the condenser IS NOT fastened to the field winding terminal. If in doubt, your local car dealer can advise you as to where the car manufacturer recommends connecting it.

AMMETER CONDENSER

A .5 MFD bypass condenser is furnished for attaching to the ammeter. This should be connected to either side of the ammeter with the ground lug fastened to a good ground nearby. In most cases the use of this condenser, the distributor suppressor, and the generator condenser, will eliminate all objectionable ignition interference.

DISTRIBUTOR SUPPRESSOR

Detach the high tension wire where it goes into the top of the distributor cap and cut two inches off the end. Screw the piece you cut off into one end of the distributor suppressor and then screw the other end of the suppressor on the long wire which leads to the coil. Insert the wire back into the distributor cap.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional .5 MFD condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short wires are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension wire from the coil to the distributor.

HIGH AND LOW TENSION WIRES

In many cases the low tension battery leads, etc., are grouped together with the high tension wires. These wires will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. These wires should be placed in a flexible wire shield and the shield grounded to frame or motor. This condition is particularly true on the V-8 Ford, as the battery and primary leads run through a special tube which also houses the high tension wires.

BONDING OF FIRE WALL

Bonding the steering column to the fire wall with a short braid may also be effective. Clean the paint from the steering column at the fire wall where the column enters the motor compartment, and solder on a short piece of braid. Ground the end of the braid to the fire wall.

In some cases it may be necessary to ground the tubes and rods coming through the fire wall in order to reduce the interference. Clean them with emery cloth and spot-solder the braid, fastening the end under a convenient screw. A 1/4" piece of wire braid 20 inches long is furnished in the suppression kit assembly for this purpose.

WHEEL STATIC

Wheel Static is a form of interference caused by the rotation of the front wheels of the car, and it is, of course, only noticed when the car is in motion. If this form of interference is present it can be eliminated by installing wheel static collector springs between the inner hub cap and the spindle shaft.

ELECTRICAL ACCESSORIES

In some cases it may be found that car accessories such as electric heaters, lighters, automatic relays, or gauges, may cause interference while in operation. Proper procedure in such cases is to connect a .5 MFD by-pass condenser from ground to the suspected accessory until the source of the interference is found. The condenser then should be permanently mounted in this location.

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MODEL 159144

ELECTRICAL SPECIFICATIONS

Power Supply	6.3 volts DC
Current	5.5 amp. average
Frequency Range	540 to 1600 KC
I. F. Frequency	455 KC
Speaker	4" P. M.
Power Output	1.2 watts, undistorted 2.5 watts, maximum
Sensitivity	10 microvolts average for 1 watt output
Selectivity	40 KC broad at 1000 times signal, at 1000 KC

This receiver contains the following:

1—6SK7GT—R. F. Amplifier.

1—6SA7GT—Converter.

1—6SK7GT—I.F. Amplifier.

1—6SQ7—Detector—AVC—1st audio.

1—6V6GT—Power output.

1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage chart, (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

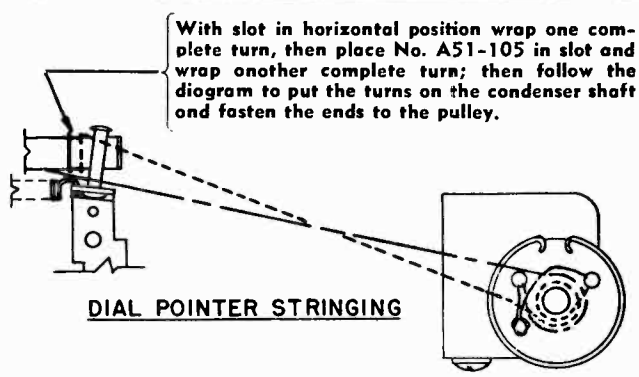
INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

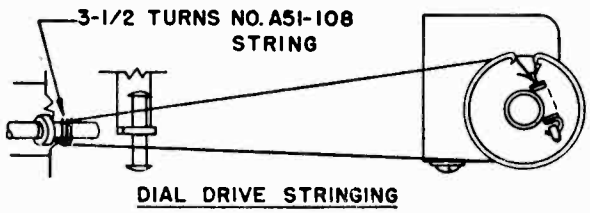
The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a ½ inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.





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ALIGNMENT PROCEDURE

Volume control—Maximum, all adjustments.

No signal applied to antenna.

Power input—6.3 volts.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil.

Connect ground lead of signal generator to chassis.

Repeat alignment procedure as a final check.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, modulated 400 cycles, 30%.

Non-metallic screwdriver.

Output meter. (1.8 volt for 1 watt output.)

Dummy antennas—.1 MFD., 75 MMFD.

For alignment points refer to Figures 5 and 6.

Dial Setting	*Generator Frequency*	*Dummy Ant.*	*Generator Connections*	*Trimmer Reference*	*Trimmer Adjustment*	*Trimmer Function*
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T2	Maximum	Output I.F.
Fully Open	455 KC	.1 MFD.	6SA7 Grid	T1	Maximum	Input I.F.
Fully Open	455 KC	75 MMFD.	Ant. lead	L3	Minimum	Wave trap
Fully Open	1600 KC	75 MMFD.	Ant. lead	C1B	Maximum	Oscillator
Tune in signal from generator	1400 KC	75 MMFD.	Ant. lead	C19	Maximum	Antenna

NOTE: The antenna trimmer condenser, C3, (see Fig. 2) should be adjusted after the radio is installed in the car. Tune the receiver to a weak station at about 1100 KC and adjust this trimmer for maximum volume.

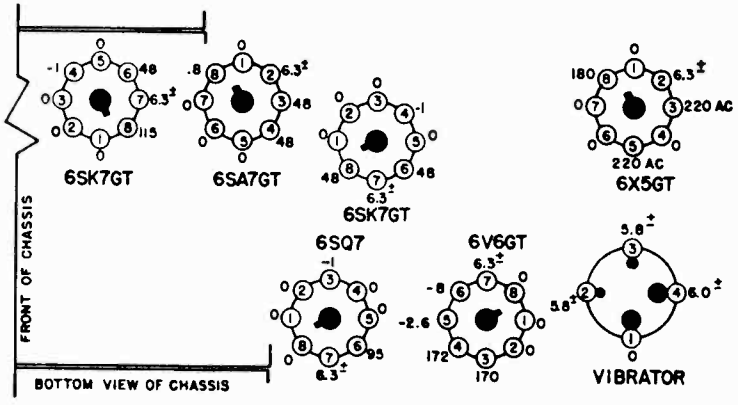

Fig. 4 Socket Voltages

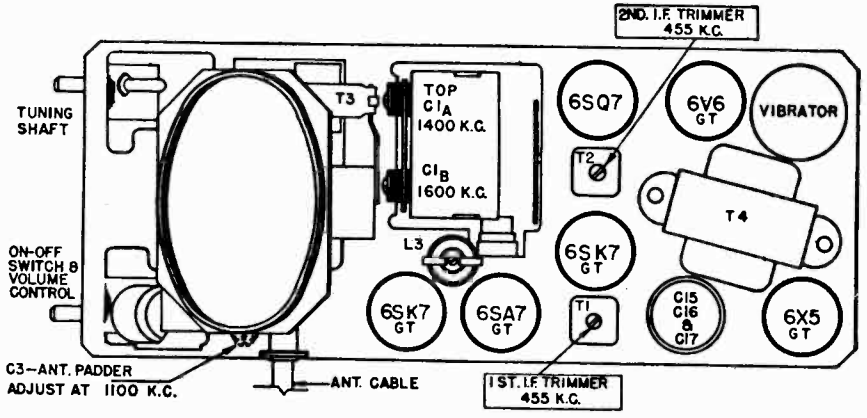

Fig. 5 Tube, Rectifier, and Trimmer Locations

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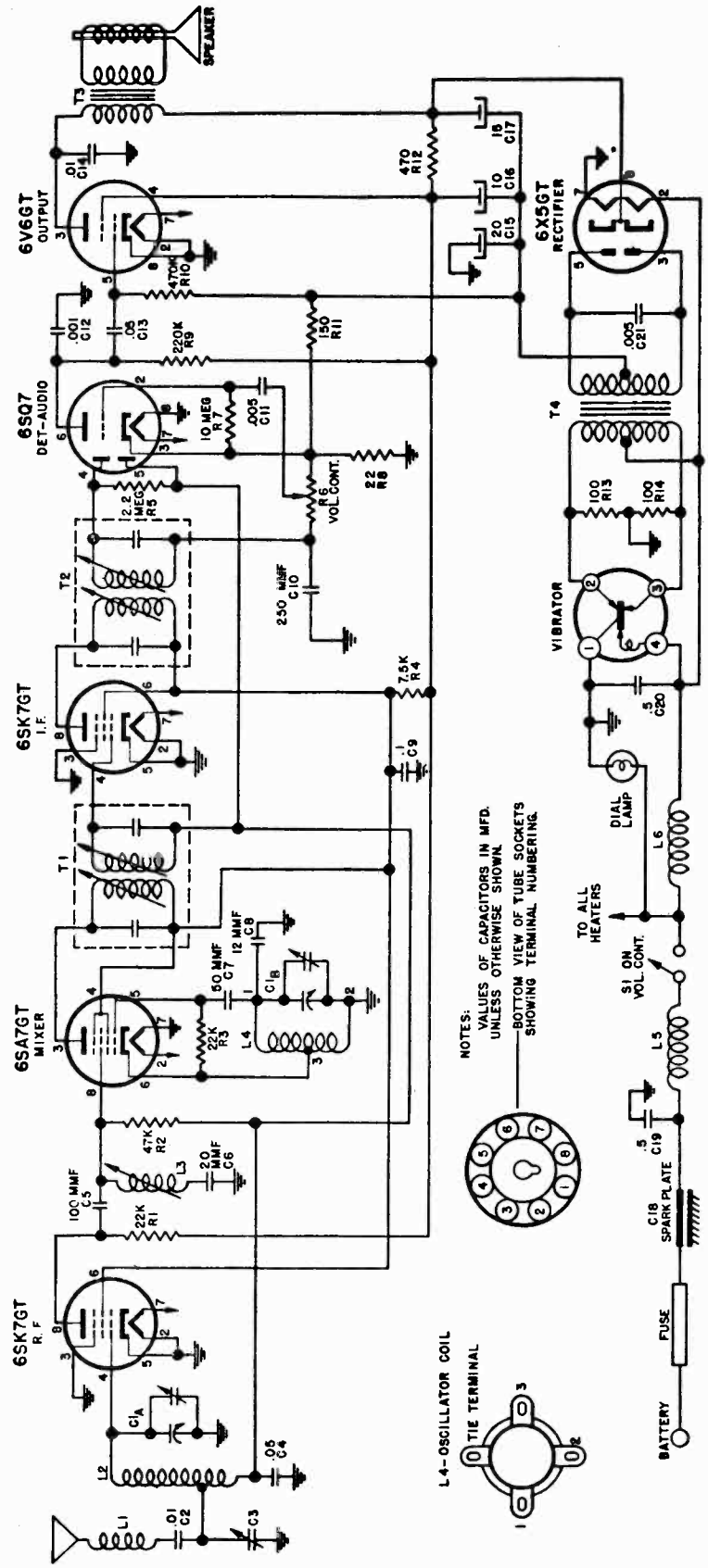

Fig. 3 Schematic Diagram

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Schematic Diagram Reference	Part No.	Description
		CONDENSERS
C1A, C1B	A19-201	Variable condenser
C2, C14	A16-192	.01 MFD 400 volt condenser
C3	A20-145	Trimmer condenser
C4	A16-189	.05 MFD 400 volt condenser
C5	A15-196	100 MMFD ceramic condenser
C6	A15-202	20 MMFD ceramic condenser
C7	A15-204	50 MMFD ceramic condenser
C8	A15-205	12 MMFD ceramic condenser, temp. comp.
C9	A16-187	.1 MFD 400 volt condenser
C10	A15-176	250 MMFD mica condenser
C11	A16-190	.005 MFD 600 volt condenser
C12	A16-195	.001 MFD ceramic condenser
C13	A16-193	.05 MFD 600 volt condenser
C15, C16, C17	A18-293	20 MFD 25 volt electrolytic condenser; 10 MFD 350 volt electrolytic condenser; 15 MFD 350 volt electrolytic condenser
C19, C20	A16-184	.5 MFD 100 volt condenser
C21	A16-185	.005 MFD 1600 volt oil filled condenser
		RESISTORS
R1, R3	A60-659	22K ohm ½ watt 20% resistor
R2	A60-685	47K ohm ½ watt 20% resistor
R4	A60-769	7.5K ohm 2 watt 10% resistor
R5	A60-726	2.2 megohm ½ watt 20% resistor
R6	A24-177	Volume control, 500,000 ohm, with switch
R7	A60-728	10 megohm ½ watt 20% resistor
R8	A60-768	22 ohm ½ watt 10% resistor
R9	A60-667	220K ohm ½ watt 20% resistor
R10	A60-731	470K ohm ½ watt 20% resistor
R11	A60-767	150 ohm ½ watt 10% resistor
R12	A60-770	470 ohm ½ watt 10% resistor
R13, R14	A60-752	100 ohm ½ watt 10% resistor
		COILS AND TRANSFORMERS
L1	A10-527	Antenna Loading Coil
L2	B10-511	Antenna Coil
L3	A10-510	I.F. Trap Coil
L4	A10-512	Oscillator Coil
L5	A33-229	Choke, "A" Line
L6	A33-228	Choke, vibrator hash
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer
T3	B80-242	Output Transformer (Part of Speaker, not furnished separately)
T4	B80-243	Power transformer
		DIAL PARTS
	A11-303	Bracket, Dial Scale
	B11-328	Bracket, String Guide
	A72-29	Bushing, Tuning Shaft Bearing
	A70-130	Clip, Spring, for Tuning Shaft
	A40-146	Dial Escutcheon
	A58-55	Dial Pointer
	B67-544	Dial Scale
	A28-101	Gasket for Speaker
	A52-295	Knob
	A11-329	Link, String Guide
	A89-10	Pilot Light, Type G.E. No. 422
	A65-37	Rivet, Shoulder, for Dial Pointer Stringing
	A65-41	Rivet, Shoulder, for String Guide Brkt. and Link
	A65-12	Rivet, Shoulder, for Dial Drive Stringing
	A75-70	Shaft, tuning
	A75-74	Shaft, for Dial Pointer
	A70-132	Spring, for Pilot Light Socket
	A70-133	Spring, Dial Drive String Tension
	A70-142	Spring, Pointer Drive String Tension
	A51-105	String, Pointer Travel, 17"
	A51-108	String, Condenser Drive, 19"
		MISCELLANEOUS
	S84-233	"A" lead assembly
	A83-421	Clip, I.F. Transformer Mounting
	A83-517	Clip, Oscillator Coil Mounting
	A43-10	Fuse, 15 Amp.
	A47-112	Grommet, rubber, (Spkr. & Gang mounting)
	B31-134	Mounting strap, rear
	B31-148	Mounting Plate, Front
	S84-192	Mounting parts kit
	A87-38	Receptacle, Antenna Cable
	B79-362	Speaker, 4" P.M. (includes Output Transformer)
	S84-193	Suppression Kit Assembly
	A34-105	Vibrator
	A83-519	Wiper, grounding, for case covers

Note: Tubular condensers must be high temperature (85°C) wax type.

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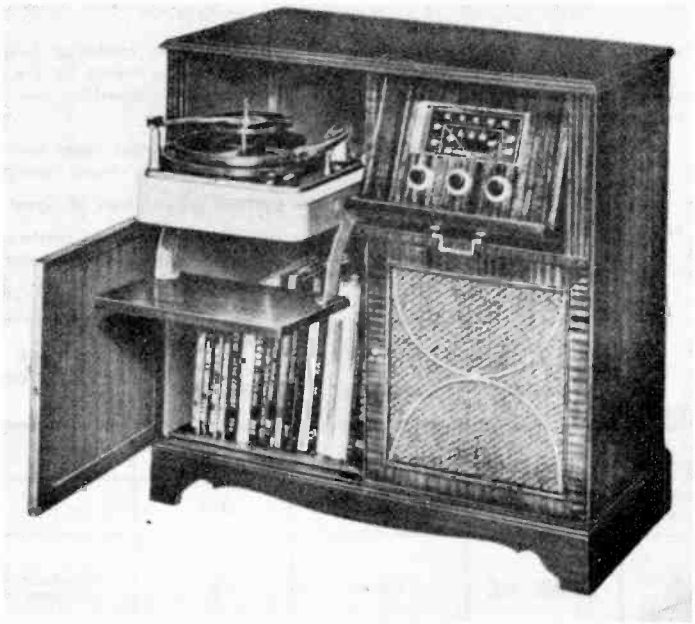
MODEL 9150-B



GENERAL SPECIFICATIONS

FREQUENCY RANGES:
AM—540 to 1700 Kc.
FM— 88 to 108 Mc.

TUNING CAPACITOR:
6 section gang (3-AM and 3-FM); entire R.F. tuning assembly is rubber mounted.

I.F. FREQUENCY:
AM—455 Kc.
FM—10.7 Mc.

POWER SUPPLY:
117 volts A.C.
Radio — 85 watts
Phono—115 watts

SPEAKER:
10 inch P.M. Dynamic
Voice coil impedance—3.2 ohms

POWER OUTPUT:
Undistorted—2.8 watts
Maximum —5.4 watts

ANTENNAS:
AM—Low impedance loop
FM—Single ended half wave dipole

RECORD CHANGER:
Automatic-intermix type; 3-speed

WEIGHT:
Packed—120 lbs.

DIMENSIONS:
Length—36"
Height—34"
Depth —18"

SENSITIVITY:
AM—20 micravolts per meter (average) for 0.5 watt output. This measurement must be made with the R.F. signal generatar (modulated 30% at 400 cycles) coupled to the receiver by means of a standard test loop antenna.

FM—10 microvolts per meter (average) for 0.5 watt output. This measurement must be made with the R.F. signal generator (frequency modulated 30%—22½ Kc. deviation—at 400 cycles) coupled to the receiver thru appropriate size carbon resistors to match the 300 ohm antenna input circuit.

HOW TO REMOVE CHASSIS FROM CABINET

1. Remove all knobs by pulling them forward.
2. Disconnect all antenna leads from the terminal strip labeled "FM—FM—AM—AM."
3. Disengage phono pick-up plug from its socket at rear of chassis.
4. Disengage phono motor plug and socket.
5. Disconnect the leads from speaker at bottom left section of cabinet.
6. Remove "ON-OFF" indicator lamp and socket from bottom center of cabinet.
7. Remove bracket which clamps dial plate to front panel of cabinet.
8. Take out the four chassis hold-down screws that are located at each corner of the pan and serve to retain the unit in position on the tilt-out panel. Chassis can now be removed by lifting it out of cabinet.

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MODEL 9150-B

BROADCAST BAND—"AM"—ALIGNMENT PROCEDURE

1. Disconnect leads from FM-AM antenna terminal strip (labeled FM—FM—AM—AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker from cabinet. If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.
2. Loop antenna leads (on cabinet) do not have to be connected to terminal strip on chassis while I.F. stages are being aligned. Before starting alignment of Ant., R.F., and Osc. stages, reconnect AM loop antenna leads to AM antenna terminal strip—do not attempt to use extension leads; place chassis as close as required to cabinet so that connections may be made direct to antenna terminal strip at back.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
4. Connect an output meter across speaker voice coil, or from plate of 6V6GT tube to chassis through a 0.1 Mfd. condenser.
5. Connect ground lead of signal generator to the receiver chassis.
6. Set volume control to maximum volume position and use a weak signal from the signal generator.
7. Set band switch to the "AM" (middle) position.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Lug on trimmer No. 6 at top of gang (see figure below for location of trimmer).	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
260 MMFD. Mica Condenser	External Antenna Clip	1500 KC	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
260 MMFD. Mica Condenser	External Antenna Clip	1500 KC	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
260 MMFD. Mica Condenser	External Antenna Clip	600 KC	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast R.F. Coil.	Adjust for maximum output.
				9	Adjustable core of Broadcast Antenna Coil.	Adjust for maximum output.

Repeat adjustment of trimmers 6 & 7 and slugs 8 & 9 until one no longer detunes the other.

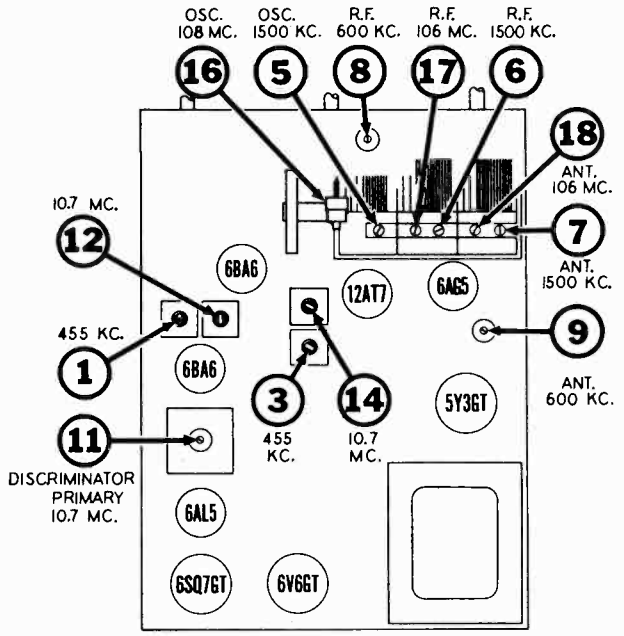

FIG. 1
Top View of Chassis

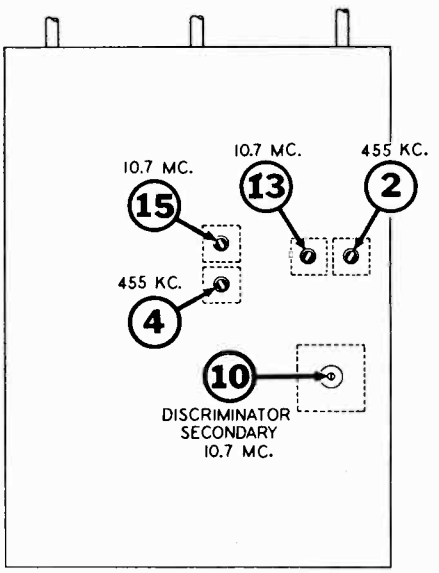

FIG. 2
Bottom View of Chassis

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MODEL 9150-B

FREQUENCY MODULATION—"FM"—ALIGNMENT PROCEDURE

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in chart below (AM alignment procedure is given on the preceding page).
2. Disconnect all leads from antenna terminal strip (labeled FM—FM—AM—AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker from cabinet. If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 88 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
4. Set volume control at maximum volume position and use a weak signal from the signal generator.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Set band switch to the FM (extreme counter-clockwise) position.

STANDARD SIGNAL GENERATOR		SWEEP GENERATOR		VTVM OR OUTPUT METER CONNECTIONS	OSCILLOSCOPE CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
CONNECTIONS	FREQUENCY	CONNECTIONS	FREQ.					
Connect high side to lug on trimmer #17 (see Fig. 1 for location of trimmer) using a .01 Mfd. condenser in series with generator lead. Connect ground lead to the receiver chassis in vicinity of gang condenser.	**10.7 MC.** Unmodulated	Not used.	———	Connect VTVM as shown in Fig. 4.	Not used.	Any position where it does not affect the signal.	**#10** Discriminator secondary **#11** Discriminator primary **#12-13** 2nd IF **#14-15** 1st IF	Adjust these trimmers for maximum meter reading — the output voltage will be of negative polarity.
Same as above.	Same as above.	Not used.	———	Connect VTVM as shown in Fig. 5.	Not used.	Same as above.	**#10** Discriminator secondary	Note that as slug #10 is rotated, a point will be found where the voltmeter will swing rather sharply from a positive to a negative reading or vice versa. The correct setting is obtained when the meter reads zero as the slug is moved thru this point.
Same as above.	Same as above. ——— Attenuate signal to prevent overload and distortion of response curve.	Connect high side to lug on trimmer #17 (see Fig. 1 for location of trimmer) using a .01 Mfd. condenser in series with generator lead. Connect ground lead to the receiver chassis in vicinity of gang condenser.	**10.7 MC** Sweeping ±300 Kc.	Not used.	Connect as shown in Fig. 5. ——— Set vertical amplifier of 'scope for maximum amplification. ——— Synchronize oscilloscope with sweep generator by connecting "horizontal input" terminals of 'scope to source of horizontal sweep modulating voltage on the sweep generator.	Same as above.	**#10** Discriminator secondary	A pattern similar to that shown in Fig. 3 should appear on the oscilloscope screen. Check for symmetry about the 10.7 Mc. center point and linearity of the slope.

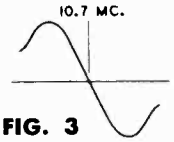

FIG. 3

If the characteristic is not shaped properly, attempt to obtain symmetry by changing the setting of slug #10. Should that fail to produce the desired results, then a slight readjustment of slugs #11, 12, 13, 14 and 15 should be undertaken.

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FREQUENCY MODULATION—"FM"—ALIGNMENT PROCEDURE (Continued)

STANDARD SIGNAL GENERATOR		SWEEP GENERATOR		VTVM OR OUTPUT METER CONNECTIONS	OSCILLOSCOPE CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
CONNECTIONS	FREQUENCY	CONNECTIONS	FREQ.					
Connect generator "high" side in series with a 270 ohm carbon resistor to end terminal marked "FM" on strip at back of chassis. Generator ground lead must connect to next terminal marked "GND."	**108 MC.** with 400 cycle AM Modulation.	Not used.	———	Connect VTVM as shown in Fig. 5.	Not used.	**108 MC.**	**#16** FM Oscillator	Set trimmer #16 to receive 108 Mc. signal as indicated by maximum meter reading.
Same as above.	**106 MC.** with 400 cycle AM Modulation.	Not used.	———	Same as above.	Not used.	Tune to 106 Mc. generator signal.	**#13** FM RF **#18** FM ANT.	Adjust trimmer for maximum meter reading.

Check calibration and trocking of receiver with input signals of 88, 98 and 106 MC. If difference between dial pointer setting and these frequencies does not exceed ±0.3 MC. and R.F. circuit is tracking properly, then alignment may be considered sotisfactory and no further adjustment is necessary. Where the calibration error is greater than ±0.3 MC., it is advisable to make the following adjustments:

Tune receiver to an 88 MC. signal and note whether dial pointer is above or below correct calibration point. Then tune receiver so that dial pointer is at the 88 MC. position. If generator signal was previously received at a setting above 88 MC., it will be necessary to slightly spread the windings of the FM ascillotor coil so thot signal will now be received at the correct dial setting. On the other hand, if generator signal was received at a dial setting below 88 MC., then slightly compress the windings of the oscillator coil until the signal comes in at the correct calibration point.

Check calibration at 108 MC. and if it is in error by more than ±0.3 MC., readjust setting of trimmer #16. Then repeat adjustments of trimmers #17 and 18 at 106 MC. Repeat calibration adjustment at 88, 106 and 108 MC. until desired accuracy is obtained.

Observe dial calibration at 106 MC. If it is found to be incorrect by an oppreciable amount, then make a very slight adjustment in the spacing of the gang condenser plates to receive the 106 MC. signal at the correct dial setting. Then check adjustment of R.F. trimmer #17 and ANT. trimmer #18 to obtain maximum output indication ot 106 MC.

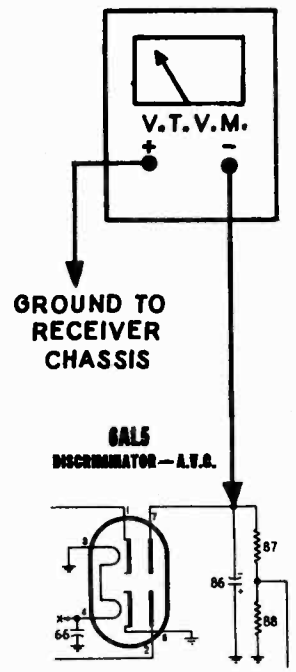

FIG. 4
VTVM Connections for I.F. Alignment

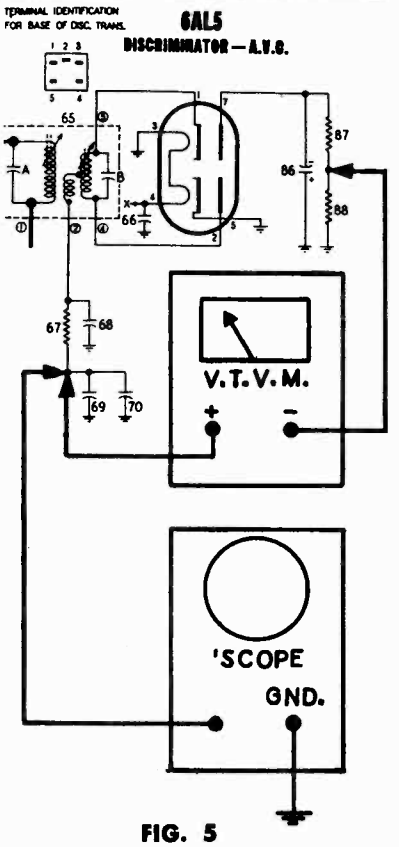

FIG. 5
VTVM and Oscilloscope Connections for Discriminator Alignment

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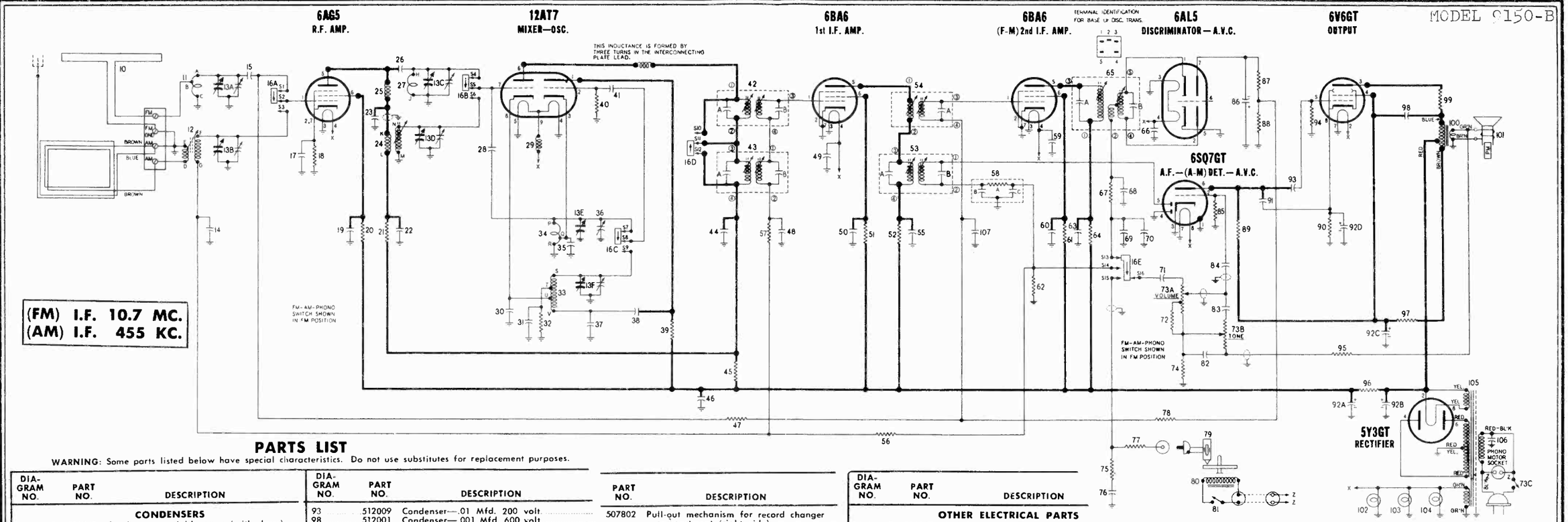


PARTS LIST

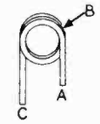
WARNING: Some parts listed below have special characteristics. Do not use substitutes for replacement purposes.

DIA-GRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
13-A to F	506348	Condenser—variable gang (with drum)
14	512027	Condenser—.05 Mfd. 200 volt
15	513406	Condenser—ceramic 22 Mmfd. 500 volt (Temperature compensating)
17	513002	Condenser—ceramic 47 Mmfd. 500 volt
19	513013	Condenser—ceramic 5000 Mmfd. 450 volt
22	513013	Condenser—ceramic 5000 Mmfd. 450 volt
23	513002	Condenser—ceramic 47 Mmfd. 500 volt
26	513401	Condenser—ceramic 5 Mmfd. ±2% 500 volt (Temperature compensating)
28	513000	Condenser—ceramic 1.0 Mmfd. 500 volt
30	513007	Condenser—ceramic 330 Mmfd. 500 volt
31	512009	Condenser—.01 Mfd. 200 volt
35	513429	Condenser—ceramic 10 Mmfd. ±10% 500 volt (Temperature compensating)
36	506336	Condenser—trimmer; 3 to 30 Mmfd.
37	513442	Condenser—ceramic 10 Mmfd. ±10% 500 volt (Temperature compensating)
38	513013	Condenser—ceramic 5000 Mmfd. 450 volt
41	513409	Condenser—ceramic 39 Mmfd. ±5% 500 volt (Temperature compensating)
42-A	506080	Condenser—ceramic 33 Mmfd. (part of 1st FM I.F. transformer)
42-B	506080	Condenser—ceramic 72 Mmfd. (part of 1st FM I.F. transformer)
43-A, B	506333	Condenser—ceramic 330 Mmfd. (part of 1st AM I.F. transformer)
44	513013	Condenser—ceramic 5000 Mmfd. 450 volt
46	513013	Condenser—ceramic 5000 Mmfd. 450 volt
48, 49, 50	513013	Condenser—ceramic 5000 Mmfd. 450 volt
53-A	505797	Condenser—ceramic 107 Mmfd. (part of 2nd AM I.F. transformer)
53-B	505797	Condenser—ceramic 86 Mmfd. (part of 2nd AM I.F. transformer)
54-A	505905	Condenser—ceramic 83 Mmfd. (part of 2nd FM I.F. transformer)
55	513013	Condenser—ceramic 5000 Mmfd. 450 volt
58-B, C	506338	Condenser—ceramic 100 Mmfd. (part of diode filter unit)
59, 60	513013	Condenser—ceramic 5000 Mmfd. 450 volt
63	513013	Condenser—ceramic 5000 Mmfd. 450 volt
65-A	506332	Condenser—ceramic 8 Mmfd. (part of discriminator transformer)
65-B	506332	Condenser—ceramic 47 Mmfd. (part of discriminator transformer)
66	513013	Condenser—ceramic 5000 Mmfd. 450 volt
68	513007	Condenser—ceramic 330 Mmfd. 500 volt
69	512005	Condenser—.003 Mfd. 600 volt
70	513003	Condenser—ceramic 100 Mmfd. 500 volt
71	512027	Condenser—.05 Mfd. 200 volt
76	512011	Condenser—.01 Mfd. 400 volt
82	512033	Condenser—.1 Mfd. 200 volt
83	512001	Condenser—.001 Mfd. 600 volt
84	512009	Condenser—.01 Mfd. 200 volt
86	504937	Condenser—electrolytic 5 Mfd. 50 volt
91	513008	Condenser—ceramic 470 Mmfd. 350 volt
92-A, B, C, D	505908	Condenser—electrolytic A—30 Mfd. 450 volt B—40 Mfd. 450 volt C—10 Mfd. 450 volt D—20 Mfd. 25 volt
93	512009	Condenser—.01 Mfd. 200 volt
98	512001	Condenser—.001 Mfd. 600 volt
106	512256	Condenser—.01 Mfd. 600 volt
107	513013	Condenser—ceramic 5000 Mmfd. 450 volt
		RESISTORS
18	510117	Resistor—carbon 82 Ohms ±10% ½ watt
20	510164	Resistor—carbon 33,000 Ohms ½ watt
21	510237	Resistor—carbon 1000 Ohms 1 watt
32	510141	Resistor—carbon 1800 Ohms ±10% ½ watt
39	510237	Resistor—carbon 1000 Ohms 1 watt
40	510155	Resistor—carbon 10,000 Ohms ½ watt
45	510237	Resistor—carbon 1000 Ohms 1 watt
47	510167	Resistor—carbon 47,000 Ohms ½ watt
51	510165	Resistor—carbon 39,000 Ohms ±10% ½ w.
52	510237	Resistor—carbon 1000 Ohms 1 watt
56	510193	Resistor—carbon 2.2 Meg. ½ watt
57	510173	Resistor—carbon 100,000 Ohms ½ watt
58-A	506338	Resistor—carbon 47,000 Ohms (part of diode filter unit)
61	510165	Resistor—carbon 39 000 Ohms ±10% ½ w.
62	510185	Resistor—carbon 470,000 Ohms ½ watt
64	510237	Resistor—carbon 1000 Ohms 1 watt
67	510159	Resistor—carbon 18,000 Ohms ±10% ½ w.
72	510170	Resistor—carbon 68,000 Ohms ½ watt
73-A, B, C	508483	Volume and tone control A—2 Meg. B—2 Meg. C—"ON-OFF" switch
74	510128	Resistor—carbon 330 Ohms ½ watt
75	510170	Resistor—carbon 68,000 Ohms ½ watt
77	510179	Resistor—carbon 220,000 Ohms ½ watt
78	510193	Resistor—carbon 2.2 Meg. ½ watt
85	510195	Resistor—carbon 4.7 Meg. ½ watt
87, 88	510153	Resistor—carbon 8200 Ohms ±10% ½ watt
89	510179	Resistor—carbon 220,000 Ohms ½ watt
90	510128	Resistor—carbon 330 Ohms ½ watt
94	510185	Resistor—carbon 470,000 Ohms ½ watt
95	510149	Resistor—carbon 4700 Ohms ½ watt
96	510732	Resistor—wire wound 2000 Ohms ±10% 10 watts
97	510261	Resistor—carbon 22,000 Ohms 1 watt
99	510113	Resistor—carbon 47 Ohms ½ watt
		TRANSFORMERS AND COILS
10	508395	Antenna—built-in (FM)
11	506353	Coil—FM Antenna
12	506354	Coil—AM Antenna
	506349	Slug core for AM antenna coil
24	506345	Coil—AM R.F.
	506344	Slug core for AM R.F. coil
25	507935	Coil—choke
27	506351	Coil—FM R.F.
29	507586	Coil—choke
33	506335	Coil—AM Oscillator
34	506352	Coil—FM Oscillator
42	506080	Transformer—1st FM I.F.
43	506333	Transformer—1st AM I.F.
53	505797	Transformer—2nd AM I.F.
54	505905	Transformer—2nd FM I.F.
65	506332	Transformer—discriminator
	508841	Slug core for primary or secondary of discriminator transformer
100	508486	Transformer—output
105	506709	Transformer—power
507802		Pull-out mechanism for record changer compartment (right side)
508840		Record changer base assembly
507807		Rod—tie; for record changer pull-out mechanism
160496		Rubber pad between dial plate and retaining bracket
160496		Rubber pad for mounting chassis
118621		Rubber pad for record changer pull-out mechanism
170167		Screw—#8-32x7/8"; for mounting chassis
508480		Socket for indicator lamp at base of cabinet (with leads)
506760		Spring—compression for record changer pull-out mechanism and radio compartment tilt mechanism
506761		Spring—tension for radio compartment tilt mechanism
507821		Spring—tension for record changer pull-out mechanism
507822		Trim strip for record changer base
		MISCELLANEOUS PARTS
506369		Background for dial (foil)
301270		Base for mounting electrolytic condenser
505165		"C" washer for tuning shaft or pointer shaft
508488		Clamp—retains dial scale
506343		Clip for mounting AM antenna or R.F. coil
505101		Clip for mounting I.F. transformer
160326		Clip—retains dial background
114955		Clip—retainer on end of dial cord
117057		Cord—dial drive (3 ft. required) per ft.
508481		Dial scale—glass
501031		Plug for phono. motor cable
500966		Plug for phono. pick-up cable
506370		Pointer
119087		Ring for dial cord
38501		Rubber bushing for band switch
116584		Rubber spacer for mounting dial scale
503588		Shaft and drum for dial
162148		Shaft and link assembly; Band switch
508485		Shaft—tuning
506349		Slug core for AM antenna coil
506344		Slug core for AM R.F. coil
508841		Slug core for primary or secondary of discriminator transformer
505307		Socket and phono. motor cable
506372		Socket—dial lamp; pair (with leads)
504597		Socket—miniature (7 pin)
506331		Socket—miniature (9 pin)
116690		Socket—octal base
160392		Socket—octal (rectifier)
160039		Socket—phono. plug
505161		Spring—dial cord tension
505924		Terminal strip (FM-FM-AM-AM)
111456		Washer—spring washer for tuning shaft or pointer shaft
		OTHER ELECTRICAL PARTS
16-A to E	506347	Switch—FM-AM-Phono
58-A, B, C	506338	Diode filter unit A—Resistor-carbon 47,000 Ohms 1/5 watt B—Condenser-ceramic 100 Mmfd. 400 volt C—Condenser-ceramic 100 Mmfd. 400 volt
101	506464	Speaker—P.M. Dynamic (10 inch)
102, 103, 104	118921	Lamp—dial (Mazda 47) 6-8 volt 150 Ma.
		RECORD CHANGER PARTS (for mechanicol parts, see record ch'g'r sec. of manual.)
	508222	Record Changer (3 speed)
79	508432	Crystal Cartridge
80	508120	Motor—115 volt 60 cycle
81	505269	Switch—"ON-OFF" for record changer
	508434	Needle—phonograph; for "Fine Groove" and "Microgroove" records
	508433	Needle—phonograph; for "Standard" records
		CABINET PARTS
	508217	Bracket for mounting OFF-ON indicator lite at base of cabinet
	508487	Bracket—retains dial plate
	506757	Bracket—slide; retains radio compartment
	507808	Bracket—tie for record changer pull-out mechanism
	117131	Bull's-eye for OFF-ON indicator lite at base of cabinet
	508399	Cabinet
	508499	Catch for record storage compartment
	508495	Door and radio tilt compartment assembly (less hardware)
	508494	Door for record changer compartment (less hardware)
	508496	Door for record storage compartment (less hardware)
	508493	Escutcheon—dial
	506380	Fastener for loop antenna
	508497	Handle for radio or record changer door
	508498	Handle for record storage compartment door
	506640	Hinge—for record storage compartment; per pair
	508492	Knob—"PHO. AM FM"
	508490	Knob—"TONE"
	508491	Knob—"TUNE"
	508489	Knob—"VOLUME-ON"
	170188	Nut—Wing #10-24; for tension adjustment of radio compartment tilt mechanism
	507809	Nut—wing #16-32; for tension adjustment on record changer pull-out mechanism
	508397	Pivot bolt for radio tilt compartment
	507801	Pull-out mechanism for record changer compartment (left side)

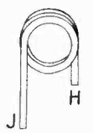
TERMINAL Q IS LOCATED 7/8 TURN FROM TERMINAL R

FM OSC. COIL 506352

TERMINAL B IS LOCATED 1¼ TURN FROM TERMINAL A

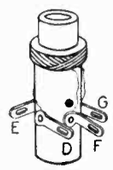


FM ANT. COIL 506353



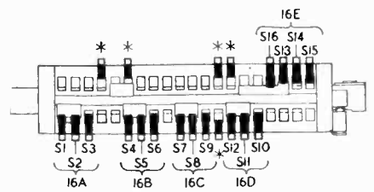
FM R.F. COIL 506351

AM OSC. COIL 506335



AM ANT. COIL 506354

AM R.F. COIL 506345



★ Not used; may serve as wiring junction point.

BAND SWITCH 506347

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

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MODEL 9150-B

STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver can be measured with an A.C. Vacuum Tube Voltmeter of the high frequency type (uniform response up to 100 MC.). An AM (600 KC.) as well as an FM (98 MC.) signal source is required. For gain measurements in the FM antenna—FM converter—FM 1st I.F. stages, a microvolt calibrated FM signal generator should preferably be used.

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F., I.F. and Discriminator stages are carefully and accurately aligned by utilizing the alignment procedure given on pages 1950-49 and 1950-50.

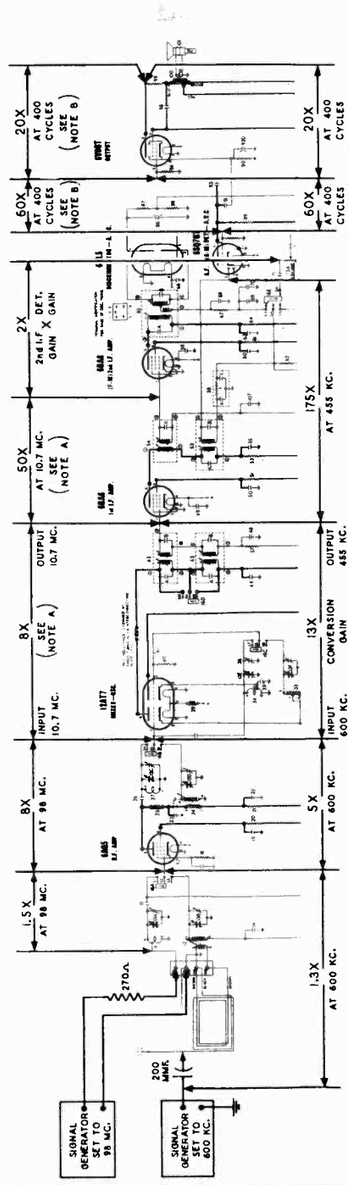
2. Connect Signal Generator as shown below. Note that generator connections differ for "AM" and "FM" measurements.

3. For "AM" measurements, set signal generator to 600 KC. (400 cycle modulation) and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.

4. For "FM" measurements, set signal generator to 98 MC. (400 cycle modulation with 22½ KC. deviation) and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.

5. The values of stage gain which are given here were measured with a fixed bias of —3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. system. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to both A.V.C. supply lines by effecting a common connection to terminal 4 of 2nd FM I.F. transformer and junction of resistors 56 and 57. Then connect the positive battery lead to the receiver chassis.

6. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.



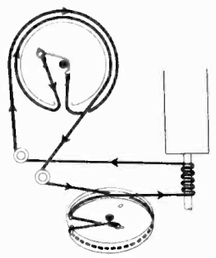
NOTE A: When making this measurement connect signal generator to pin 7 of 12AT7 and adjust frequency to 10.7 MC. Also short oscillator grid, pin 2, to ground so that local oscillator will be inoperative.

NOTE B: Tone control set to its maximum clockwise position.

DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

DIAL AND POINTER DRIVE CORD ARRANGEMENT

SIDE VIEW



To string dial cord, set gang condenser to fully open position and use the following parts:
- 114955 Clip on end of cord
- 117057 Cord (3 feet)
- 119087 Ring for dial cord
- 505161 Tension spring

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MODEL 9150-B

SOCKET VOLTAGES

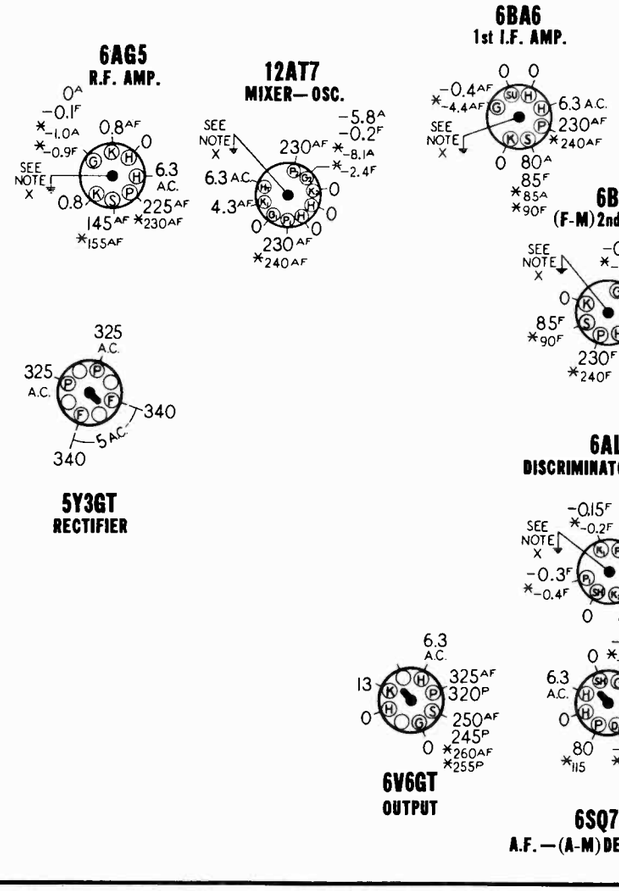
THE VOLTAGE SHOWN IN THIS CHART WERE MEASURED UNDER THE FOLLOWING CONDITIONS

1. Power Supply—117 volts 60 cycles A.C.
2. All voltages are measured between socket terminals and chassis unless otherwise indicated on the chart.
3. All measurements made with a voltmeter having a sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.
4. Where a particular voltage is dependent upon band switch position, the value shown on the chart carries a letter suffix which is interpreted as follows (no suffix letter indicates that voltage is the same for any of the three switch positions).
   - "A" indicates band switch set to "AM" (center) position.
   - "F" indicates band switch set to "FM" (counter-clockwise) position.
   - "P" indicates band switch set to "PHO" (clockwise) position.
5. When measuring FM voltages, receiver should be tuned to 88 Mc.
6. When measuring AM voltages, receiver should be tuned to 540 Kc.
7. All terminals on strip labeled "FM—FM—AM—AM" at rear of chassis are shorted together by using a jumper wire.
8. Volume control set to maximum position with no signal.
9. Tone control set to maximum clockwise position.

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS UNLESS OTHERWISE INDICATED.



REAR OF CHASSIS

NOTE X: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

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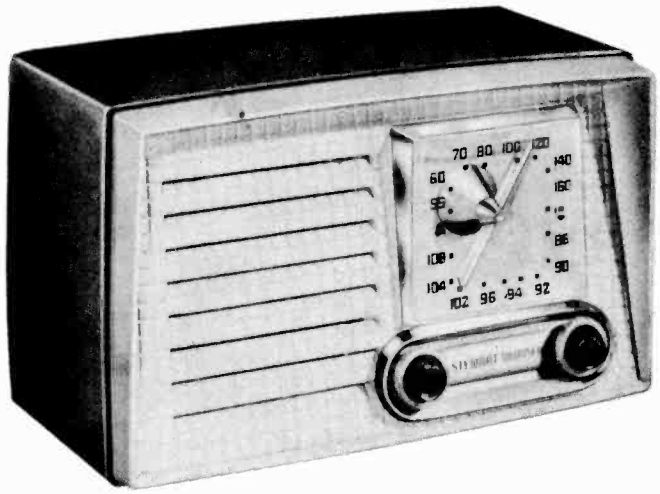
MODEL 9151-A



GENERAL SPECIFICATIONS

SPEAKER:

6 inch P-M Dynamic

Voice coil impedance—3.2 ohms

POWER OUTPUT:

Undistorted—1.2 watts

Maximum—2.3 watts

ANTENNAS:

AM—High impedance loop

FM—Built-in line cord type

WEIGHT:

13 pounds

DIMENSIONS:

Length—15"

Heigth—9¼"

Depth—8¼"

FREQUENCY RANGES:

AM—540 to 1700 KC.

FM—88 to 108 MC.

TUNING CAPACITOR:

4 section gang (2-AM and 2-FM) rigid mounting.

I.F. FREQUENCY:

AM—455 KC.

FM—10.7 MC.

POWER SUPPLY:

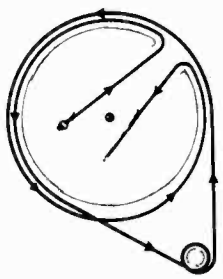
117 volts A.C. or D.C.

40 watts

HOW TO REMOVE CHASSIS FROM CABINET

1. Remove all knobs by pulling them forward.
2. Take off dial scale by pressing down on top center of plastic dial enclosure and at the same time pulling it forward.
3. Remove pointer by pulling it forward.
4. Remove cabinet back by taking out three screws and two clips. Note: Cabinet back has a power cord interlock which is automatically disconnected when back is removed.
5. Take out two chassis mounting screws at bottom of cabinet. Chassis may now be readily removed by sliding it out of cabinet.
6. When replacing cabinet back be sure that it is parallel to loop and power cord interlock plug fits into socket on chassis.

DIAL POINTER DRIVE CORD ARRANGEMENT



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

114955 Clip on end of cord
117057 Cord (3½ ft. required)
119087 Ring for dial cord
161384 Spring

SOCKET VOLTAGES

THE VOLTAGES SHOWN IN THIS CHART WERE MEASURED UNDER THE FOLLOWING CONDITIONS

1. Power Supply—117 volts 60 cycles A.C.
2. All voltages are measured between socket terminals and chassis unless otherwise indicated on the chart.
3. All measurements made with a voltmeter having a sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.
4. Where a particular voltage is dependent upon band switch position, the value shown on the chart carries a letter suffix which is interpreted as follows:

"A" indicates band switch set to "AM" (counter-clockwise) position.
"F" indicates band switch set to "FM" (center) position.
"P" indicates band switch set to "PHO" (clockwise) position.
No suffix letter indicates that voltage is the same for any of the three switch positions.

5. When measuring FM voltages, receiver should be tuned to 88 Mc.
6. When measuring AM voltages, receiver should be tuned to 540 Kc.
7. Terminals on AM loop antenna are shorted together.
8. Built-in FM antenna lead is disconnected from the "FM ANT." terminal.
9. Volume control set to maximum with no signal.

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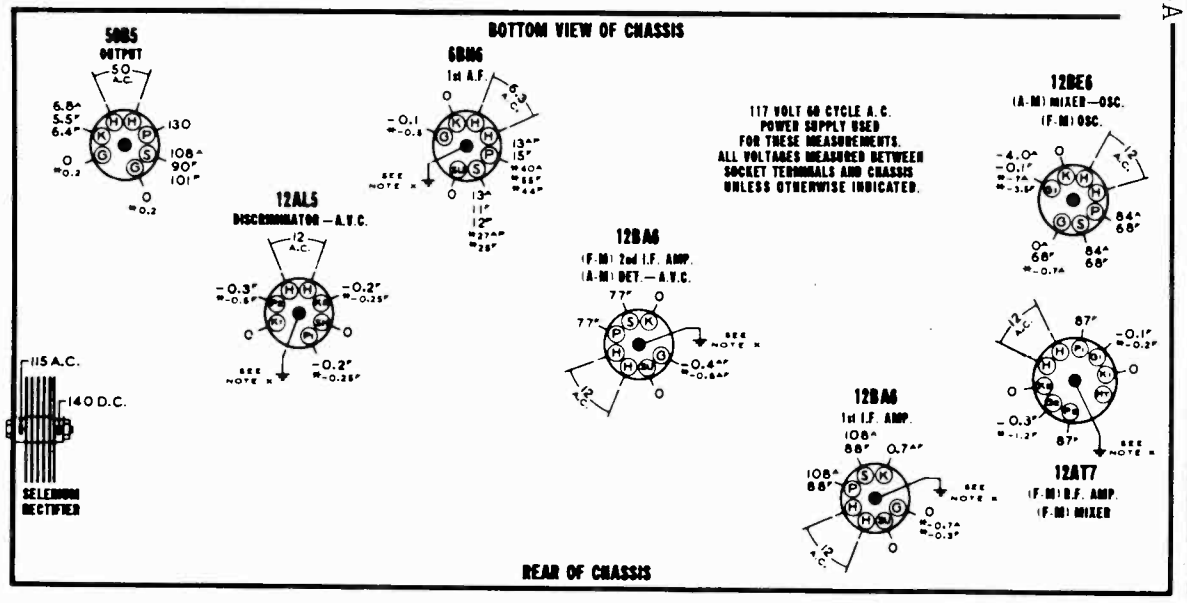
STAGE GAIN MEASUREMENT PROCEDURE

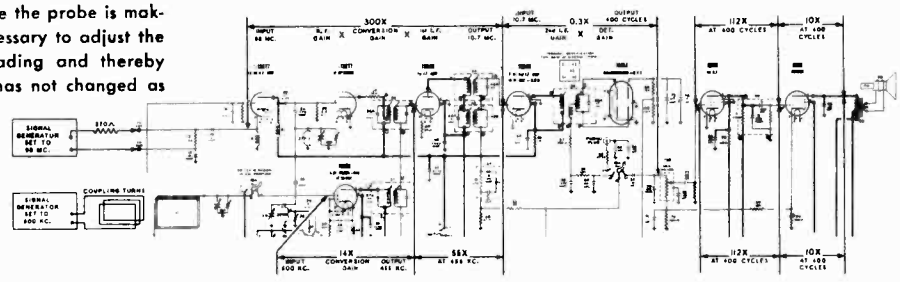
REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver should be measured with an A. C. Vacuum Tube Voltmeter of the high frequency type (uniform response up to 100 MC). A conventional "AM" type signal generator may be used but it must be capable of producing **fundamental** frequencies of 600 KC. and 98 MC—**avoid using a generator that produces the 98 MC. signal by means of harmonics.**

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F., I.F. and Discriminator stages are carefully and accurately aligned by utilizing the alignment procedure given on page 1950-7.
2. Connect Signal Generator as shown below. Note that generator connections differ for "AM" and "FM" measurements.
3. For "AM" measurements, set signal generator to 600 KC. and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
4. For "FM" measurements, set signal generator to 98 MC. and then carefully tune radio receiver to this signal by using a D. C. Vacuum Tube Voltmeter as an output indicator—meter must be connected between pin 2 of 12AL5 tube and chassis ground. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. The values of stage gain which are given here were measured with a fixed bias of 3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to A.V.C. at terminal 3 of the 1st AM I.F. transformer and connect the positive battery lead to chassis ground.
6. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.



NOTE X: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.



DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

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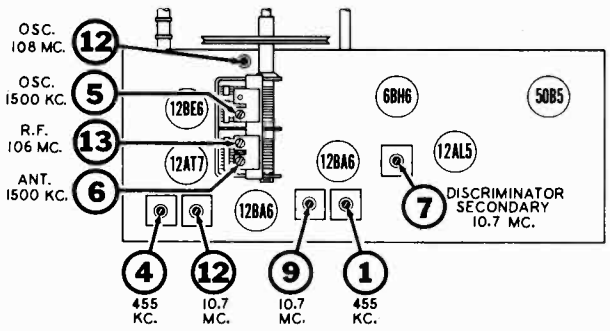
BROADCAST BAND—"AM"—ALIGNMENT PROCEDURE

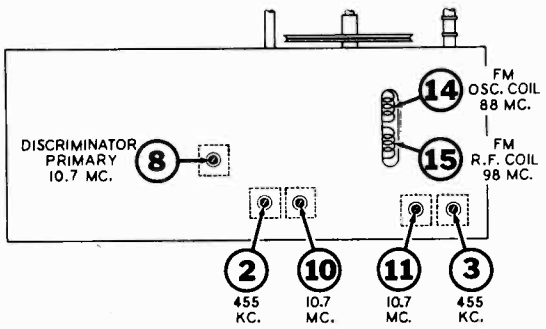
1. If alignment of both AM and FM channels are required, it is advisable to align the AM channel first; then align the FM channel as instructed on Page 1950-7.
2. Remove chassis and loop antenna (which is mounted to chassis) from cabinet by following procedure outlined on Page 1950-3. Allow loop to remain attached to chassis.
3. In order to provide a coupling for signal generator during R.F. alignment as instructed in chart below, wind several turns of wire in a circular shape so that it may be placed adjacent and parallel to the loop.
4. Connect an output meter across the speaker voice coil or from the plate of the 50B5 tube to chassis through a 0.1 Mfd. condenser.
5. Set band switch to the "AM" (counter-clockwise) position.
6. Set volume control at maximum and use a weak signal from the signal generator.
7. Since the dial scale is a part of the cabinet, when completely assembled, it becomes necessary to provide a temporary means of locating the dial to obtain calibration points. Rotate gang condenser fully counter-clockwise and replace pointer so that it is **parallel** with base of the chassis. Now, hold dial scale in front of pointer in such a position that the ends of the indicator point to the "AM" and "FM" markers. While holding the dial scale in this position, rotate tuning sleeve until pointer indicates desired frequency.

SIGNAL GENERATOR CONNECTIONS		SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	CONNECT GROUND LEAD OF SIGNAL GENERATOR TO					
Lug on trimmer #6 at top of gang (see figure 1 for location of trimmer).	Chassis ground. **CAUTION:** If your signal generator is designed with an AC-DC type power supply, connect ground lead of signal generator to receiver chassis through a .25 Mfd. condenser.	**455 KC**	Any point where it does not affect the signal.	**1 and 2**	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3 and 4	1st I.F.	
Connect directly to coupling turn. See Step 3 above for instruction on coupling loop.		**1500 KC**	1500 KC See Step 7 above for instructions on how to obtain this calibration point.	**5**	AM Oscillator	Adjust for maximum output.
Connect directly to coupling turn. See Step 3 above for instruction on coupling loop.		**1500 KC**	Tune to 1500 Kc. generator signal.	**6**	AM Antenna	Adjust for maximum output.



Top View of Chassis

FIG. 1



Bottom View of Chassis

FIG. 2

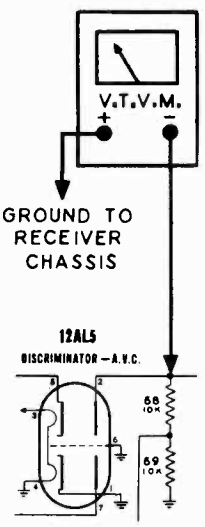


FIG. 3
VTVM Connections for IF Alignment

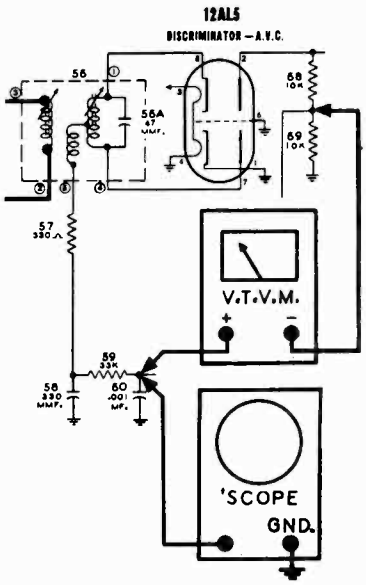


FIG. 4
VTVM and Oscilloscope Connections for Discriminator Alignment

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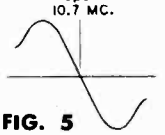
MODEL 9151-A

FREQUENCY MODULATION—"FM"—ALIGNMENT PROCEDURE

1. If alignment of both AM and FM channels are required it is advisable to align the AM channel first as instructed in chart on Page 1950-6. Then, accomplish FM channel alignment by using the procedure outlined in the chart below.
2. Remove chassis and loop antenna (which is mounted to chassis) from cabinet by following procedure outlined on Page 1950-3. Allow loop to remain attached to chassis.
3. Disconnect built-in FM lead from "FM ANT." terminal at back of chassis.
4. Set band switch to the "FM" (middle) position.
5. Set volume control at maximum and use a weak signal from the signal generator.
6. Dress FM circuit leads as short and straight as possible, particularly those in the oscillatar circuit. IF plate and grid leads should also be kept short and straight.
7. Since the dial scale is a part of the cabinet, when completely assembled, it becomes necessary to provide a temporary means of locating the dial to obtain calibration points. Rotote gang condenser fully counter-clockwise and replace pointer so that it is **parallel** with base of the chassis. Now, hold dial scale in front of pointer in such a position that the ends of the indicator point to the "AM" and "FM" markers. While holding the dial scale in this position, rotate tuning sleeve until pointer indicates desired frequency.

STANDARD SIGNAL GENERATOR		SWEEP GENERATOR		VTVM OR OUTPUT METER CONNECTION	OSCILLOSCOPE CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
CONNECTIONS	FREQUENCY	CONNECTIONS	FREQ.					
Connect high side to lug on trimmer #13 (see Fig. 1 for location of trimmer) using a .01 Mfd. condenser in series with generator lead. Connect ground lead to the receiver chassis in vicinity of gang condenser. **CAUTION:** If your signal generator is designed with an AC-DC type power supply, connect ground lead of signal generator to receiver chassis through a .25 Mfd. condenser.	**10.7 MC.** Unmodulated	Not used.	———	Connect VTVM as shown in Fig. 3.	Not used.	Any position where it does not affect the signal.	**#7** Discriminator secondary **#8** Discriminator primary **#9—10** 2nd IF **#11—12** 1st IF	Adjust these trimmers for maximum meter reading — the output voltage will be of negative polarity.
Same as above.	Same as above.	Not used.	———	Connect VTVM as shown in Fig. 4.	Not used.	Same as above.	**#7** Discriminator secondary	Note that as slug #7 is rotated, a point will be found where the voltmeter will swing rather sharply from a positive to a negative reading or vice verso. The correct setting is obtained when the meter reads zero as the slug is moved thru this point.
Same as above.	Same as above. ——— Attenuate signal to prevent overload and distortion of response curve.	Connect high side to lug on trimmer #13 (see Fig. 1 for location of trimmer) using a .01 Mfd. condenser in series with generator lead. Connect ground lead to the receiver chassis in vicinity of gang condenser. **CAUTION:** If your signal generator is designed with an AC-DC type power supply, connect ground lead of signal generator to receiver chassis through a .25 Mfd. condenser.	**10.7 MC** Sweeping ±300 Kc.	Not used.	Connect as shown in Fig. 4. ——— Set vertical amplifier of 'scope for maximum amplification. ——— Synchronize oscilloscope with sweep generator by connecting "horizontal input" terminals of 'scope to source of horizontal sweep modulating voltage on the sweep generator.	Same as above.	**#7** Discriminator secondary	A pattern similar to that shown in Fig. 5 should appear on the oscilloscope screen. Check for symmetry about the 10.7 Mc. center point and linearity of the slope.  10.7 MC. **FIG. 5** If the characteristic is not shaped properly, attempt to obtain symmetry by changing the setting of slug #7. Should that fail to produce the desired results, then a slight readjustment of slugs #8, 9, 10, 11 and 12 should be undertaken.
Connect high side in series with a 270 ohm carbon resistor to "FM ANT." terminal at rear of chassis. Connect ground lead to "FM GND." terminal.	**108 MC.** with 400 cycle AM Modulation.	Not used.	———	Connect VTVM as shown in Fig. 3.	Not used.	108 Mc. See Step 7 above for instructions on how to obtain this calibration point.	**#12** FM Oscillator	Set trimmer #12 to receive 108 Mc. signal as indicated by maximum meter reading.
Same as above.	**108 MC.** with 400 cycle AM Modulation.	Not used.	———	Same as above.	Not used.	Tune to 108 Mc. generator signal.	**#13** FM RF	Adjust trimmer for maximum meter reading.

Check calibration and tracking of receiver with input signals of 88 and 98 MC. If difference between dial pointer setting and the above mentioned frequencies does not exceed ±0.3 MC. and RF circuit is tracking properly then alignment may be considered satisfactory and no further adjustment is necessary.
Where the calibration error is greater than ±0.3 MC. it is advisable to make the following adjustments:
Tune receiver to an 88 MC. signal and note whether dial pointer is above or below correct calibration point. Then tune receiver so that dial pointer is at the 88 MC. position. If generator signal was previously received at a setting above 88 MC., it will be necessary to slightly spread the windings of the FM oscillator coil (#14 in Fig. 2) so that signal will now be received at the correct dial setting. On the other hand, if generator signal was received at a dial setting below 88 MC., then slightly compress the windings of the oscillator coil until the signal comes in at the correct calibration point.
Check calibration at 108 MC. and if it is in error by more than ±0.3 MC., readjust setting of trimmer # 12. Repeat calibration adjustment at 88 and 108 MC. until desired accuracy is obtained.
Observe dial calibration at 98 MC. If it is faund to be incorrect by an appreciable amount, then make a very slight adjustment in the spacing of the gang condenser plates to receive the 98 MC. signal at the correct dial setting. Then check adjustment of RF trimmer #13 to obtain maximum output indication at 98 MC.

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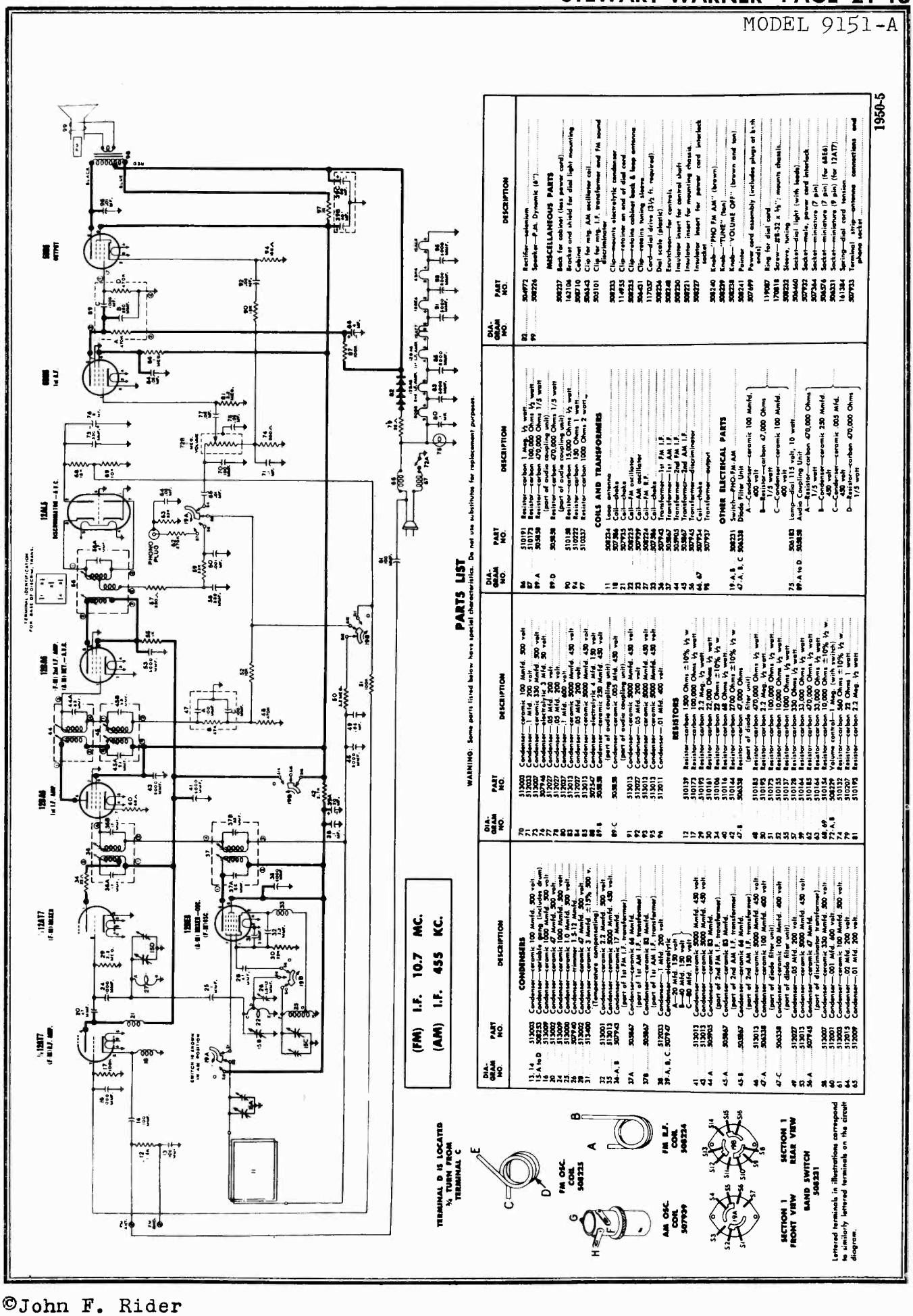
MODEL 9151-A



PARTS LIST

WARNING: Some parts listed below have special characteristics. Do not use substitutes for replacement purposes.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
13, 14	513003	Condenser—ceramic 100 Mmfd. 500 volt
15-A to D	508235	Condenser—variable gang (includes drum)
16	513009	Condenser—ceramic 1000 Mmfd. 500 volt
20	513002	Condenser—ceramic 47 Mmfd. 500 volt
24	513000	Condenser—ceramic 10 Mmfd. 500 volt
25	513000	Condenser—ceramic 10 Mmfd. 500 volt
26	507940	Condenser—trimmer 1.5-12 Mmfd.
28	513002	Condenser—ceramic 47 Mmfd. 500 volt
31	513040	Condenser—ceramic 47 Mmfd. ±5% 500 v. (Temperature compensating)
22	513001	Condenser—ceramic 22 Mmfd. 500 volt
23	513013	Condenser—ceramic 3300 Mmfd. 450 volt
34-A, B	507943	Condenser—ceramic .005 Mfd. 450 volt (part of 1st FM I.F. transformer)
37-A	503867	Condenser—ceramic 66 Mmfd. (part of 1st AM I.F. transformer)
37-B	503867	Condenser—ceramic 66 Mmfd. (part of 1st AM I.F. transformer)
38	512033	Condenser—ceramic .02 Mfd. 200 volt
39-A, B, C	507942	Condenser—electrolytic A—20 Mfd. 150 volt B—20 Mfd. 150 volt C—80 Mfd. 150 volt
41	513013	Condenser—ceramic 3000 Mmfd. 450 volt
42	503903	Condenser—ceramic 83 Mmfd. (part of 2nd FM I.F. transformer)
43-A	503867	Condenser—ceramic 83 Mmfd. (part of 2nd AM I.F. transformer)
43-B	503867	Condenser—ceramic 83 Mmfd. (part of 2nd AM I.F. transformer)
46	513013	Condenser—ceramic 3000 Mmfd. 450 volt
47-A	506338	Condenser—ceramic 100 Mmfd. 400 volt (part of diode filter unit)
47-C	506338	Condenser—ceramic 100 Mmfd. 400 volt (part of diode filter unit)
49	512027	Condenser—.05 Mfd. 200 volt
53	513013	Condenser—ceramic 3000 Mmfd. 450 volt
56-A	507943	Condenser—ceramic .47 Mfd. (part of Electrolytic unit)
58	513007	Condenser—ceramic 330 Mmfd. 500 volt
60	512021	Condenser—.001 Mfd. 500 volt
61	513003	Condenser—ceramic 100 Mmfd. 500 volt
64	512013	Condenser—.02 Mfd. 200 volt
65	512009	Condenser—.01 Mfd. 200 volt

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS (continued)
70	513003	Condenser—ceramic 100 Mmfd. 500 volt
71	512033	Condenser—.1 Mfd. 200 volt
72	513007	Condenser—ceramic 330 Mmfd. 500 volt
73	507944	Condenser—electrolytic 2 Mfd. 50 volt
77	512027	Condenser—.05 Mfd. 200 volt
78	512027	Condenser—.1 Mfd. 600 volt
80	513027	Condenser—.05 Mfd. 2000 Mmfd. 450 volt
82	512027	Condenser—.05 Mfd. 2000 Mmfd. 450 volt
83	513013	Condenser—ceramic 3000 Mmfd. 450 volt
86	507547	Condenser—electrolytic 4 Mfd. 150 volt
88	503858	Condenser—ceramic 250 Mmfd. 450 volt
89-C	503858	Condenser—ceramic .002 Mfd. 450 volt (part of audio coupling unit)
91	513013	Condenser—ceramic 3000 Mmfd. 450 volt
92	512027	Condenser—.05 Mfd. 200 volt
93	513013	Condenser—ceramic 3000 Mmfd. 450 volt
94	513013	Condenser—ceramic 3000 Mmfd. 450 volt
97	512011	Condenser—.01 Mfd. 400 volt
		RESISTORS
12	510139	Resistor—carbon 1500 Ohms ±10% ½ w
17	510193	Resistor—carbon 3.3 Meg. Ohms ½ watt
20	510193	Resistor—carbon 3.3 Meg. Ohms ½ watt
30	510161	Resistor—carbon 22,000 Ohms ½ watt
34	510106	Resistor—carbon 22 Ohms ±10% ½ w
40	510116	Resistor—carbon 68 Ohms ½ watt
45	510144	Resistor—carbon 270 Ohms ±10% ½ w
47-B	506338	Resistor—carbon 47,000 Ohms (part of diode filter unit)
48	510183	Resistor—carbon 470,000 Ohms ½ watt
50	510193	Resistor—carbon 3.3 Meg. ½ watt
51	510173	Resistor—carbon 100,000 Ohms ½ watt
52	510193	Resistor—carbon 3.3 Meg. ½ watt
55	510137	Resistor—carbon 1000 Ohms ½ watt
59	510128	Resistor—carbon 330 Ohms ½ watt
62	510183	Resistor—carbon 470,000 Ohms ½ watt
63	510164	Resistor—carbon 33,000 Ohms ½ watt
66	510154	Resistor—carbon 10,000 Ohms ½ watt
67-A, B	508229	Volume control—1 Meg. (with switch)
74	510132	Resistor—carbon 560 Ohms ±10% ½ w.
79	510207	Resistor—carbon 22 Ohms 1 watt
81	510193	Resistor—carbon 3.3 Meg. ½ watt

DIAGRAM NO.	PART NO.	DESCRIPTION
		COILS AND TRANSFORMERS
11	508234	Loop antenna
18	507764	Coil—choke
21	507715	Coil—choke
22	508225	Coil—FM oscillator
23	507759	Coil—AM oscillator
27	507764	Coil—FM R.F.
33	507764	Coil—choke
36	507943	Transformer—1st FM I.F.
37	503867	Transformer—1st AM I.F.
44	503903	Transformer—2nd FM I.F.
43	503867	Transformer—2nd AM I.F.
64, 67	507754	Coil—choke
96	507937	Transformer—output
		OTHER ELECTRICAL PARTS
19-A, B	508231	Switch—FM-AM
47-A, B, C	506338	Diode filter unit A—Complete—ceramic 100 Mmfd. 400 volt B—Resistor—carbon 47,000 Ohms ½ watt C—Condenser—ceramic 100 Mmfd. 400 volt
75	506153	Lamp—dial 115 volt, 10 watt
89-A to D	503858	Audio Coupling Unit A—Complete—carbon 470,000 Ohms ½ watt B—Condenser—ceramic 250 Mmfd. 450 volt C—Condenser—ceramic .005 Mfd. 450 volt D—Resistor—carbon 470,000 Ohms ½ watt

DIAGRAM NO.	PART NO.	DESCRIPTION
		MISCELLANEOUS PARTS
82	504972	Rectifier—selenium
99	508226	Speaker—P.M. Dynamic (6")
	508237	Back for cabinet (less power cord)
	162106	Bracket and shield for dial light mounting
	508710	Cabinet
	508343	Clip for mtg. AM oscillator coil
	503101	Clip for mtg. I.F. transformer and FM sound discriminator
	508233	Clip—mounts electrolytic condenser
	116955	Clip—retainer on end of dial cord
	508253	Clip—retains cabinet back & loop antenna
	504401	Clip—retains tuning sleeve
	117057	Cord—dial drive (3½ ft. required)
	508256	Dial scale (plastic)
	508248	Escutcheon—for controls
	508250	Insulator insert for control shaft
	508221	Insulator insert for mounting chassis
	508227	Insulator insert for power cord interlock socket
	508240	Knob—"PHO FM AM" (brown)
	508239	Knob—"TUNE" (tan)
	508238	Knob—"VOLUME OFF" (brown and tan)
	508241	Pointer
	507699	Power cord assembly (includes plugs at both ends)
	119087	Ring for dial cord
	170818	Screw—#8-32 x ¾"; mounts chassis
	508252	Sleeve, tuning
	504460	Socket—dial light (with leads)
	507922	Socket—male, power cord interlock
	507364	Socket—miniature (7 pin)
	506574	Socket—miniature (7 pin) (for 6AL6)
	506331	Socket—miniature (9 pin) (for 12AT7)
	161384	Spring—dial cord tension
	507933	Terminal strip—antenna connections and phono socket

1950-5

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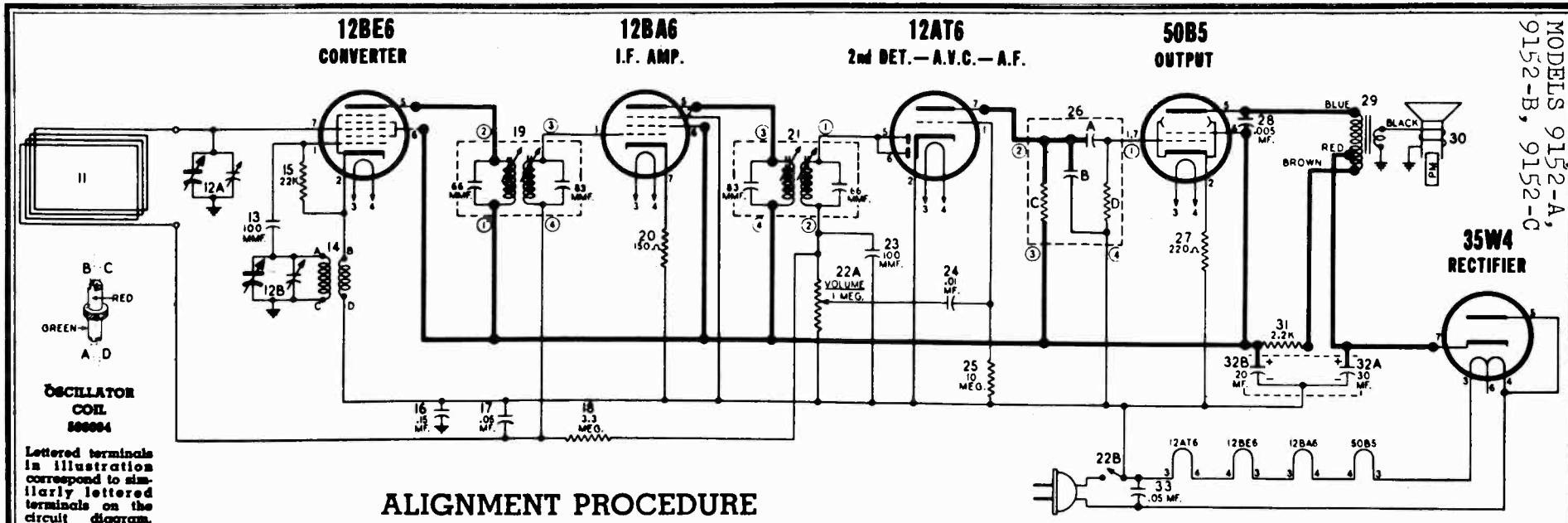
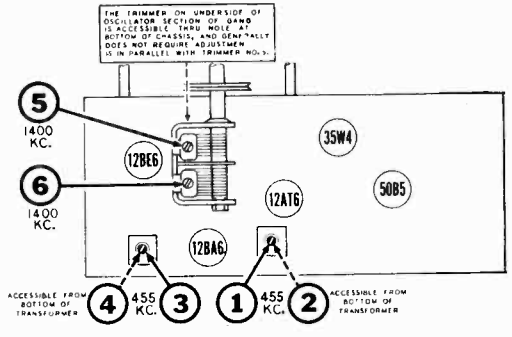


ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna (mounted to chassis) from cabinet; allow loop to remain attached to chassis.
2. Replace the dial scale on the shaft of the gang condenser.
3. Since the "position indicator" for the dial scale is an integral part of the cabinet, it becomes necessary to install a "temporary pointer" when the chassis is removed from the cabinet. This can readily be accomplished by securing a piece of heavy wire under the right front gang condenser mounting screw and shaping the free end of the wire so that it can be placed in a vertical position directly in front of the dial scale. With the gang condenser fully meshed, the "temporary pointer" should appear directly in front of the fine line preceding "55" on the dial scale.
4. Couple the signal generator to the receiver by connecting its output to several turns of wire formed in a circular shape so that it may be placed adjacent and parallel to the receiver loop antenna.
5. Connect an output meter across the speaker voice coil or from the plate of the 50B5 tube to B— through a 0.1 Mfd. condenser.
6. Set volume control at maximum volume position and use a weak signal from the signal generator.

I.F. 455 KC.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
None	Connect directly to coupling turn as instructed in Step 4 above	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
None	Connect directly to coupling turn as instructed in Step 4 above	1400 KC	1400 KC	5	Broadcast Oscillator	Adjust for maximum output.
None	Connect directly to coupling turn as instructed in Step 4 above	1400 KC	Tune to 1400 KC generator signal.	6	Broadcast Antenna	Adjust for maximum output.



TRIMMER LOCATIONS

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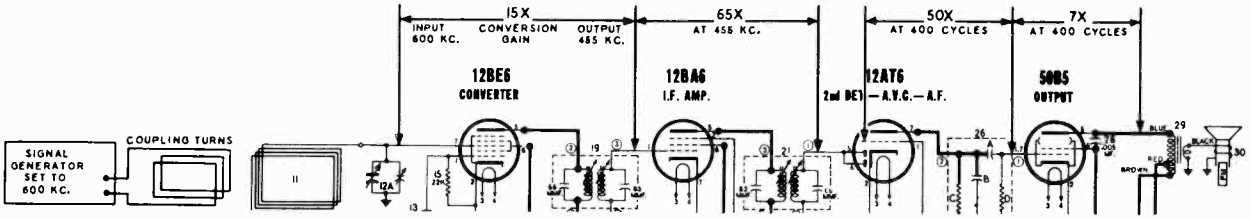
MODELS 9152-A, 9152-B, 9152-C

STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver may be measured with an A.C. Vacuum Tube Voltmeter or a "channel" type instrument containing a tuned and calibrated amplifier.

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F. and I.F. stages are carefully and accurately aligned by utilizing the alignment procedure given above.
2. Connect Signal Generator as shown below.
3. The values of stage gain which are given here were measured with a fixed bias of 3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to A.V.C. at terminal #4 of the 1st I.F. transformer and connect the positive battery lead to B— in receiver chassis.
4. Set Signal Generator for operation at 600 Kc with 400 cycle modulation and carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.
6. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

PARTS LIST

ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
12-A, B	508143	Condenser—variable gang (with drum)
13	512503	Condenser—mica 100 Mmfd. 500 volt
16	512040	Condenser—.15 Mfd. 400 volt
17	512028	Condenser—.05 Mfd. 400 volt
23	512503	Condenser—mica 100 Mmfd. 500 volt
24	512010	Condenser—.01 Mfd. 400 volt
26-A	505858	Condenser—ceramic .005 Mfd. 450 volt (part of audio coupling unit)
26-B	505858	Condenser—ceramic 250 Mmfd. 450 volt (part of audio coupling unit)
28	512006	Condenser—.005 Mfd. 600 volt
32-A, B	508147	Condenser—electrolytic A—30 Mfd. 150 volt; B—20 Mfd. 150 volt
33	512030	Condenser—.05 Mfd. 600 volt
		RESISTORS
15	510161	Resistor—carbon 22,000 Ohms ½ watt
18	510184	Resistor—carbon 3.3 Meg. ½ watt
20	510122	Resistor—carbon 150 Ohms ½ watt
22-A, B	506087	Volume control 1 Meg. (with switch)
25	510197	Resistor—carbon 10 Meg. ½ watt
26-C, D	505858	Resistor—carbon 470,000 Ohms 1/5 watt (part of audio coupling unit)
27	510125	Resistor—carbon 220 Ohms ½ watt
31	510243	Resistor—carbon 2,200 Ohms 1 watt
		OTHER ELECTRICAL PARTS
11	508148	Loop Antenna
14	506084	Coil—oscillator
19	505867	Transformer—1st I.F.
21	505867	Transformer—2nd I.F.
26	505858	Audio coupling unit: A—Condenser—ceramic .005 Mfd. 450 volt; B—Condenser—ceramic 250 Mmfd. 450 volt; C—Resistor—carbon 470,000 Ohms 1/5 watt; D—Resistor—carbon 470,000 Ohms 1/5 watt
29	508146	Transformer—output
30	506079	Speaker—P.M. dynamic (4 inch)
		MISCELLANEOUS
	508244	Back for cabinet
	508245	Background for dial (foil)
	505165	"C" washer for tuning shaft
	508643	Cabinet—Model 9152-A
	508644	Cabinet—Model 9152-B
	508645	Cabinet—Model 9152-C
	505101	Clip for mounting I.F. transformer
	508149	Clip for mounting loop antenna
	114955	Clip—retainer on end of dial cord
	508235	Clip—retains cabinet back

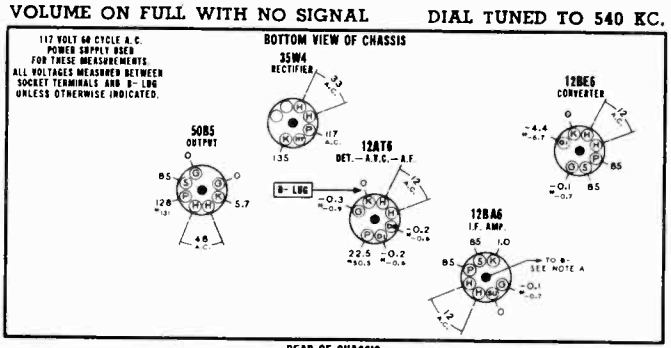
DIAGRAM NO.	PART NO.	DESCRIPTION
	117057	Cord dial drive (2 ft. required) per ft.
	508246	Dial scale
	508248	Escutcheon—for controls
	508247	Knob—green; Models 9152-A and 9152-C
	508658	Knob—brown; Model 9152-B
	18785	Screw #8x⅞" chassis mounting
	506085	Shaft—tuning
	507364	Socket—miniature (7 pin)
	505161	Spring (dial cord tension)

SOCKET VOLTAGES

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

LOOP ANTENNA TERMINALS SHORTED TOGETHER

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



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

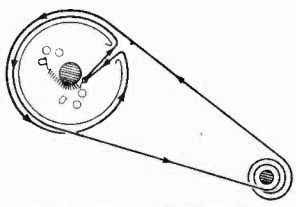
DRIVE CORD ARRANGEMENT

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

114955 Clip on end of cord

117057 Cord (2 feet)

505161 Tension Spring



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MODEL 9153-A

GENERAL SPECIFICATIONS

FREQUENCY RANGE:

540 to 1600 KC.

TUNING CAPACITOR:

2 section gang, shock mounted, Planetary drive.

I.F. FREQUENCY:

455 KC.

ANTENNA:

High impedance loop.

POWER SUPPLY:

Power line Operation { 117 volts A.C. or D.C. 15 watts

Portable Operation { 1—67½ volt "B" Battery 5— 1½ volt "A" Batteries

POWER OUTPUT:

Undistorted—60 milliwatts

Maximum—110 milliwatts

SPEAKER:

4 inch P.M. Dynamic

Voice coil impedance—3.2 ohms

DIMENSIONS:

Length—9½"

Height—6⅞"

Depth—4¾"

WEIGHT:

7 pounds

HOW TO REMOVE CHASSIS FROM CABINET

1. Remove volume and the dual tuning knobs by pulling them forward.
2. To remove cabinet back first swing handle outward and note finger grip recess at back edge of cabinet. Grasp back at this recess and pull outward until it is free. Disconnect leads to loop antenna by slipping pin type connectors out of the electrical clips attached to loop.
3. Loosen set screw in hinge pin collar. Then, push hinge pin into one end of handle and withdraw it completely by pulling out of the other end.
4. Remove three chassis mounting screws, two of which are located along one edge and the other located on the opposite edge. To gain access to one of the chassis mounting screws it will first be necessary to remove "A" battery hold down plate as instructed on label attached to this plate.
5. Chassis is now free and may be lifted out of cabinet.
6. Bottom cover on chassis may be removed by taking out three screws at the sides.

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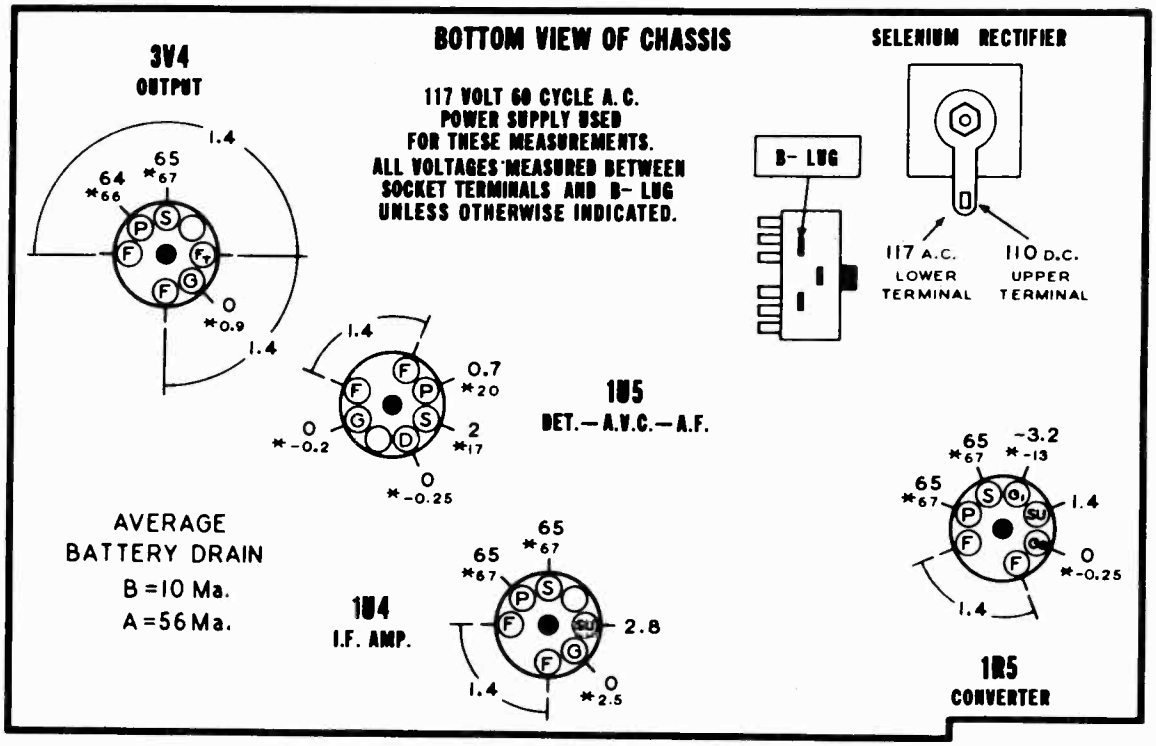
SOCKET VOLTAGES

THE VOLTAGES SHOWN IN THIS CHART WERE MEASURED UNDER THE FOLLOWING CONDITIONS

1. Power supply—117 V. 60 cycles, A.C.
2. All voltages were measured between socket terminals and B— unless otherwise indicated on the chart.
3. All measurements were made with a voltmeter having a sensitivity of 1000 Ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.
4. Receiver should be tuned to 540 KC.
5. Loop antenna terminals should be shorted together.
6. The volume control was set to maximum position with no signal.

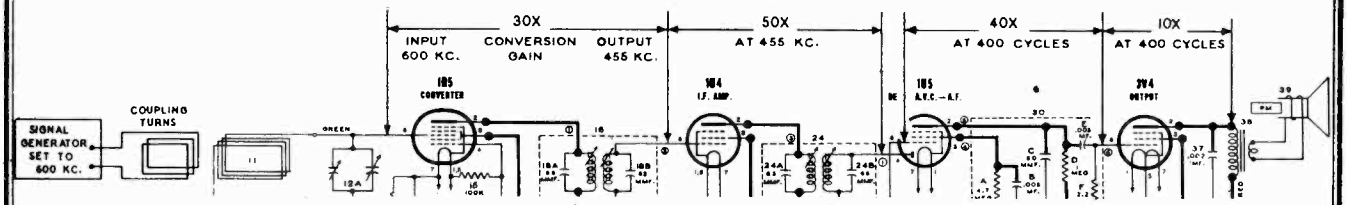


STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver may be measured with an A.C. Vacuum Tube Voltmeter or a "channel" type instrument containing a tuned and calibrated amplifier.

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F. and I.F. stages are carefully and accurately aligned by utilizing the alignment procedure given on page 1950-118A.
2. Connect Signal Generator as shown below.
3. The values of stage gain which are given here were measured with a fixed bias of 1½ volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 1½ volt battery to A.V.C. at frame of gang condenser and connect the positive battery lead to B - in receiver chassis.
4. Set Signal Generator for operation at 600 Kc. with 400 cycle modulation and carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.
6. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

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MODEL 9153-A

ALIGNMENT PROCEDURE

1. Remove chassis from cabinet by following procedure described on page 117. Reconnect loop antenna leads to clips on cabinet back. As battery position slightly affects R.F. alignment, it is preferable to have batteries in proper place during this procedure.

2. Replace dial scale and tuning knob on shafts of the gang condenser.

3. Since the "position indicator" for the dial scale is an integral part of the cabinet, it becomes necessary to install a temporary pointer when the chassis is removed from the cabinet. This can readily be accomplished by securing a piece of heavy wire under the chassis bottom cover mounting screw and then shaping the free end of the wire so that it can be placed in a vertical position directly in front of the dial scale. The dial scale should be installed on the gang condenser shaft so that when the condenser is fully meshed the smaller 5 of the 55 on the scale is directly under the pointer.

4. In order to provide a coupling for the signal generator during R.F. alignment, wind several turns of wire in a circular shape so that it may be placed adjacent and parallel to the loop antenna. Position cabinet back so that loop antenna is in approximately the same position as when receiver is completely assembled.

5. Solder approximately 5 in. of insulated wire to each of "soldering lugs" on **secondary** of output transformer. Connect output meter to these extension leads.

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

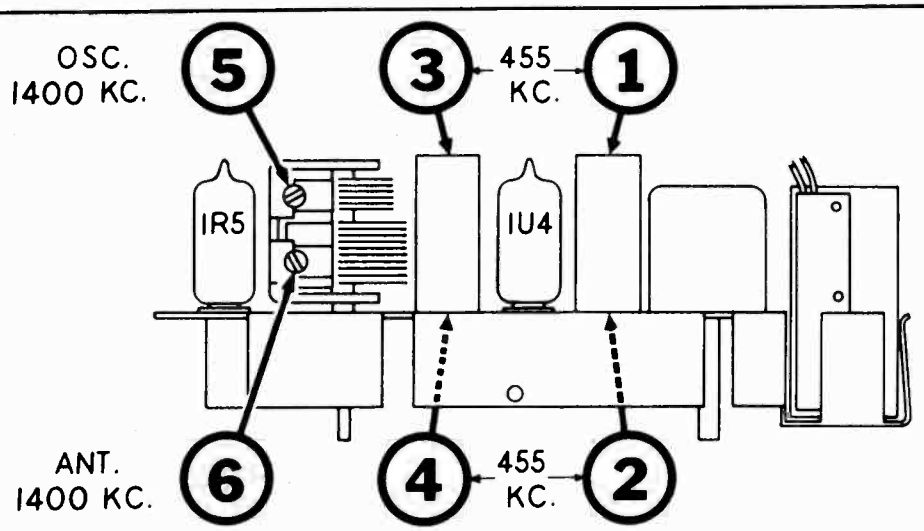
7. Operate the receiver from a 117 V. AC or DC line.

SIGNAL GENERATOR CONNECTIONS		SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	CONNECT GROUND LEAD OF SIGNAL GENERATOR TO					
Lug on trimmer #6 at side of gang (see chart below for location of trimmer).	B— lug in chassis. **CAUTION** If your signal generator is designed with an AC-DC type power supply, connect ground lead of signal generator to receiver through a .25 Mfd. condenser.	**455 KC**	Any point where it does not affect the signal.	**1 and 2**	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3 and 4	1st I.F.	
Connect directly to coupling turn. See Step 4 above for instructions on coupling loop.		**1400 KC**	1400 KC See Step 3 above for instructions on how to obtain this calibration point.	**5**	Broadcast Oscillator	Adjust for maximum output.

IMPORTANT:—Before undertaking alignment of the antenna circuit it is necessary to reassemble the chassis in the cabinet. When reinstalling cabinet back be sure that extension leads previously soldered to secondary of output transformer extend through ventilation slot on edge of back. Now, replace back and be sure that it snaps into proper position. To gain access to antenna trimmer #6 it will be necessary to first lift off the snap button at bottom of cabinet. Now complete the alignment procedure as follows.

Connect directly to coupling turn. See Step 4 above for instructions on coupling loop.	**1400 KC**	Tune to 1400 Kc. generator signal.	**6**	Broadcast Antenna	Adjust for maximum output.

Open cabinet back and unsolder two extension leads attached to secondary of output transformer.



SIDE VIEW OF CHASSIS

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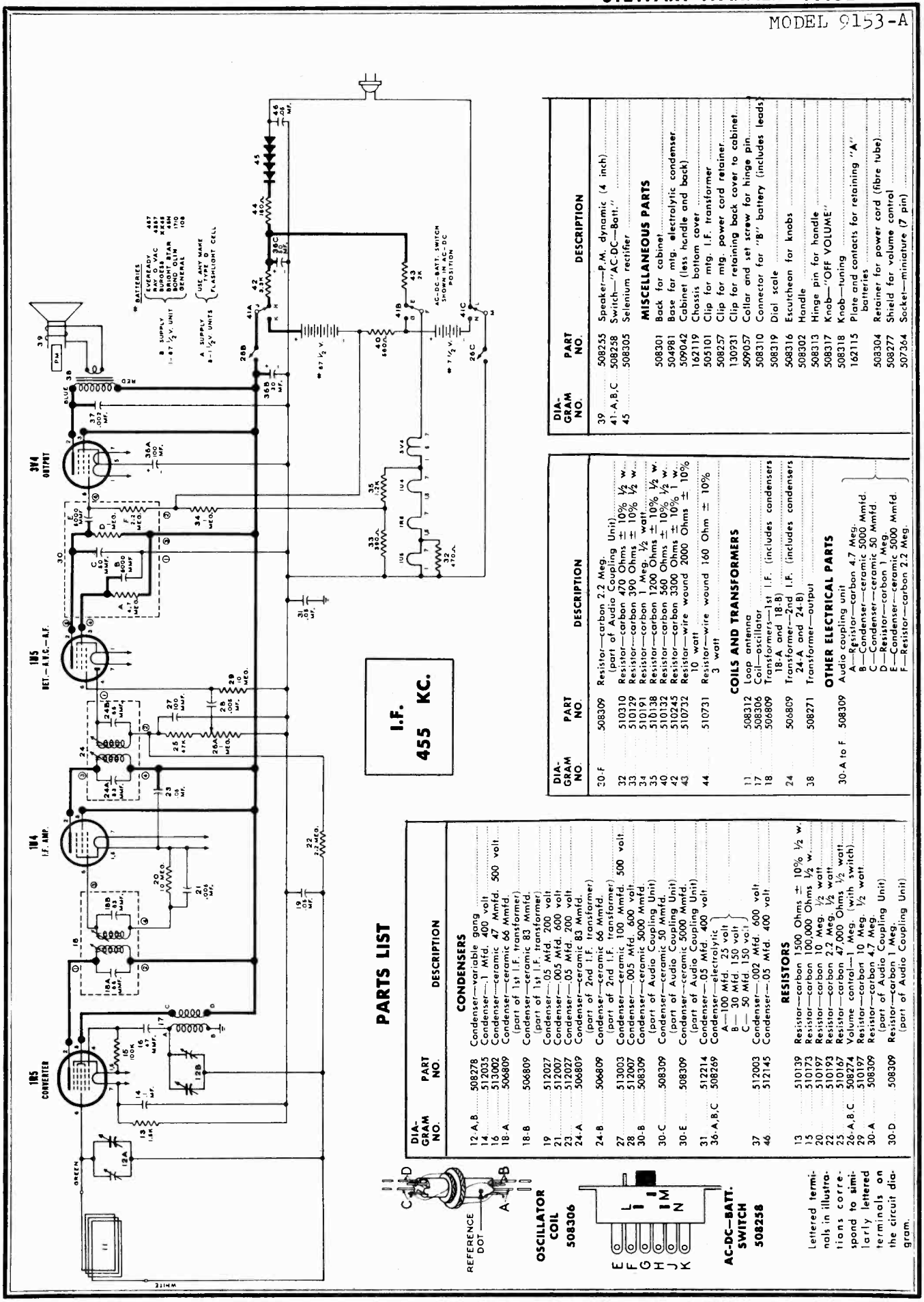
MODEL 9153-A



PARTS LIST

DIA-GRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
12-A,B	508278	Condenser—variable gang
14	512035	Condenser—.1 Mfd. 400 volt
16	513002	Condenser—ceramic 47 Mmfd. 500 volt
18-A	506809	Condenser—ceramic 66 Mmfd. (part of 1st I.F. transformer)
18-B	506809	Condenser—ceramic 83 Mmfd. (part of 1st I.F. transformer)
19	512027	Condenser—.05 Mfd. 200 volt
21	512007	Condenser—.005 Mfd. 600 volt
23	512027	Condenser—.05 Mfd. 200 volt
24-A	506809	Condenser—ceramic 83 Mmfd. (part of 2nd I.F. transformer)
24-B	506809	Condenser—ceramic 66 Mmfd. (part of 2nd I.F. transformer)
27	513003	Condenser—ceramic 100 Mmfd. 500 volt
28	512007	Condenser—.005 Mfd. 600 volt
30-B	508309	Condenser—ceramic 5000 Mmfd. (part of Audio Coupling Unit)
30-C	508309	Condenser—ceramic 50 Mmfd. (part of Audio Coupling Unit)
30-E	508309	Condenser—ceramic 5000 Mmfd. (part of Audio Coupling Unit)
31	512214	Condenser—.05 Mfd. 400 volt
36-A,B,C	508269	Condenser—electrolytic A—100 Mfd. 25 volt B—30 Mfd. 150 volt C—50 Mfd. 150 volt
37	512003	Condenser—.002 Mfd. 600 volt
46	512145	Condenser—.05 Mfd. 400 volt
		RESISTORS
13	510139	Resistor—carbon 1500 Ohms ± 10% ½ w.
15	510173	Resistor—carbon 100,000 Ohms ½ w.
20	510197	Resistor—carbon 10 Meg. ½ watt
22	510193	Resistor—carbon 2.2 Meg. ½ watt
25	510167	Resistor—carbon 47,000 Ohms ½ watt
26-A,B,C	508274	Volume control—1 Meg. (with switch)
29	510197	Resistor—carbon 10 Meg. ½ watt
30-A	508309	Resistor—carbon 4.7 Meg. (part of Audio Coupling Unit)
30-D	508309	Resistor—carbon 1 Meg. (part of Audio Coupling Unit)

DIA-GRAM NO.	PART NO.	DESCRIPTION
30-F	508309	Resistor—carbon 2.2 Meg. (part of Audio Coupling Unit)
32	510310	Resistor—carbon 470 Ohms ± 10% ½ w.
33	510129	Resistor—carbon 390 Ohms ± 10% ½ w.
34	510191	Resistor—carbon 1 Meg. ½ watt
35	510138	Resistor—carbon 1200 Ohms ± 10% ½ w.
40	510132	Resistor—carbon 560 Ohms ± 10% ½ w.
42	510245	Resistor—carbon 3300 Ohms ± 10% ½ w.
43	510732	Resistor—wire wound 2000 Ohms ± 10% 10 watt
44	510731	Resistor—wire wound 160 Ohm ± 10% 3 watt
		COILS AND TRANSFORMERS
11	508312	Loop antenna
17	508306	Coil—oscillator
18	506809	Transformers—1st I.F. (includes condensers 18-A and 18-B)
24	506809	Transformer—2nd I.F. (includes condensers 24-A and 24-B)
38	508271	Transformer—output
		OTHER ELECTRICAL PARTS
30-A to F	508309	Audio coupling unit A—Resistor—carbon 4.7 Meg. B—Condenser—ceramic 5000 Mmfd. C—Condenser—ceramic 50 Mmfd. D—Resistor—carbon 1 Meg. E—Condenser—ceramic 5000 Mmfd. F—Resistor—carbon 2.2 Meg.

DIA-GRAM NO.	PART NO.	DESCRIPTION
39	508255	Speaker—P.M. dynamic (4 inch)
41-A,B,C	508258	Switch—"AC-DC—Batt."
45	508305	Selenium rectifier
		MISCELLANEOUS PARTS
	508301	Back for cabinet
	504981	Base for mtg. electrolytic condenser
	509042	Cabinet (less handle and back)
	162119	Chassis bottom cover
	505101	Clip for mtg. I.F. transformer
	508257	Clip for mtg. power cord retainer
	130931	Clip for retaining back cover to cabinet
	509057	Collar and set screw for hinge pin
	508310	Connector for "B" battery (includes leads)
	508319	Dial scale
	508316	Escutcheon for knobs
	508302	Handle
	508313	Hinge pin for handle
	508317	Knob—"OFF VOLUME"
	508318	Knob—tuning
	162115	Plate and contacts for retaining "A" batteries
	508304	Retainer for power cord (fibre tube)
	508277	Shield for volume control
	507364	Socket—miniature (7 pin)

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SPECIFICATIONS

Voltage Rating — Radio	117 Volts AC-DC
Type of Circuit	Superheterodyne
Tuning Range	540-1640 Kc
Input Power Rating	30 Watts
Intermediate Frequency	455 Kc
Speaker Voice Coil Impedance	3 Ohm
Power Output	1.5 Watts at 10% Distortion

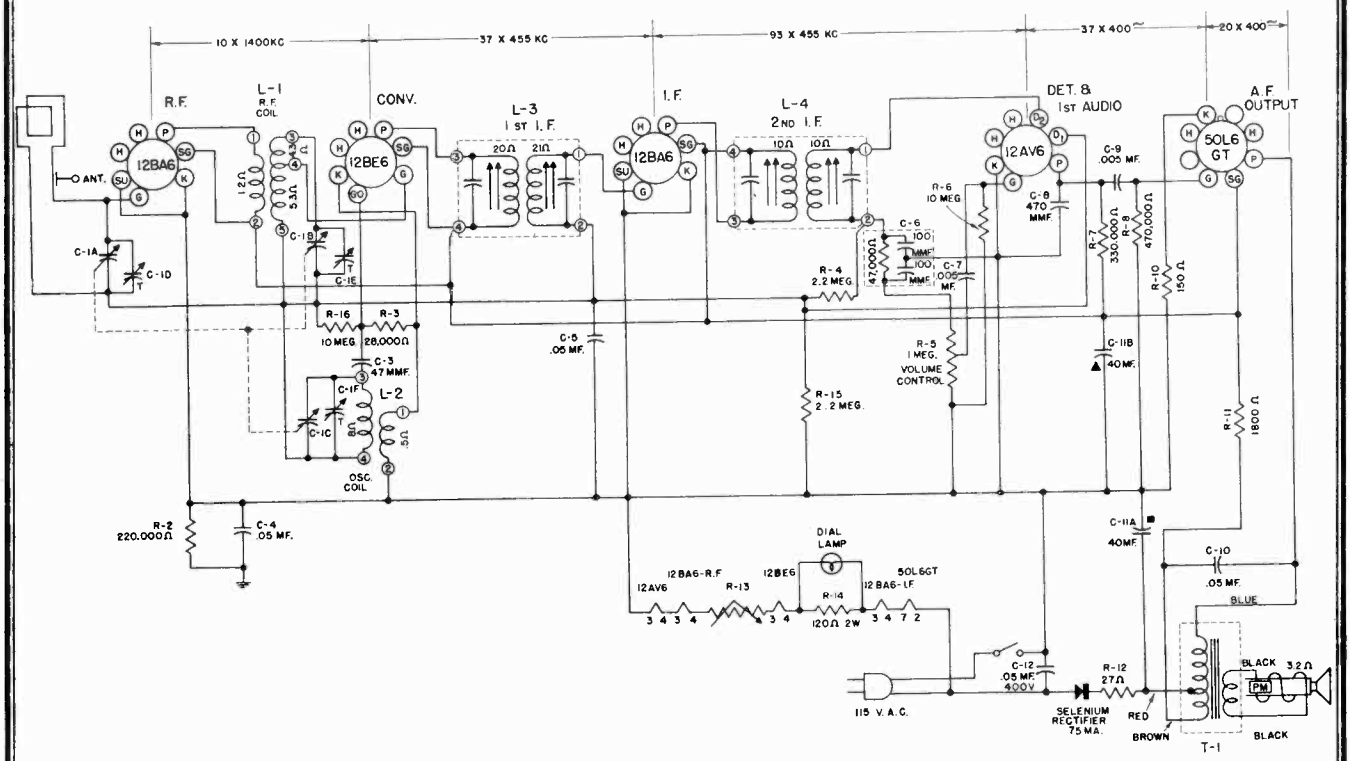
TUBE COMPLEMENT

2 12BA6 Miniature RF and IF Amplifier

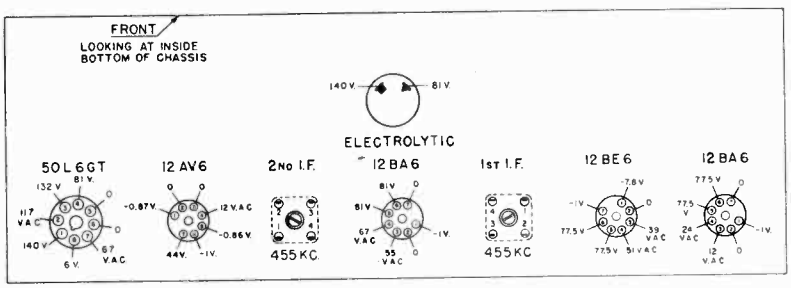
1 12BE6 Miniature Converter

1 12AV6 Miniature Detector, AVC and Audio Driver

1 50L6GT Power Output



Voltage and Tube Location Chart



Measurements are made at 117V line, using electronic Voltmeter. Except where otherwise indicated, volages are D.C. and are positive with respect to the reference point which is the common Black-White lead.

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MODEL 1500

ALIGNMENT PROCEDURE

CAUTION: As this is a transformless Receiver, observe all usual precautions. The Black-White (B-) lead is common to one side of the 117 Volt Power Line Cord.

Pointer Setting	Generator Setting	Input and Dummy	VTVM and Scope Connection and Scale	Adj. and Notes
I. F. ADJUSTMENT				
(1) Low frequency end of dial	455 kc. 400 cy. mod.	Pin #7, 12BE6 tube 0.01 mfd. dummy	-3V DC Scale Green-White (AVC) lead and Black-White (B-) lead.	Adj. top and bottom cores of each I. F. transformer with non-metallic screwdriver for maximum voltage.
(2) "	455 kc. Swept 15 kc.	"	Scope to Junction C-6 and Volume Control	Adj. same cores as above for best over-lapping curve on scope.
R. F. ADJUSTMENT				
(1) 1650 kc. Condenser plates all way out	1650 kc. 400 cy. mod.	Ant. terminal 0.01 mfd. dummy	"	Adj. Osc. (front) trimmer on variable condenser for maximum voltage.
(2) 1400 kc.	1400 kc. 400 cy. mod.	"	"	Adj. R. F. and Loop trimmers on variable condenser for maximum voltage.

Circuit Symbol	S-C Part No.	Capacity	Voltage
C-1	110026	Variable	
C-3	110458	47 MMF	400 V
C-4	40632	.05 MF	400 V
C-5	40632	.05 MF	400 V
C-6	110478	Diode Filter	
C-7	27760	.005 MF	600 V
C-8	110464	470 MMF	400 V
C-9	27760	.005 MF	600 V
C-10	40632	.05 MF	400 V
C-11	111032	2-40 MF	200 V
C-12	40632	.05 MF	400 V

Circuit Symbol	S-C Part No.	Description
L-1	114055	RF COIL ASSEMBLY
L-2	114056	OSC. COIL ASSEMBLY
L-3	114336	1st IF TRANSFORMER
L-4	114337	2nd IF TRANSFORMER
T-1	161413	OUTPUT TRANSFORMER

Circuit Symbol	S-C Part No.	Resistance	Watt	Tol.
R-2	149115	220K ohms	½	20%
R-3	149109	22K ohms	½	20%
R-4	149121	2.2 megohms	½	20%
R-5	145032	1 megohm		Pot.
R-6	149125	10 megohms	½	20%
R-7	149116	330K ohms	½	20%
R-8	149117	470K ohms	½	20%
R-10	28148	150 ohms	½	10%
R-11	149047	1800 ohms	2	10%
R-12	149244	27 ohms	2	10%
R-13	149243	Special NTC		
R-14	149035	120 ohms	2	10%
R-15	149121	2.2 megohms	½	20%
R-16	149125	10 megohms	½	20%

Miscellaneous

139035	LOOP ASSEMBLY
117008	POWER CORD
122032	DIAL LENS
124016	DIAL DRIVE CORD
144018	POINTER
30933	PILOT LAMP
152096	PILOT LIGHT SOCKET
152040	SOCKET 7-PT. MIN.
152041	SOCKET 8-PT. OCTAL.
162034	SELENIUM RECTIFIER — 75 MA
108065	WALNUT CABINET
134004	BROWN KNOB
108066	IVORY CABINET
134005	IVORY KNOB
108169	RED CABINET
134137	BLACK KNOB
108170	TAN CABINET
155187	SPEAKER

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POWER SOURCES: This receiver is designed for operation on either an external power source or on the enclosed batteries.

AC OR DC OPERATION: This receiver may be operated on 50 to 60 cycle, 110 to 125 volt AC current or 110 to 125 DC current.

CAUTION: Never plug this receiver into a 220 volt line as this will seriously damage the component parts which have been designed for 110 to 125 volt operation only.

To operate on AC or DC open the small door at the right in the back of the cabinet. Pull out the power cord and plug into a convenient outlet of the proper voltage and current. Follow instructions under "Controls."

To operate on the enclosed batteries, follow instructions under "Controls."

ANTENNA: This receiver is equipped with a sensitive loop antenna and requires no external antenna wire. However, due to the directional qualities of the loop some stations may appear to be weak in reception. This condition may be remedied by rotating or changing the position of the receiver.

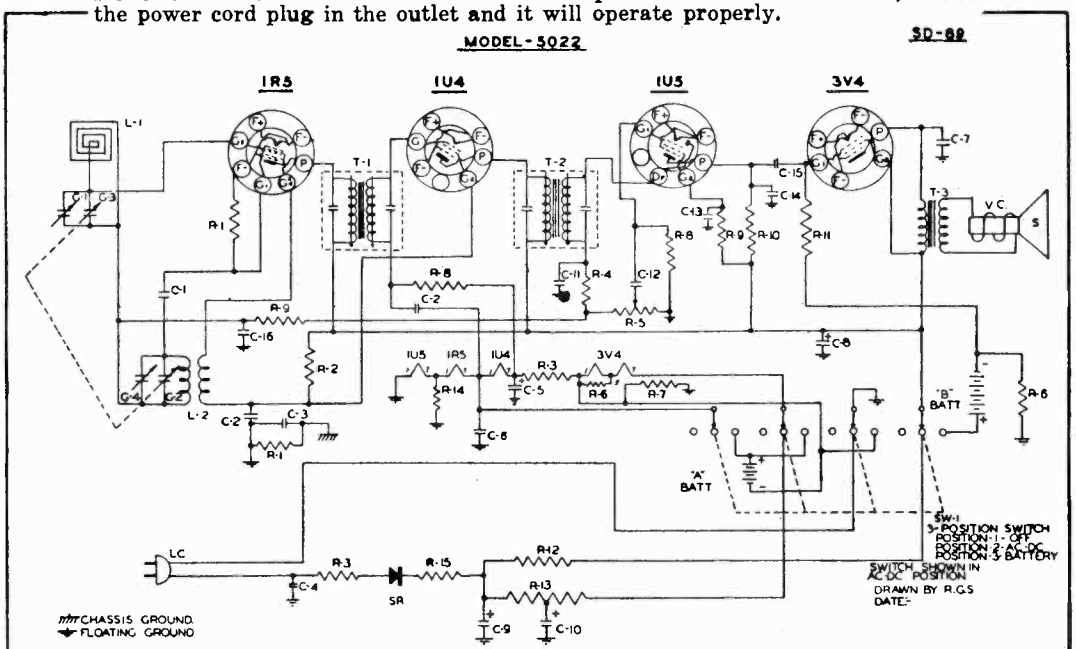
CONTROLS: This receiver has three control knobs which are located on the front panel of the cabinet.

STATION SELECTOR KNOB: The center knob is the station selector. Rotate this knob to the right or left to select your desired station. The dial scale is calibrated in kilocycles. By mentally adding a zero to the numbers on the scale, the result will be read directly in (KC) kilocycles. (i.e., 60 plus 0 equals 600 KC or 140 plus 0 equals 1400 KC).

POWER SELECTOR SWITCH: The right hand knob is the power selector. It has three positions which are indicated on the front panel. The extreme left hand position is the "OFF" position. The small dot on this knob must point to "OFF" when the receiver is not in use. The center position is "AC-DC" and is used when it is desired to operate the receiver from a power line source. The extreme right hand position is "BATT" and is used when it is desired to operate on the enclosed batteries.

AC OPERATION: When an AC power source is used, set the power selector knob to "AC-DC" after the power cord has been plugged into a convenient outlet. The receiver is now ready for operation.

DC OPERATION: If the receiver does not operate after a few seconds, reverse the power cord plug in the outlet and it will operate properly.



PART NO.		DESCRIPTION
IR-20	R-1	220M RESISTOR 1/2W 20%
IR-37	R-2	10M RESISTOR 1/2W 20%
IR-17	R-3	33K RESISTOR 1/2W 20%
IR-31	R-4	82M RESISTOR 1/2W 10%
VC-11	R-5	1MEG VOLUME CONTROL
IR-33	R-6	270K RESISTOR 1/2W 10%
IR-39	R-7	620K RESISTOR 1/2W 5%
IR-3	R-8	10MEG RESISTOR 1/2W 20%
IR-23	R-9	3.3MEG RESISTOR 1/2W 20%
IR-12	R-10	1MEG RESISTOR 1/2W 20%
IR-13	R-11	2.2MEG RESISTOR 1/2W 20%
IR-40	R-12	3900Ω RESISTOR 1W 10%
WR-7	R-13	1050-1050 CANDOHM RESISTOR 5W 5%
IR-1	R-14	470K RESISTOR 1/2W 20%
IR-41	R-15	47K RESISTOR 1W 10%
MC-2	C-1	100MMFD. MICA CONDENSER
PC-7	C-2	.01MFD CONDENSER 400 W.V.
PC-8	C-3	.1 MFD. CONDENSER 400 W.V.
PC-5	C-4	.05 MFD CONDENSER 400 W.V.
EC-6	C-5	70MFD. 10 W.V. ELECTROLYTIC

PART NO.		DESCRIPTION
PC-3	C-6	1 MFD. CONDENSER 200 W.V.
PC-6	C-7	.005 MFD. CONDENSER 600 W.V.
	C-8	40 MFD.
EC-14	C-9	40 MFD. 150 W.V. ELECTROLYTIC
	C-10	20 MFD.
	C-11	150MMFD.
	C-12	.002MFD.
MC-7	C-13	.005MFD.
	C-14	100 MFD.
	C-15	.005MFD.
PC-2	C-16	.05MFD CONDENSER 200 W.V.
	G-1	ANT. TRIMMER
	G-2	
GC-6	G-3	GANG CONDENSER
LL-23	L-1	LOOP ANTENNA
LO-8	L-2	OSC. COIL
SA-2	SR	SELENIUM RECTIFIER
CO-1	LC	LINE CORD
SW-8	SW-1	4 POLE, 3 POSITION SWITCH
	"A" BATT	2 "D" SIZE FLASHLITE CELLS, 1½ VOLTS
	"B" BATT	1-67½ VOLT BATTERY

PART NO.		DESCRIPTION
LI-5	T-1	INPUT I.F. TRANSFORMER
LI-5	T-2	OUTPUT I.F. TRANSFORMER
	T-3	SPEAKER OUTPUT TRANSFORMER
SPM-16	VC	VOICE COIL
	S	3½ PM SPEAKER
	G-4	OSC. TRIMMER
TU-39	—	IR5-1U4-1U5-3V4

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BATTERY OPERATION: The power cord is not used for battery operation and may be hanked and put back in the cabinet. Set the power control knob to "BATT" and the receiver is ready for operation on the enclosed batteries.

CAUTION: When the receiver is not in use, the power selector knob must be turned to "OFF." If the knob is allowed to remain in "BATT" position, the batteries will be in use constantly. The volume control does not control the batteries and they are still in operation even though the volume control is turned all the way off.

VOLUME CONTROL: The left hand knob is the volume control. After the power selector knob has been properly set and the receiver is in operation, rotate the volume control knob to the right to increase volume or to the left to decrease volume.

BATTERY SUPPLIERS

The batteries for this receiver may be purchased from any reliable dealer.

For proper operation this receiver requires two "A" batteries and one "B" battery.

The "A" batteries are size "D" flashlight cells and are made by all battery manufacturers.

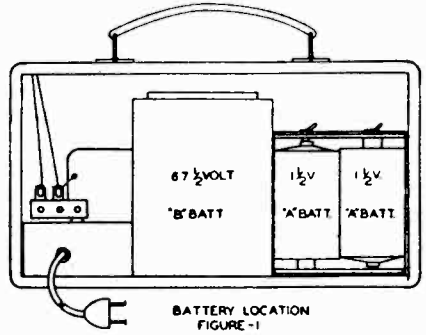
The "B" battery is a 67½ volt battery and is made by the following manufacturers.

Eveready 67½ vlt. #467

Burgess 67½ vlt. #XX45

General 67½ vlt. #W45A

Ray-O-Vac 67½ vlt. #4367



BATTERY LOCATION
FIGURE-1

BATTERY SERVICING (See Fig. No. 1)

To replace the batteries in this receiver. Remove the back.

To the right, looking into the rear of the cabinet is the "A" or flashlight battery container. To the left is the "B" or 67½ volt battery.

To replace the "A" batteries, pull the old batteries out of the container. Replace with fresh batteries, making sure the batteries are inserted according to the diagram on the inside of the container.

To replace the "B" battery, disconnect the snap fastener connectors. Replace with a fresh battery and snap the connectors into place. Replace the battery in the cabinet as shown in Fig. No. 1, making sure that the connector end faces the top of the cabinet.

After the batteries have been installed, replace the back, making sure that the two washers in the bottom of the back fit into the slot near the bottom edge of the cabinet.

ALIGNMENT AND SERVICE DATA

(See Fig. No. 2 For Trimmer Location)

Remove chassis from cabinet for alignment.

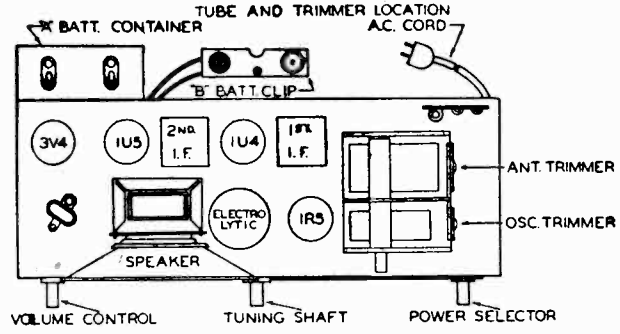
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

FIRST STEP: Connect the hot lead from the generator to the ANT. Section of the gang condenser through a .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

THIRD STEP: Remove the generator leads from the gang condenser and replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn of wire over the outside of the cabinet. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer through the hole which is provided in the end of the cabinet until a maximum signal is noted on the output meter. The ANT. trimmer hole in the side of the cabinet is covered by a small plug button. Replace this button after adjustment has been made. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.



MODEL-5022
FIGURE-2
TL-89

WARRANTY

This receiver has been carefully tested and was shipped from our factory in perfect operating condition. If the set arrives damaged in any way, it is important that you file claim immediately against the carrier. We warrant this receiver to be free from defective materials and workmanship. We agree to exchange any part, which under normal use, becomes defective within a period of 90 (ninety) days from the date of sale to the original purchaser. If this receiver does not operate, it should be returned for service to the dealer from whom it was purchased.

This warranty does not apply if the receiver has been damaged, tampered with, or misused. If the receiver is returned to the factory, transportation charges must be prepaid. No receiver may be returned without our written consent.

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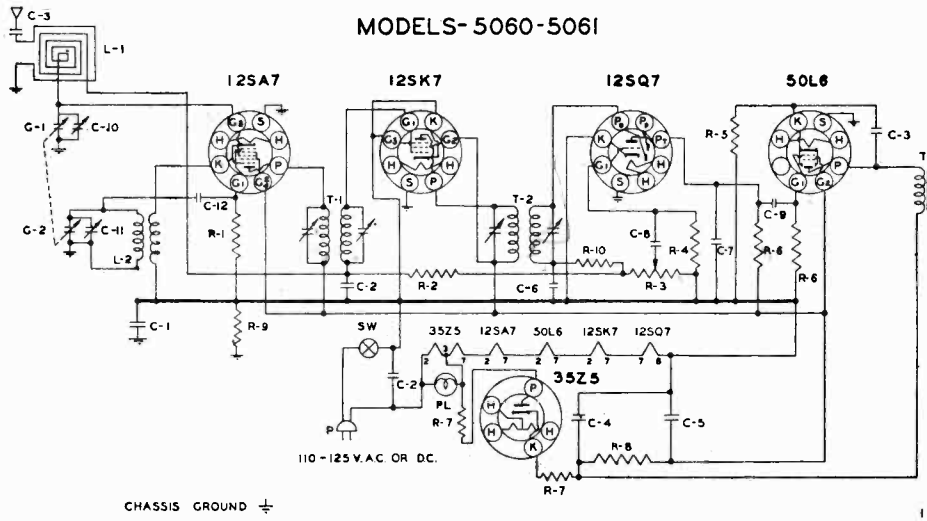
SCHEMATIC DIAGRAM — MODELS 5060 and 5061

MODELS-5060-5061 SD-92-U



PART NO.		DESCRIPTION
IR-9	R-1	22,000 Ω RESISTOR 1/2W 20 %
IR-23	R-2	3.3 MEG. RESISTOR 1/2W 20 %
VC-3	R-3	1 MEG. VOLUME CONTROL
IR-13	R-4	2.2 MEG. RESISTOR 1/2W 20 %
IR-14	R-5	150 Ω RESISTOR 1/2W 20%
IR-11	R-6	470 M Ω RESISTOR 1/2W 20%
IR-17	R-7	33 Ω RESISTOR 1/2W 20%
IR-25	R-8	2200 Ω RESISTOR 1 W 10%
IR-20	R-9	220 M Ω RESISTOR 1/2W 20%
IR-10	R-10	47000 Ω RESISTOR 1/2W 20%
PC-8	C-1	.1 MFD. CONDENSER 400 V.
PC-5	C-2	.05 MFD. CONDENSER 400 V.
PC-7	C-3	.01 MFD. CONDENSER 400 V.
EC-12	C-4	40 MFD.
	C-5	20 MFD. 150 V. ELECTROLYTIC
MC-8	C-6	220 MMFD.
	C-7	220 MMFD.
	C-8	.002 MFD.
	C-9	.005 MFD.
	C-10	ANT. TRIMMER.
	C-11	OSC. TRIMMER
MC-4	C-12	50 MMFD. MICA CONDENSER
GC-6A	G-1	GANG CONDENSER
	G-2	
LL-6	L-1	LOOP ANTENNA
LO-13	L-2	OSC. COIL
LI-6	T-1	INPUT I.F. TRANSFORMER
LI-7	T-2	OUTPUT I.F. TRANSFORMER.
	T-3	SPEAKER OUTPUT TRANSFORMER
SPK-12B	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	PL	#47 PILOT BULB
	SW	A.C. SWITCH ON VOLUME CONTROL
CO-1	P	LINE CORD

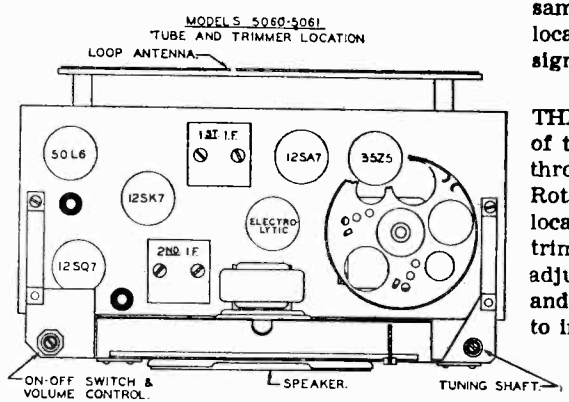


FIGURE-1

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the top of the ANT. section of the gang condenser. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

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MODEL 6D-620, Tuner

GENERAL:

Signal Seeking Tuners are used on the following radios:

	Bulletin No.
Buick	
Model 980899 1950 6D-	929
Cadillac	
Model 7258865 1950 6D-	1060
Oldsmobile	
Model 982482 1950 6D-	987
Model 982483 1950 6D-	987

The service bulletin for any radio using this tuner will refer to this bulletin for tuner servicing.

This bulletin covers the theory of operation, adjustments, replacements and trouble-shooting procedure.

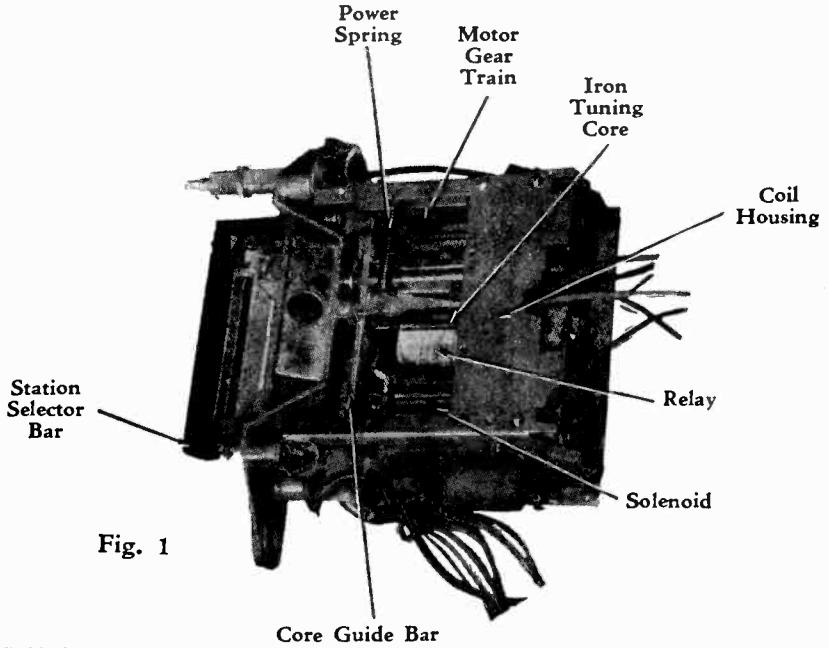

Fig. 1

THE SIGNAL SEEKING TUNER

The Signal Seeking Tuner is an electronically controlled automatic tuner by which the operator can change stations by merely depressing a single station selector bar on the radio or an auxiliary foot switch. The seeking operation is a uni-directional sweep of the broadcast band from low to high frequency with a nearly instantaneous return. The tuning mechanism is driven by a spring loaded mechanical motor which is stopped on station by a triggering circuit actuated by voltage developed from an incoming signal.

The number of stations on which the tuner will stop can be regulated by use of the Sensitivity Control. It is a step control which in the extreme clockwise position gives maximum stopping sensitivity, while it allows the tuner to stop only on strong local stations when in the minimum sensitivity or extreme counterclockwise position. This control is in the circuit only while the tuner is seeking and does not affect the "on station" sensitivity of the receiver.

THEORY OF OPERATION

This discussion of the operation of the Signal Seeking Tuner does not refer to any particular model radio. It covers the overall operation and the bulletin for the particular radio involved will give the details of the circuit used in the actual receiver.

Sweep and Return Cycle (See Fig. 2)

One Power Spring, which is fastened to the lower plate of the Planetary Arm, pulls this arm around its pivot. The Planetary Arm is linked to the Core Bar. Thus, as the spring contracts and moves the Planetary Arm it also pulls the core bar and its iron cores from the tuning coils thereby changing the tuned frequency of the radio towards the high end of the broadcast band. After the tuner has swept beyond the top broadcast frequency, the High Frequency Switch Operating Cam on the lower Planetary Arm trips the Tuner Return Switch which in turn energizes the Solenoid and this quickly returns the Planetary Arm to its original position with the cores inserted fully into the coils (low frequency) and the power spring is now under maximum tension. As the Planetary Arm returns, the Low Frequency Switch Operating Cam trips the Tuner Return Switch to its original position thus de-energizing the Solenoid and completing the cycle.

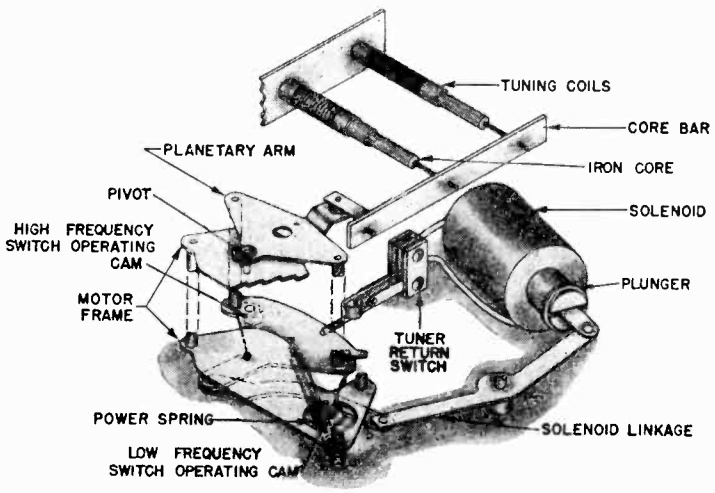

Fig. 2

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MODEL 6D-620,
Tuner

Motor and Control (See Fig. 3)

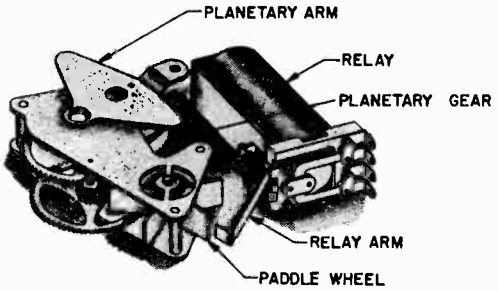

Fig. 3

The Power Spring tends to move the Planetary Arm about its pivot point thereby starting the Planetary Gear and its meshed train in motion. This motion is transferred through the gear train to the Paddle Wheel which acts as an air vane governor keeping the motion at a constant speed. This movement of the Planetary Arm is then controlled by merely freeing or blocking the Paddle Wheel with the Relay Arm. Thus, the movement of the Planetary Arm which moves the tuning cores is started or stopped by the action of the Relay Arm.

Manual Tuning Gear Operation (See Fig. 4)

Manual tuning is accomplished by turning the Manual Control Shaft which turns the Worm Gear in its bracket. The Worm Gear is meshed with the Manual Drive Gear which in turn is meshed with the Planetary Pinion Gear. During manual tuning the Paddle Wheel is held in place by the Relay Arm and this Pinion Gear is not free to rotate, thus effectively locking the Planetary Arm to the outer edge of the Manual Drive Gear. Therefore as the Manual Drive Gear turns, the Planetary Arm moves in unison with it and varies the frequency of the tuner by varying the position of the iron cores in the tuning coils. (Notice that when the set is being tuned automatically and the Paddle Wheel is rotating, the Manual Drive Gear is held securely in place by the Worm Gear while the Planetary Pinion Gear "walks around" the periphery of the Manual Drive Gear thereby causing the Planetary Arm to move and change the position of the tuning cores.)

On sets which have no manual drive, the Manual Drive Gear is secured to the Motor Frame and the Control Shaft and Worm Gear are eliminated.

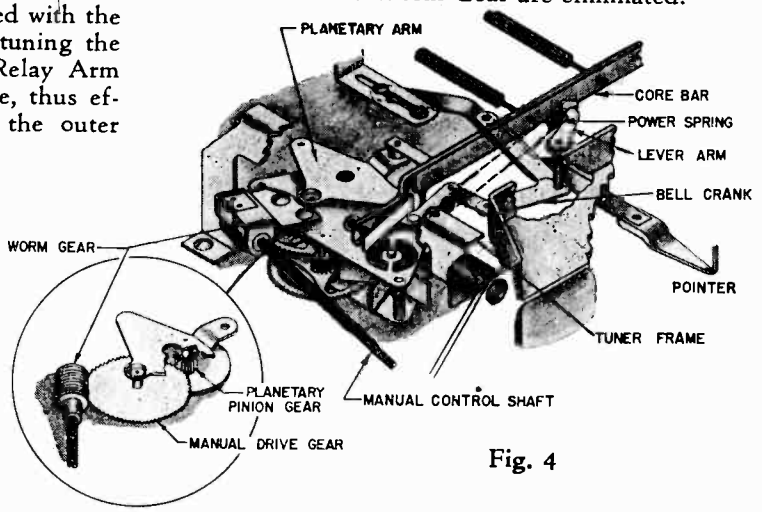

Fig. 4

Pointer and Core Bar Linkage (See Fig. 4)

The second power spring is shown in this view. It has a dual purpose, serving both as a power spring and an antibacklash spring. The primary linkage is from the tuner frame to the Lever Arm which is securely staked to the Bell Crank. At the Bell Crank the linkage splits, with one arm linked to the core bar at the extreme left end, and the other arm linked to the pointer. Thus, this spring helps pull the core bar in the high frequency direction when it is free to move and provides a spring loaded linkage between the core bar and the pointer preventing any tendency for backlash.

Clutching Operations (See Fig. 5)

The Ratchet Pawl and Wheel are used so that the Solenoid can cock the power springs without running the entire gear train in the reverse direction during the return sweep. Notice that the Ratchet also is used when the dial pointer has reached the high end of the band while tuning manually. Then the Planetary Arm has reached the end of its tuning arc and so the planetary pinion tends to be rotated by the Manual Drive Gear (see Fig. 3). This turns the Ratchet Wheel out of the Pawl and allows the pinion gear to turn freely without exerting further force on the Planetary Arm and thereby eliminates any possible damage to the mechanism.

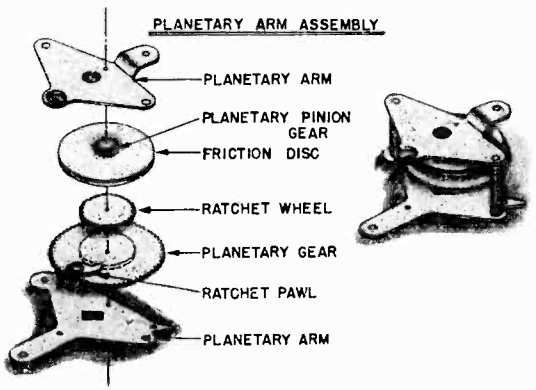

Fig. 5

The purpose of the Friction Disc is to prevent damage to the mechanism when manually tuned past the low frequency stop. This is accomplished because the disc slips before excessive pressure is exerted when the Pinion Gear tends to rotate the Planetary Gear. The Friction Disc is not found on radios without a manual drive.

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Tuner Sweep Cycle Outline (Fig. 6)

I. Tuner is started by removing Relay Arm from Paddle Wheel

A. Spring driven gear train begins to sweep. (Fig. 3)

B. Planetary Arm moves. (Fig. 2)

C. Tuning cores are moved toward higher frequency by core bar linkage to Planetary Arm.

D. Spring loaded dial pointer scans dial. (Fig. 4)

II. Signal actuates relay causing arm to stop paddle wheel

A. Gear train stops. (Fig. 3)

B. Planetary Arm is stopped.

C. Core bar movement is stopped.

D. Dial pointer sweep is stopped.

III. When tuner reaches high end of dial after last stop.

A. The High Frequency Switch Operating Cam trips Tuner Return Switch. (Fig. 2)

B. Solenoid is energized.

C. Plunger is pulled into the Solenoid.

D. Planetary Arm and pointer are returned to low end of dial.

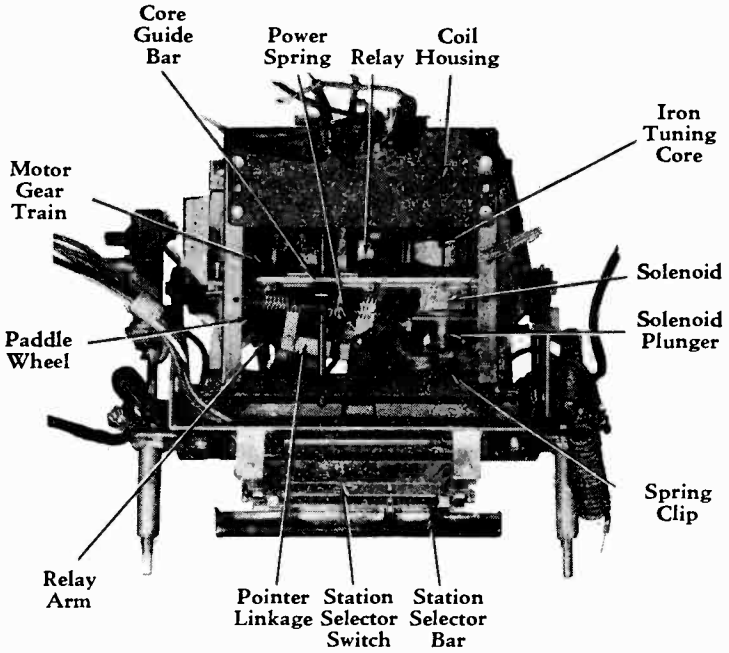

Fig. 6

E. The Low Frequency Switch Operating Cam trips the Tuner Return Switch in the opposite direction. (Fig. 2)

F. The Solenoid is de-energized and the sweep starts from the low frequency stop.

ELECTRICAL OPERATION

The purpose of the electrical components associated with the tuner is to control the relay so the operator may start the tuner sweeping cycle by merely depressing the station selector bar and so that the sweeping operation will continue until a signal is received. At that time it is the function of this circuit to accurately tune to the frequency of the selected station. It also provides the necessary conditions to keep the tuner on the station until a change is desired. The operational cycle of the electronic control system of the signal seeker tuner is outlined

The Electrical Cycle Outline (Fig. 7)

I. Starting the Tuner Seeking (Energizing the Relay)—The Station Selector Bar (27) is momentarily depressed.

A. Contact #2 of the Station Selector Switch opens first, ungrounding secondary of the output transformer therefore muting the set as contact #1 closes.

B. Contact #1 closes and provides a circuit from B+ through the relay winding, the 15,000 ohm resistor (30), the Selector Switch contacts, and the delay circuit resistor network to ground.

C. The current through this circuit energizes the Relay and removes the Relay Arm from the Paddle Wheel—thus starting the tuner, opening contacts #2 and #4, and grounding relay contacts #1 and #3.

II. Keeping the Tuner Seeking after the Selector Bar is released (Keeping the Relay Energized)

A. Relay contact #3 is closed providing a path to ground for the cathodes of the R.F. and I.F. amplifier tubes. This path is through the Sensitivity Control so the sensitivity of the set can be controlled during the sweeping operation.

B. Relay contact #1 is grounded thus lowering the cathode to ground resistance of the Relay Section of the Trigger Tube by putting the 6,800 ohm resistor (24) in parallel with the 47,000 ohm cathode resistor (26).

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MODEL 6D-620,
Tuner

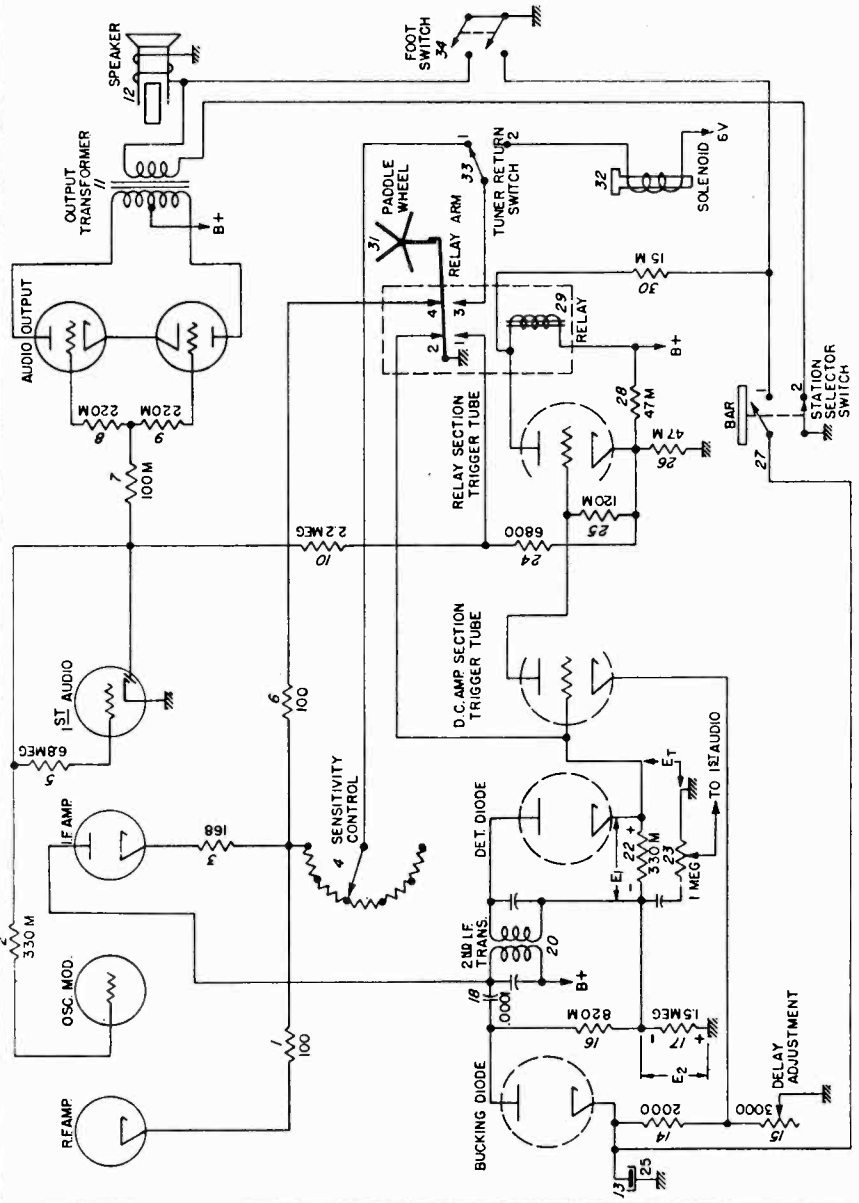

Fig. 7

This Diagram Does Not Refer to Any Particular Radio Model

The Electrical Cycle Outline (Continued)

This causes a lowering of the cathode voltage thereby causing an increased plate current flow which is sufficient to keep the relay energized and the tuner seeking.

III. Stopping the Tuner on Station with an Incoming Signal (De-energizing the Relay)

A. A voltage from the incoming signal is developed in the primary and secondary of the 2nd I.F. transformer (20).

B. The voltage in the secondary of the I.F. coil is rectified by the Detector Diode developing a D.C. voltage across the 330,000 ohm resistor (22).

C. The voltage in the primary of the I.F. coil is rectified by the Bucking Diode developing a D.C. voltage across the 1.5 megohm resistor (17).

D. The voltage developed by the Bucking Diode across the 1.5 megohm resistor (17) opposes the voltage developed by the Detector Diode across the 330,000 ohm resistor (22). The resultant voltage is applied to the grid of the D.C. Amplifier Section of the Trigger Tube. This triggering voltage gives a substantially constant tuning accuracy for all signals.

E. When the resultant triggering voltage on the grid of the D.C. Amplifier becomes positive it causes the tube to conduct.

F. The plate current flow in the D.C. amplifier section develops a biasing voltage across the 120,000 ohm resistor (25) which is between grid and cathode of the Relay Section of the Trigger Tube, making the grid more negative than the cathode thus reducing the plate current.

G. The decrease in plate current flow causes the relay to be de-energized and the Relay Arm again engages the Paddle Wheel thereby stopping the tuner sweep on a station, opening contacts #1 and #3 and grounding relay contacts #2 and #4.

IV. Holding the Tuner on Station until a new Station is Desired (Holding the Relay De-energized):

A. Relay contact #1 is opened, ungrounding the 6800 Ohm Resistor (24), thus preventing any appreciable current flow in the relay.

B. Relay contact #4 is grounded and this grounds the cathode circuits of the R.F. and I.F. amplifiers effectively by-passing the sensitivity control (4), which is now ungrounded, and leaving the set at normal sensitivity.

C. Relay contact #2 is grounded thereby grounding out the grid of the D.C. Amplifier. Any voltage now developed across the 330,000 ohm resistor (22) keeps the Bucking Diode from conducting by applying a negative voltage to its plate and the Detector Diode now functions as a conventional detector.

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The Tuner Detection Circuit (See Figs. 7 and 8)

The purpose of the tuner detection circuit is to take input signal voltages of varying strength and trigger the relay tube so that the tuner will stop accurately on the station frequency. A positive voltage developed by the signal on the grid of the D.C. Amplifier Section causes the tuner to trigger and stop. This is accomplished by using the Detector Diode and Bucking Diode to develop voltages of opposite polarity (E_1 and E_2) between grid and ground of the D.C. Amplifier Section of the Trigger Tube, thus effectively applying the algebraic sum of these voltages (E_t) to this signal grid. (Note that contacts #2 and #4 of the relay are open.) These relative voltages plotted against frequency are shown in Fig. 8 using a station frequency of 1200 KC. Notice that the response curve of the voltage (E_2) across the 1.5 megohm resistor (17) is broader and not as large as the voltage (E_1) developed across the 330,000 ohm (22) detector load. This is because the detector voltage has benefit of one more tuned circuit which gives the narrower curve. Also there is a positive voltage appearing at the cathode of the Bucking Diode which will have the effect of lowering the voltage (E_2) across the 1.5 megohm resistor (17) because it will introduce a delay before the Bucking Diode will begin to conduct. This delay can be controlled by the Delay Adjustment in the cathode of the Bucking Diode. This Delay Adjustment also controls the trigger level so

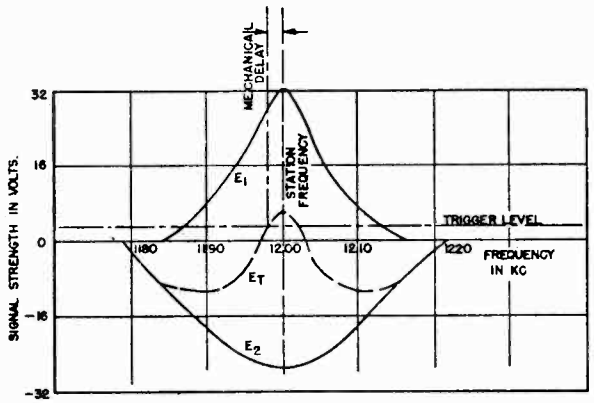

Fig. 8

that the mechanical delay is compensated for and the tuner stops exactly on station. It is a factory adjustment and SHOULD not be adjusted unless it is proven faulty.

Since the two diodes obtain their voltages from the same incoming signal, the strength of both voltages will vary directly with the strength of the incoming signal. Therefore, while they both rise and fall with variation in signal strength, their difference (E_t), which is effectively the trigger pulse, will tend to remain constant. Thus, a station will be tuned in with the same degree of accuracy whether it is a strong or weak signal.

Tuner Muting (See Fig. 7)

Various methods of muting are employed in the signal seeker tuner operated radios. To prevent a click in the speaker as the station selector bar energizes the relay, the output transformer circuit is opened (contact #2 of Station Selector Switch (27), before contact #1 is made. Or, in the case of the foot switch, the speaker voice coil is grounded and the set muted before the relay energizing contact is made.

The receiver is also muted when the solenoid is energized during the return cycle of the tuner. This is accomplishd because when the tuner return switch (33) is mechanically tripped to position #2 it ungrounds the Sensitivity Control which is the cathode return for the R.F. and I.F. amplifier tubes thus momentarily disabling the set.

The receiver also may be muted during the sweep cycle of the tuner by applying the negative oscillator voltage to the grids of the audio tubes to cut them off during the sweep time. Then, when the relay stops the paddle wheel on station and contact #1 is ungrounded enough positive voltage is applied through the 2.2 megohm resistor (10) to counteract the negative voltage from the oscillator and return the output tubes to normal operation. Any excess positive voltage will leak off through the diode to ground in the 1st audio tube.

Sensititivity Control

The sensitivity control is a step resistor which is inserted into the cathodes during the tuning sweep when relay contact #3 is grounded and is the means by which the operator controls the number of stations on which the tuner will stop.

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MODEL 6D-620,
Tuner

ADJUSTMENTS

All illustration numbers in this section can be used in conjunction with the bulletin for the radio involved and do not refer to the Theory of Operation portion of this bulletin.

All adjustments on Signal Seeking Tuners are made accurately at the factory and do not require further adjustment unless it is definitely proven they are wrong or tuner parts are replaced. These adjustments are readily accessible and can be made without removing the tuner from the radio. All adjustments are made with the antenna disconnected from the radio. All adjustments can be reached by removing the front and rear covers of the radio and the adjustment cover on the top of the radio. The correct procedures for making these adjustments are as follows:

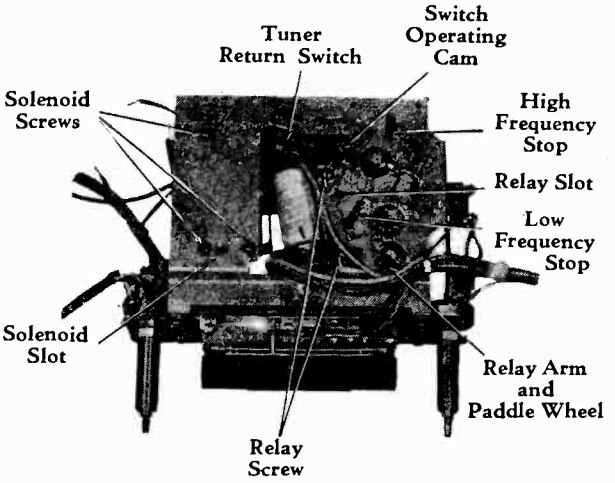
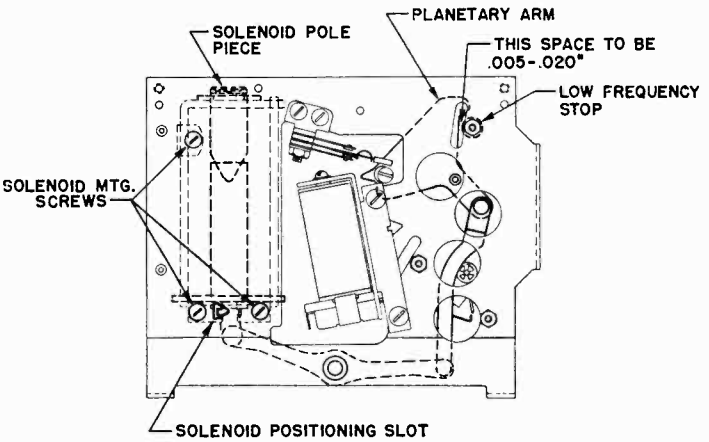


Fig. 9

Solenoid Pole Piece Adjustment (Fig. 10)

This adjustment should be made whenever the Solenoid or Solenoid Plunger is replaced. Its purpose is to obtain the correct amount of force from the Solenoid and to prevent the Solenoid Plunger from sticking.

1. With a screwdriver back the Solenoid Pole Piece out of the Solenoid.
2. Bottom the Solenoid Plunger in the Solenoid. The plunger is bottomed when the "C" washer collar on the plunger hits the frame of the Solenoid.
3. Screw the Solenoid Pole Piece into the Solenoid until it just touches the plunger.
4. Back the pole piece off exactly 1½ turns.
5. Tighten the hex locking nut and seal with glyptal or shellac.



SOLENOID POSITIONING ADJUSTMENT

Fig. 10

Solenoid Adjustment (Fig. 10)

The Solenoid adjustment should be made whenever solenoid or Solenoid plunger is replaced. Its purpose is to provide the correct amount of solenoid plunger movement to move the tuner to the low frequency end of the broadcast band.

1. With the radio turned off, connect a jumper wire across the 0.5 mfd condenser, Illustration #43, on the cold side of the Solenoid. This is the only paper condenser found on the tuner.
2. Turn the radio on. (This energizes the Solenoid.)
3. Energize the Relay by momentarily depressing the Station Selector Bar.
4. Loosen but do not remove the three solenoid mounting screws.
5. Using a screwdriver in the Solenoid Positioning Slot, turn the screwdriver and move the Solenoid until there is a 0.005 to 0.020 inch gap between the Planetary Arm and its Low Frequency Stop.
6. Tighten the three Solenoid Mounting Screws.
7. Turn the radio off and remove the jumper wire from the condenser.

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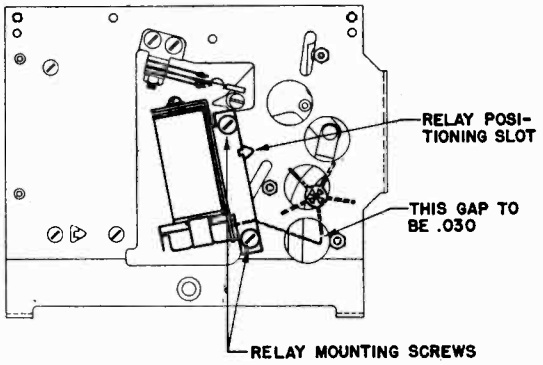
Relay Adjustment (Fig 11)

This adjustment should be made whenever the relay is replaced. This is the only adjustment of the relay that should be attempted in the field. The adjustment of the relay is to position the relay arm to have the correct engagement and clearance with the gear train paddle wheel.

1. With the radio turned off, connect a jumper wire across the 0.5 mfd condenser, Illustration #43, on the cold side of the Solenoid. This condenser is found on the tuner.
2. Turn the radio on. (This energizes the Solenoid.)
3. Energize the Relay by momentarily depressing the Station Selector Bar.
4. Loosen but do not remove the two Relay Mounting Screws.
5. Using a screwdriver in the Relay Positioning Slot, turn the screwdriver and move the relay until there is a gap of approximately 0.030 or 1/32 inch between the top of the Relay Arm and the tip of the blades on the Paddle Wheel.
6. Tighten the two Relay Mounting Screws.
7. Turn the radio off and remove the jumper wire from the condenser.



RELAY POSITIONING ADJUSTMENT

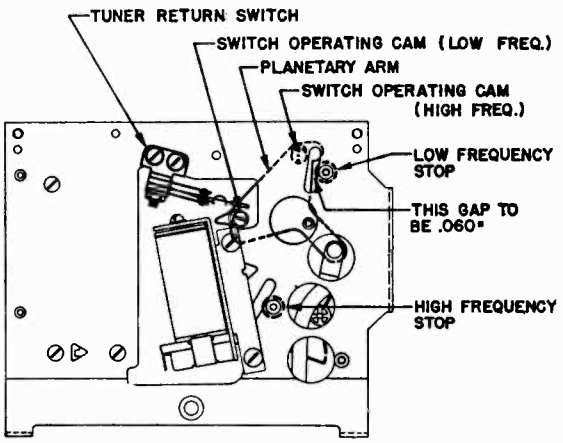
Fig. 11

Switch Operating Cam Adjustment (Fig. 12)

This adjustment should be made whenever the Motor Gear Train or the Tuner Return Switch is replaced. Its purpose is to set the timing of the Tuner Return Switch.

1. With the radio turned off, insert a 0.060 inch feeler gauge through the slot against the Low Frequency Stop. Number 14 bare wire is a satisfactory gauge.
2. Position the Planetary Arm against the feeler gauge. This can be done with the manual tuning control or on radios without this control the Planetary Arm can be moved directly or by moving the core guide bar to the low frequency end of the broadcast band (tuning cores all the way in the coils).

   CAUTION: ON RADIOS HAVING NO MANUAL TUNING CONTROL, THE PLANETARY ARM CAN BE MOVED ONLY TOWARD THE LOW FREQUENCY STOP WITHOUT DAMAGING THE MOTOR GEAR TRAIN.
3. With a small screwdriver, move the Low Frequency Switch Operating Cam to a position furthest from the Tuner Return Switch.
4. Trip the Tuner Return Switch so that its operating arm is toward the cam.
5. Turn the Low Frequency Switch Operating Cam in a counter clockwise direction until it trips the switch.
6. Insert a 0.060 inch feeler gauge through the slot against the High Frequency Stop.
7. Position the planetary arm against the feeler gauge. CAUTION: DO NOT USE DIRECT FORCE TO MOVE THE PLANETARY ARM. The Planetary Arm can be positioned either by using the manual tuning control or on radios without a manual control as follows:
   (a) Turn the radio on and depress the Station Selector Bar.
   (b) Turn the radio off very close to the high frequency end of the broadcast band.
   (c) With a screwdriver turn the Switch Operating Cam to the position furthest from the Tuner Return Switch.
   (d) Turn the radio on and depress the Station Selector Bar.
   (e) Allow the Planetary Arm to run against the feeler gauge.
   (f) Turn the radio off.
8. Turn the Switch Operating Cam to the position furthest from the Tuner Return Switch if this has not already been done.
9. Trip the Tuner Return Switch so that its operating arm is towards the cam.
10. Turn the High Frequency Switch Operating Cam in a clockwise direction until it trips the Tuner Return Switch.



SWITCH OPERATING CAM ADJUSTMENTS

Fig. 12

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MODEL 6D-620,
Tuner

Cathode Delay Adjustment

This adjustment controls the tuning accuracy of the radio and is carefully adjusted at the factory. It should not be made unless the part is replaced. It is adjusted as follows:

1. With the antenna disconnected turn the radio on. If the bulletin for the radio involved specifies the adjustment to be made with the radio "seeking" depress the station selector bar.
2. Adjust the input voltage to the radio to exactly 6 volts at the "A" connector or the spark plate.
3. Connect a meter from the cathode of the D.C. amplifier section of the trigger tube (pin 8 of the 12AU7 tube) to chassis and adjust the cathode delay rheostat, illustration 110, so the meter reads the voltage specified under "Adjustment Procedure" in the service bulletin for the model radio involved.

REPLACEMENTS

All illustration numbers in this section can be used in conjunction with the bulletin for the radio involved and do not refer to the Theory of Operation portion of this bulletin.

This tuner has been designed to provide a maximum of servicing efficiency. All service parts have been made very accessible and easy to replace. The wiring to the tuner has been made long enough so that the tuner can be dismounted from the radio case and worked on without disconnecting any leads. (NOTE: It may be necessary to remove some connections of bond straps.) For most replacements such as the relay, the tuner return switch, etc., no special instructions other than being sure the proper adjustments are made are necessary. However, to facilitate fast replacement of some parts, the following instructions are included:

Solenoid or Solenoid Plunger Replacement (Fig. 10)

1. Remove the radio rear cover and adjustment cover. (Note: It will be necessary to remove the front cover on some radios.)
2. Remove the three solenoid mounting screws found on the top of the tuner.
3. Disconnect the two leads to the solenoid.
4. Remove the solenoid and bracket from the rear of the tuner. (It will be necessary to disconnect one lead of a 0.5 mfd condenser on some radios to give sufficient clearance.)
5. Remove the solenoid plunger from its linkage by removing the spring clip holding this linkage to it.
6. Place the plunger in the solenoid and make the **Solenoid Pole Piece Adjustment.**
7. Install the solenoid plunger and solenoid in the tuner.
8. Fasten the solenoid plunger to its linkage with the spring clip.
9. Solder the leads to the terminals from which they were removed. (If the 0.5 mfd condenser lead was removed, solder it in place).
10. Mount the solenoid to the tuner with the three screws and make the **solenoid adjustment.**

Station Selector Switch Replacement (Fig. 13)

1. Remove the escutcheon from the front of the radio.
2. Remove the Station Selector Bar and switch assembly which is held in place with two screws through the mounting plate.
3. Remove the switch and disconnect the leads.
4. Connect the leads to the new switch and assemble to mounting plate.
5. Adjust the position of the Switch Operating Ring so that it overtravels the opening and closing of the switch contacts in both directions about .030 or 1/32 inch. This adjustment is made by inserting a screwdriver in the slot on the ring and sliding on the selector bar shaft.
6. Return the selector bar and switch assembly to the radio and fasten with the two screws.

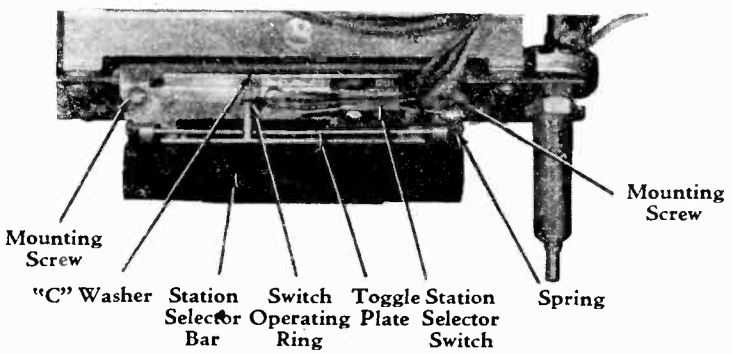

Fig. 13

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Station Selector Bar Replacement (Fig. 13)

1. Remove the station selector bar and switch assembly from the radio as described in steps 1 and 2 of **Station Selector Switch Replacement.**
2. Remove the small "C" washer from the end of the station selector bar shaft.
3. Remove the two springs that hold the station selector bar and toggle plate to the mounting plate.
4. Assemble the new station selector bar and toggle plate with the two springs to the mounting plate as shown.
5. Place the "C" washer on the shaft and secure.
6. Adjust the position of the switch operating ring as described in step 5 of **Station Selector Switch Replacement.**
7. Return assembly to the radio and mount with the two screws.

Motor Gear Train Replacement (Fig. 14)

1. Remove the front and rear cover of the radio.
2. Dismount the tuner from the case and move it out of case far enough so that it can be worked on.
3. Divide the tuner into two parts by:
   (a) Removing the spring clip holding the gear train planetary arm to the core guide bar linkage.
   (b) Removing the four tuner assembly screws. (Some tuners have two additional screws.)
   (c) Separating the two halves of the tuner.
4. On radios having a manual tuning control, remove the worm gear and bracket from the gear train.
5. Disconnect the motor gear train from the solenoid plunger linkage by removing the spring clip holding them together.
6. Remove the three nuts mounting the motor gear train.
7. Mount the new motor gear train to the tuner with the three nuts.

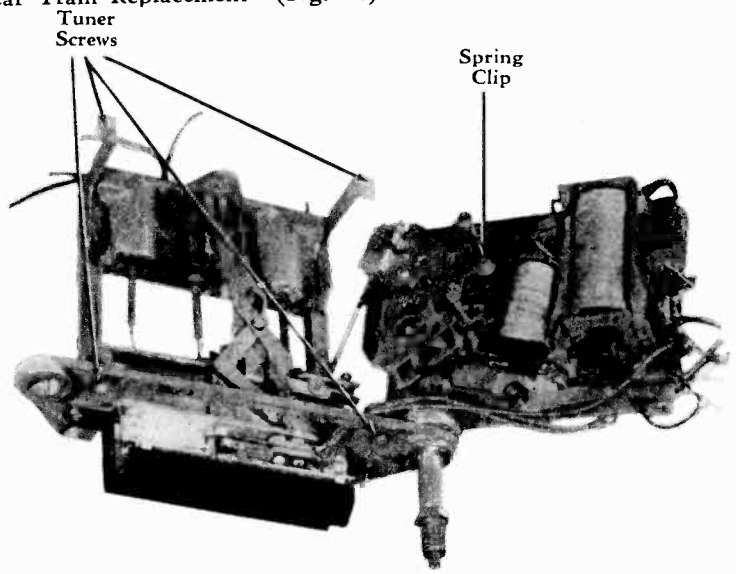

Fig. 14

8. Connect the gear train to the solenoid linkage with the spring clip.
9. On radios having a manual tuning control, remove the screw holding the manual gear of the gear train in position and mount the worm gear and bracket to the gear train. Be careful to get good gear mesh and do not lose the anti-squeak spring on the worm gear bracket.
10. Reassemble the tuner and make the **Switch Operating Cam Adjustment.**

THE TROUBLE SHOOTER'S GUIDE

All illustration numbers in this section can be used in conjunction with the bulletin for the radio involved and do not refer to the Theory of Operation portion of this bulletin.

To facilitate rapid diagnosis of troubles which may develop in the Signal Seeking Tuner, those most likely to occur have been classified and listed in a trouble shooting chart. Three fundamental tests which are easily made on the radio are the basis for this chart. The normal indication for each test is shown just to the right of the test block in solid lines and if the indication is normal the next basic test should be made. However, if the normal indication does not apply to the radio under test, the various abnormal indications that could result from the check are shown in irregular line blocks below the normal condition. When the block which applies to the radio being checked is reached, a chart which will contain a simplified partial schematic will be referred to. The checks necessary to isolate the defective components will also be included in this chart and components common to all sets are assigned illustration numbers which are the same as those in the individual bulletins for each specific set. Thus, through the use of these charts, the vast majority of the troubles can be isolated in a very short period of time.

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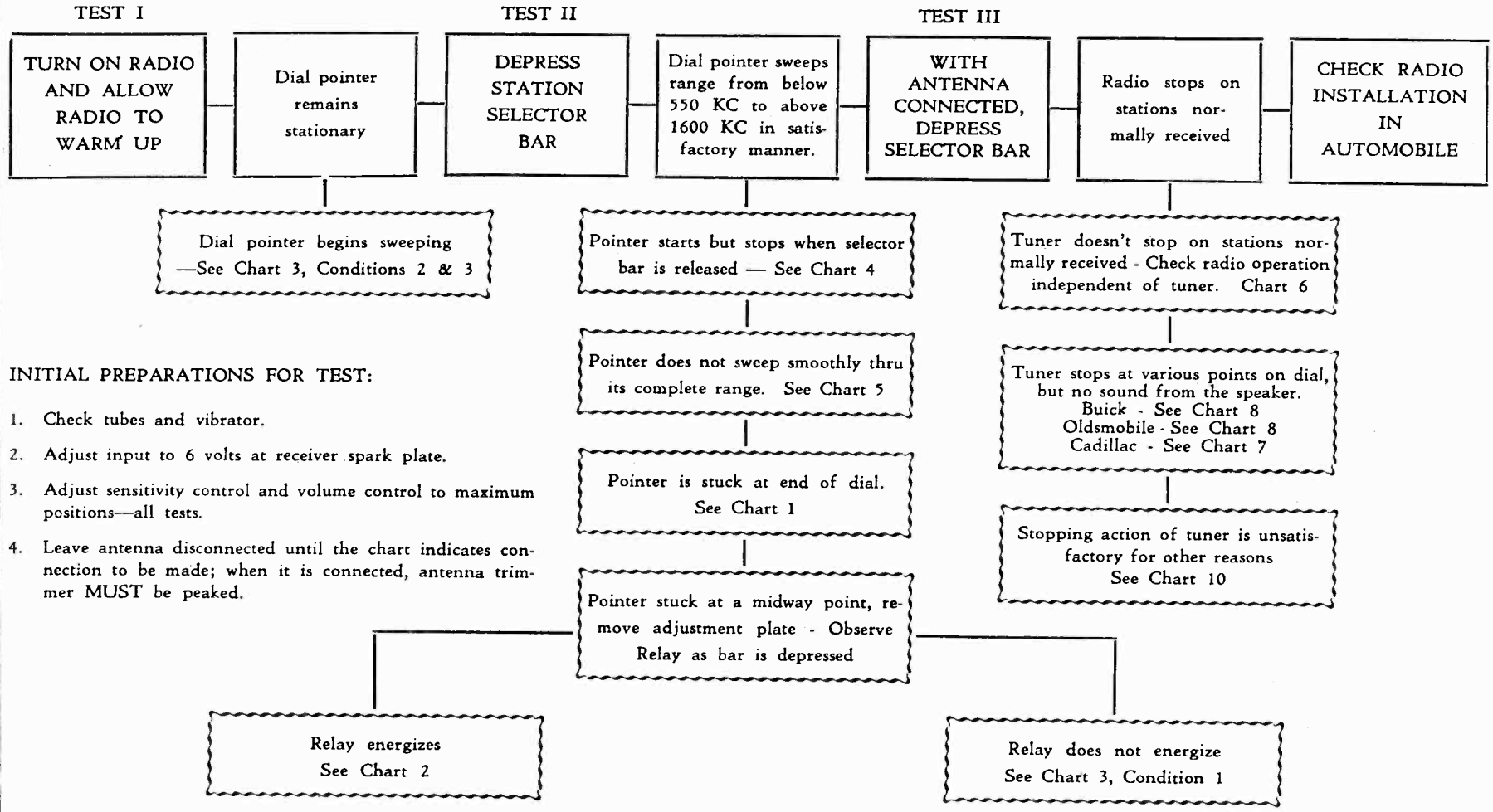
Initial Trouble-Shooting Tests

NOTE: Read the chart from LEFT to RIGHT until the specified condition does not apply to the radio being tested, then read down until the condition listed is identical to that of the radio under test. See the chart indicated for further analysis.



INITIAL PREPARATIONS FOR TEST:

1. Check tubes and vibrator.
2. Adjust input to 6 volts at receiver spark plate.
3. Adjust sensitivity control and volume control to maximum positions—all tests.
4. Leave antenna disconnected until the chart indicates connection to be made; when it is connected, antenna trimmer MUST be peaked.

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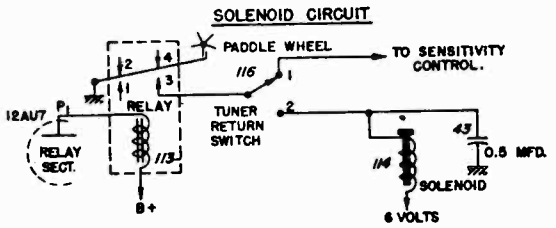
CHART 1



Solenoid Circuit

CONDITION 1: TUNER WILL NOT START. POINTER STATIONARY AT END OF DIAL

IF STUCK AT HIGH END OF DIAL, momentarily short out the solenoid condenser, Illus. 43

IF THE TUNER RETRACES

Check

1. Adjustment of high frequency cam which closes tuner return switch at high end of the band. Illus. 116
2. Tuner return switch, Illus. 116, for sticking open.
3. Ground connection of relay armature.
4. Relay Contact #3 for open.

IF THE TUNER WON'T RETRACE

Check

1. Solenoid, Illus. 114, for open.
2. Solenoid for short. (Fuse blows when bar is depressed)
3. Voltage across solenoid with solenoid condenser, Illus. 43, shorted out. Solenoid voltage should be at least 5.5 volts.
4. Solenoid positioning adjustment.
5. For mechanical bind by grasping planetary arm and cocking motor gear train by hand.

IF STUCK AT LOW END OF THE DIAL, make a visual inspection of the position of the tuner return switch, Illus. 116.

IF TUNER RETURN SWITCH IS CLOSED

(Position 2)

Check

1. Adjustment of cam which opens tuner return switch at low end of the band. (See Adjustment)
2. Tuner return switch for sticking closed.

IF TUNER RETURN SWITCH IS OPEN

(Position 1)

Check

1. Switch for possible shorted terminals.
2. Mechanical portion of tuner for a bind or a defective motor.
3. 0.5 mfd solenoid condenser, Illus. 43, for short.
4. Cold side of solenoid for short to chassis.

IMPORTANT: IF ABOVE CHECKS PROVE THE SOLENOID CIRCUIT TO BE SATISFACTORY GO TO CHART 2 AND CHECK FOR A MECHANICAL DEFECT.

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MODEL 6D-620,
Tuner

CHART 2

Relay Energizes But Tuner Will Not Start

I. DEPRESS STATION SELECTOR BAR AND NOTICE WHETHER RELAY ARM DISENGAGES PADDLE WHEEL. IF IT DOESN'T—SEE RELAY POSITIONING ADJUSTMENT.

II. VISUALLY CHECK FOR CAUSE OF BIND. INSPECT TUNER FOR IMPROPERLY ROUTED WIRES FOULING MECHANISM.

III. REMOVE TUNER FROM THE RADIO. SEPARATE THE TWO HALVES OF THE TUNER.

A. CHECK THE TOP HALF OF TUNER FOR BIND BY MOVING THE CORE BAR WITH YOUR FINGER.

IF

Top half doesn't bind, check bottom half.

IF

Top half binds, remove clip from connecting link between core bar and pointer, and check each separately for bind.

B. CHECK BOTTOM HALF OF TUNER FOR BIND BY REMOVING CLIP FROM MOTOR SIDE OF SOLENOID LINKAGE.

CHECK

For bind in solenoid by moving solenoid linkage by hand.

IF

Bind occurs in solenoid linkage, remove clip from solenoid end of solenoid linkage to determine if bind is in solenoid plunger or linkage. If the solenoid linkage and solenoid are O. K., connect the gear train and soleniod together again.

CHECK

Gear train for bind by pressing the plunger into the solenoid then carefully moving the relay arm out of the paddle wheel. The paddle wheel should start running.

IF

The paddle wheel doesn't begin running, the gear train is defective and should be replaced.

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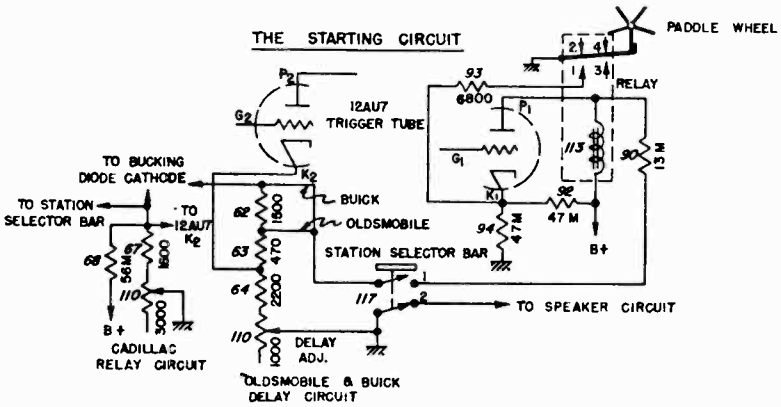
MODEL 6D-620, Tuner

CHART 3



The Starting Circuit

CONDITION 1: THE TUNER WILL NOT START. RELAY DOES NOT ENERGIZE WHEN THE STATION SELECTOR BAR IS DEPRESSED.

MEASURE THE VOLTAGE BETWEEN THE CHASSIS AND THE SWITCH SIDE OF THE 13M OHM RESISTOR (ILLUS. 90)—(WITH RADIO ON AND AN INPUT OF 6 VOLTS, THIS VOLTAGE MUST BE AT LEAST 180 VOLTS FOR PROPER OPERATION OF THE RELAY.)

IF

VOLTAGE IS ZERO, check for

1. Open relay winding.
2. Open 13M ohm resistor.
3. Inoperative power supply or short in B voltage line.

VOLTAGE IS LOW check, for

1. Defect in power supply.
2. Low input voltage.

IF

VOLTAGE APPROXIMATES THE B VOLTAGE, depress the station selector bar and again note the voltage.

IF

THE VOLTAGE DROPS, (normal drop approximately 65 volts)

Check

1. Relay winding for short or partial short.

   (Normal relay resistance from 3200 - 3600 ohms.)
2. Resistor string from station selector bar switch to ground, for possible excessive resistance.
3. Relay Current. If relay doesn't energize with 9.5MA current relay is defective.

IF

THERE IS NO CHANGE IN VOLTAGE

Check

1. Station selector switch contacts, Illus. 117, for open.
2. Resistor string from station selector bar switch to ground for possible open.

CONDITION 2: THE POINTER COMMENCES SWEEPING ACTION IMMEDIATELY WHEN THE RADIO IS TURNED ON, WITHOUT PREVIOUS DEPRESSION OF THE STATION SELECTOR BAR.

Check for

1. Defective station selector bar switch, (Sticking closed) or a short at the switch terminals.
2. Short to chassis from either end of the 13M ohm resistor (Illus. 90).
3. Short to chassis at Plate (P1) terminal of the 12AU7 tube. (Pin 1)
4. Relay armature stuck in the energized position. (Should return to de-energized position when set is turned off.)

CONDITION 3: POINTER COMMENCES SWEEPING ACTION AFTER WARM UP PERIOD, WITHOUT PREVIOUS DEPRESSION OF THE STATION SELECTOR BAR.

Check for

1. Short from cathode (K1) of 12AU7 (Pin 3) to ground.
2. Contact #1 of the relay switch shorted to ground at all times.

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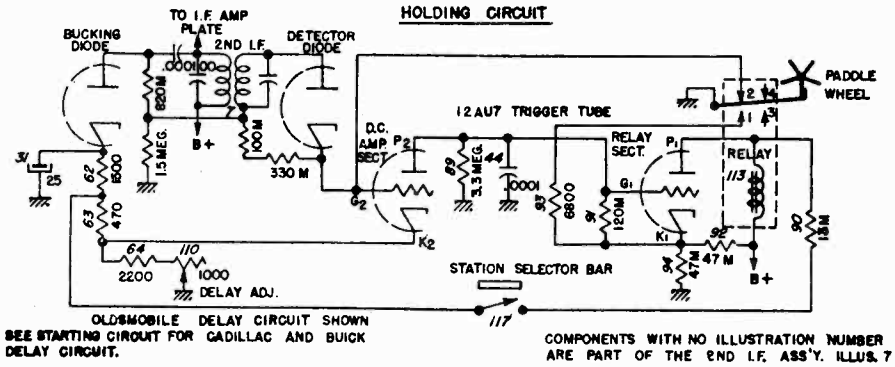
MODEL 6D-620,
Tuner

CHART 4



Holding Circuit

CONDITION: DIAL POINTER STOPS INSTANTLY WHEN STATION SELECTOR BAR IS RELEASED.

I. CHECK TRIGGER TUBE (12AU7). IF OK GO TO NEXT CHECK.

II. MEASURE GRID (G_1) (Pin 2) TO CATHODE (K_1) (Pin 3) VOLTAGE AT 12AU7 TUBE WITH RADIO TURNED ON. (THIS VOLTAGE MUST BE MEASURED WITH A VACUUM TUBE VOLTMETER.)

IF VOLTAGE READING IS LESS THAN 25 VOLTS — GO TO CHECK III.

IF VOLTAGE READING IS ABOVE 25 VOLTS check:

1. Grid (G_1) to chassis resistance. If 110,000 ohms or less, check:
   a. .000100 mfd. condenser (Illus. 44) for short or leakage.
   b. P_2 (Pin 6) and G_1 terminals of 12AU7 for possible shorts to chassis.
2. D.C. amplifier cathode, (K_2) of 12AU7 (Pin 8), to ground resistance for possible short.
   a. Check at station selector switch terminals, Illus. 117, for possible short.
   b. Check at D.C. amplifier cathode terminal (K_2) for short to chassis or grid (G_2) terminal. (Pin 7)
3. 25 mfd electrolytic, Illus. 31, for short.

III REPEAT MEASUREMENT MADE IN TEST II, THIS TIME WITH STATION SELECTOR BAR DEPRESSED.

IF VOLTAGE IS LESS THAN 8 VOLTS, check for:

1. Open between P_1 and relay.
2. Open 6800 ohm resistor. (Illus. 93)
3. Poor relay contact #1.
4. Partially shorted relay. (Resistance should be 3200 - 3600 ohms)

IF VOLTAGE IS MORE THAN 8 VOLTS, check for:

1. Defective detector tube. (Check by substitution. 6R8 - Buick and Oldsmobile, 6AQ7 - Cadillac)
2. Leaky .000100 mfd. coupling condenser from I.F. amplifier plate to bucking diode plate. (This part in 2nd I.F. assembly. Check by measuring voltage at orange lead of 2nd I.F. with set turned on. A VTVM reading of more than 3 volts positive with respect to ground indicates a leaky condenser.) Replace 2nd I.F.
3. Oscillation in radio. (Check by grounding G_2 and depressing bar. If tuner action is now OK trouble is due to oscillation.) (For oscillation - check AVC filter and screen by-pass condensers.)

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CHART 5

Miscellaneous Defects in the Sweep Action of the Tuner

CONDITION I. TUNER DOES NOT SWEEP THROUGH THE COMPLETE FREQUENCY RANGE.

IF — Tuner retraces before high band edge is reached, adjust high frequency eccentric cam which closes tuner return switch so that retrace occurs at approximately 1620 KC. See adjustments.

IF — Tuner starts sweeping before low band edge is reached, adjust low frequency eccentric cam which opens tuner return switch so that sweeping starts at a point below 550 KC. See adjustments.

CONDITION II. TUNER SWEEP ACTION IS SLOW, JERKY OR ERRATIC.

CHECK — For pointer drag against escutcheon backplate. If this exists, see adjustments.

CHECK — For broken or missing motor power spring.

CHECK — For light mechanical bind - See Chart 2

CHECK — For defective gear train. See methods for checking outlined on Chart 2

CONDITION III. TUNER SWEEPS NORMALLY UNTIL A CERTAIN POINT ON ITS DIAL IS REACHED, WHEN IT STOPS. DEPRESS STATION SELECTOR BAR.

IF — Tuner can be started again by depression of selector bar, tuner is stopping on an oscillation or feedback in the radio circuit which occurs only at certain points on the dial. Check radio.

IF — Tuner will not start when selector bar is again depressed, check for mechanical bind. See Chart 2

CONDITION IV. TUNER RETURN ACTION ABNORMAL

IF — Tuner returns to a midway point and sticks there - check solenoid plunger for a bind.

IF — Pointer rapidly goes back and forth between high end and midway point with a "Machine-gun" like effect.

A. Manual worm unmeshed from manual drive gear. (On sets with manual)

B. Screw which secures gear just below top plate of planetary arm to the planetary arm missing or loose. (On sets without manual tuning)

C. Defect in planetary arm assembly. Replace motor gear train.

IF — Tuner return action is slow — (About the same speed as sweeping speed)—the defect is in planetary arm assembly — replace gear train.

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MODEL 6D-620,
Tuner

CHART 6

Procedure for Checking Radio Operation Independent of Tuner

CONDITION I. RADIO HAS MANUAL TUNING KNOB.

Tune radio manually and note number of stations received with listenable volume. Adjust sensitivity control to maximum and note number of stations selected automatically.

IF

Normal number of stations is received manually, but these stations are not received automatically, check tuner. See Chart 9.

IF

Normal number of stations cannot be received, TROUBLE-SHOOT RADIO PROPER.

CONDITION II. RADIO DOES NOT HAVE MANUAL TUNING.

Connect signal generator to antenna connector through a series condenser of the value specified in the service bulletin. Adjust generator output to a high level and tune the generator around the frequency indicated by the radio dial pointer until the signal is tuned in.

IF

RADIO PICKS UP SIGNAL, set the sensitivity control to maximum, peak antenna trimmer and depress the station selector bar.

IF

SIGNAL IS NOT PICKED UP BY RADIO, analyze the cause of radio failure.

IF

TUNER STOPS ON THE SIGNAL,

tune generator to frequency of weak station normally heard in the locality. Depress the station selector bar. When the tuner stops on the generator signal, plug in the antenna and again peak the antenna trimmer.

IF STATION CAN BE HEARD

Check the tuner - See Chart 10.

IF STATION CANNOT BE HEARD

Check the radio for defect causing it to be weak.

IF

TUNER DOES NOT STOP ON SIGNAL, see Chart 9.

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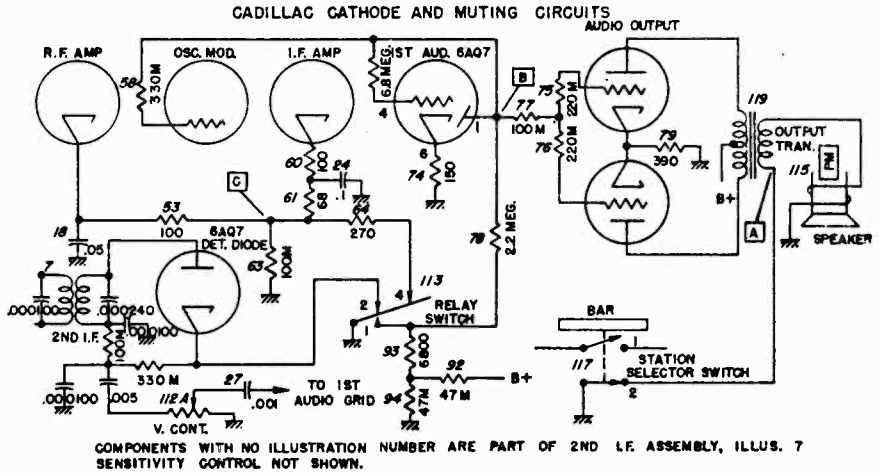
CHART 7



Tuner Stops on Signals But No Sound From Speaker

I. SHORT OUTPUT TRANSFORMER SECONDARY LEAD. GOING TO SELECTOR SWITCH, TO CHASSIS. (POINT A).

IF SOUND COMES FROM SPEAKER, find open between transformer secondary and ground end of muting section of station selector switch contact 2.

IF RADIO IS STILL DEAD — go to check II.

II. SHORT PIN #1 OF 6AQ7 TUBE TO CHASSIS. (POINT B)

IF SOUND COMES FROM SPEAKER, check for open between pin #1 at 6AQ7 and connect #1 of relay switch.

IF RADIO IS STILL DEAD — go to check III.

III. SHORT RF AND IF CATHODE STRING TO CHASSIS. (POINT C)

IF SOUND COMES FROM THE SPEAKER, check for open between cathode string and ground through relay contact #4.

IF RADIO IS STILL DEAD, make usual radio checks to localize defective part.

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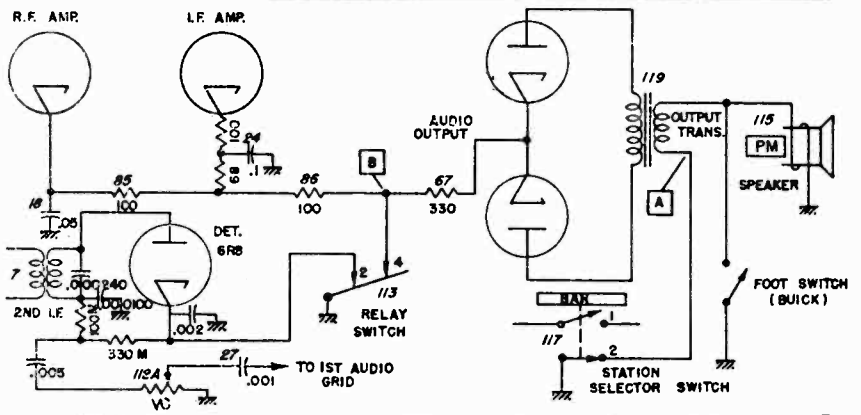
MODEL 6D-620,
Tuner

CHART 8

BUICK & OLDSMOBILE CATHODE AND SPEAKER MUTING CIRCUITS



COMPONENTS WITH NO ILLUSTRATION NUMBERS ARE PART OF 2ND I.F. ASSEMBLY, ILLUS. 7
ONLY RECEIVER DISABLING SECTION OF BUICK FOOT SWITCH SHOWN.
SENSITIVITY CONTROL NOT SHOWN.

Tuner Stops on Signals But No Sound From Speaker

I. SHORT TO CHASSIS THE OUTPUT TRANSFORMER SECONDARY LEAD GOING TO SELECTOR SWITCH. (POINT A)

IF SOUND COMES FROM SPEAKER, find open between transformer secondary and ground end of muting section of station selector switch. Check for shorted foot switch - (Buick)

IF RADIO IS STILL DEAD — go to check II.

II. SHORT RF, IF, AND OUTPUT CATHODE CIRCUITS TO CHASSIS AT POINT B.

IF SOUND COMES FROM SPEAKER, check for open between cathode string and ground through relay contact #4.

IF RADIO IS STILL DEAD, make usual radio checks to find defective part.

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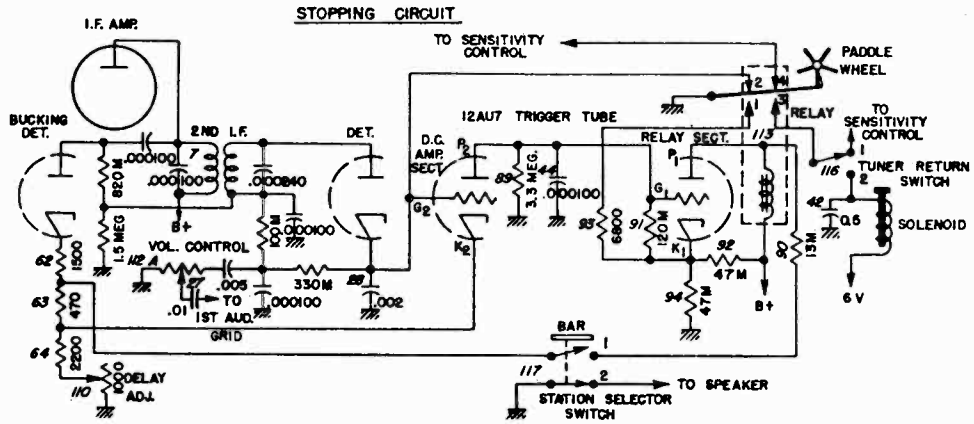
MODEL 6D-620, Tuner

CHART 9



COMPONENTS WITH NO ILLUSTRATION NUMBERS ARE PART OF 2ND I.F. ASSEMBLY, ILLUS. 7. OLDSMOBILE DELAY CIRCUIT SHOWN.

Tuner Will Not Stop on Stations, Radio Otherwise Normal

I. WITH RADIO OFF, CHECK ENGAGEMENT OF RELAY ARM TO PADDLE WHEEL

IF Relay arm is missing — replace relay.

IF Relay arm does not engage paddle wheel—check relay positioning adjustment. (Do not adjust engagement by bending relay arm)

II. WITH TUNER SWEEPING, MOMENTARILY SHORT 12AU7 CATHODE (K_2) (Pin 8) TO GROUND

IF TUNER STOPS, check:

1. Voltage between D.C. amplifier cathode (K_2) and B—.
   - NO VOLTAGE: Open between K_2 and ground.
   - WRONG VOLTAGE: (For correct voltage see bulletin for model radio involved) Set delay adjustment rheostat according to bulletin instructions.
2. .002 condenser (Illus. 28) for short, or short from G_2 to B— when relay is energized.
3. Open between G_2 and detector cathode.
4. Open in sensitivity control. (Check continuity from cathode string to B— with relay energized.)
5. Check 2nd I.F. - Procedure listed below.
   - (1) Feed a modulated signal from the signal generator into the antenna connector of the receiver through the appropriate series condenser.
   - (2) Tune signal generator until signal is heard in receiver. Adjust generator input for an output signal of approximately 1000 micro-volts. On many signal generators this is obtained roughly with the fine attenuator at 1 and the rough attenuator at 1000. If you have no way of knowing how the output of your signal generator is calibrated, set your signal generator coarse attenuator at about the half way mark and vary it about ¼ range each direction, when going through step (6).
   - (3) Remove 12AU7 tube from its socket.
   - (4) Disconnect the green wire connected between the grid of the 12AU7 (G_2) or its equivalent and the relay at the tube socket terminal.
   - (5) Connect VTVM between G_2 and chassis and re-tune the generator frequency for maximum voltage.
     - a. No voltage indication. Defective 2nd I.F.
     - b. Voltage which is approximately 90% of the voltage from K_2 to chassis - proceed with step (6).
   - (6) Change generator signal to an unmodulated signal and vary the signal by a factor of 10 times louder and weaker. On many signal generators this can be accomplished by merely turning the rough attenuator one step on each side of the starting point.
     - a. If voltage remains almost constant, increasing slightly with increases in output - the 2nd I.F. is O.K.
     - b. If voltage goes through a large variation corresponding to voltage reading taken across detector load—the bucking detector circuit is defective. Check tube containing bucking diode by substitution. If this does not cure trouble, the 2nd I.F. is probably defective.

IF TUNER DOESN'T STOP, check for

1. Trigger tube defective.
2. Open between grid (G_1) at relay section and plate (P_2) at D. C. amplifier section of trigger tube.
3. 47,000 ohm resistor (Illus. 92) between B+ and K_1 open.
4. Open 120 M ohm resistor (Illus. 91) between G_1 and K_1.

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CHART 10

Miscellaneous Defects in the Tuner

I. TUNER DOES NOT STOP ON THE PEAK OF SIGNALS.
- A. Check 2nd IF—See Chart 9.
- B. Check relay drop out current. It should not drop out on current above 3.7 MA.
- C. Check setting of delay adjustment — See set bulletin.

II. TUNER MOMENTARILY STOPS, THEN STARTS AGAIN OR WILL STOP ONLY ON STRONG STATIONS.
- A. This can be caused by improper timing of the relay contacts. To check this, temporarily connect a 10 mfd electrolytic condenser of suitable voltage rating from the terminal on the sensitivity control to which the yellow lead connects, to chassis. If this cures the trouble the defect is due to improper relay point timing and the relay should be replaced.

III. TUNER STOPS ON STATIONS DURING THE TUNER'S RETURN.
- A. The sensitivity control circuit is not being opened during the return cycle, because
  - (1) There is a short to chassis at the sensitivity control terminal of the tuner return switch, or at the sensitivity control.
  - (2) The cathode string is shorted to chassis elsewhere.

IV. THE TUNER WILL JAR OFF STATION ON ROUGH ROADS.
- A. On sets having manual tuning this is due to a defective friction clutch in the planetary arm assy. - Replace the gear train.

V. THE RADIO DOES NOT MUTE IN BETWEEN STATIONS.
- A. This is caused either by a lack of muting voltage appearing on the audio grids due to an open between the oscillator grid and the muting line or a defective audio tube. (Check the Cadillac muting circuit on Chart 7)

VI. TUNER STOPS ONLY ON STRONG SIGNALS AND THE RADIO IS OK.
- A. Heater to cathode leakage of the 6R8 tube in case of Buick or Oldsmobile; the 6AQ7 tube in the case of Cadillac. This can be checked by increasing the "A" voltage. If situation gets worse with increased "A" voltage, change 6R8 or 6AQ7 tube, whichever applies.
- B. Sensitivity control not at maximum sensitivity.

VII. TUNER STOPS ON SIGNALS BUT THE SOUND IS DISTORTED.

Short pin 3 of 6R8 or pin 2 of 6AQ7 (Cadillac) to chassis. If distortion clears, find open between detector cathode and ground through relay contact #2.

SERVICE PARTS INTERCHANGEABILITY

FOR 1950 SIGNAL SEEKING TUNERS

	Buick 980899	Cadillac 7258865	Oldsmobile 982582 982583
Temp. Comp. Cond.	7257567	7257567 (Same)	7257567 (Same)
Dual Trimmer	7242454	7242454 (Same)	7242454 (Same)
Tuning Core	7259201	7259201 (Same)	7259201 (Same)
2nd I.F.	1219602	1219602 (Same)	1219602 (Same)
1st I.F.	1219508	1219508 (Same)	1219508 (Same)
Osc. Coil	7259184	7259184 (Same as Buick)	7259665
Ant. & R.F. Coil	7257979	7257979 (Same)	7257979 (Same)
Det-Aud Tube	6R8	6AQ7GT	6R8 (Same as Buick)
Trigger Tube	12AU7	12AU7 (Same)	12AU7 (Same)
Power Spring	7259055	7259055 (Same)	7259055 (Same)
Selector Bar Switch	7259012	7259012 (Same)	7259012 (Same)
Tuner Return Switch	7259011	7259011 (Same)	7259011 (Same)
Motor Gear Train	1219610	1219610 (Same)	1219610 (Same)
Relay	7259009	7259009 (Same)	7259009 (Same)
Solenoid	1219661	1219661 (Same)	1219661 (Same)

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MODEL 416270, Packard

GENERAL

MOUNTING—All 1950 Packard Cars.

TUBES—Seven, Plus Rectifier.

SPEAKER — 7" Round, Permanent Magnet.

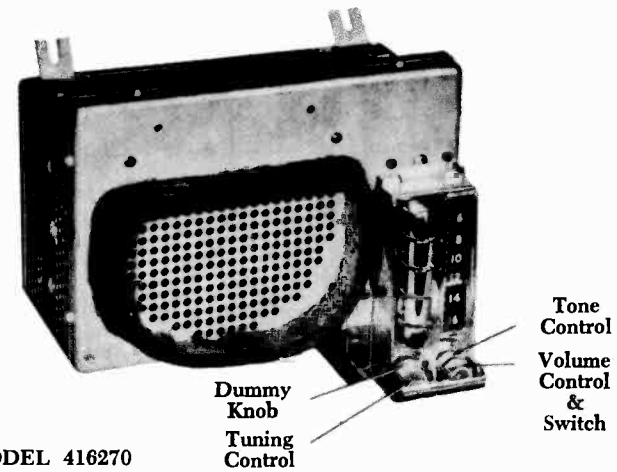
TUNING—Manual and 5 P.B. Mechanical.

ANTENNA TRIMMER COMPENSATION—0.000060 - 0.000085 Mfd.

Tuning Range—540 - 1600 KC.

PUSHBUTTON SET-UP

Pull pushbutton down and out. Tune in desired station manually. Push button all the way in.



MODEL 416270

ALIGNMENT PROCEDURE:

Output Meter Connection ..... Across Voice Coil

Signal Generator Return ..... To Chassis

Dummy Antenna ..... In Series With Generator

Volume Control ..... Maximum Volume

Tone Control ..... Treble

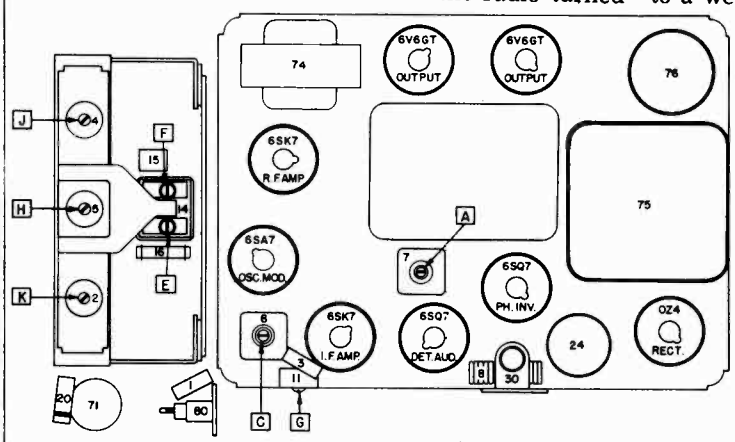
Generator Output ..... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	L**

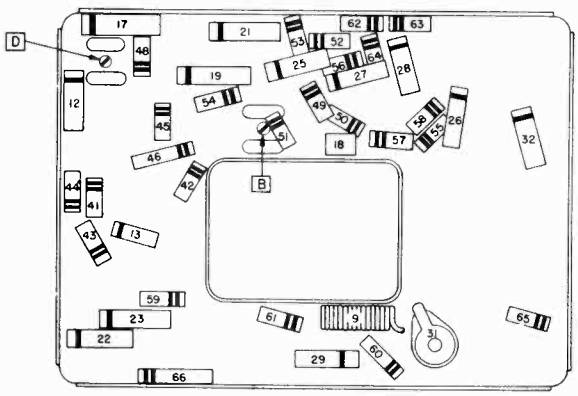
*Before making this adjustment check the mechanical setting of the oscillator core "H." The slotted end of the core should be 1 25/32" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form). If adjustment is necessary,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

**"L" is the pointer adjustment screw on the pointer connecting link (See tuner drawing). Adjust so pointer reads 1000 KC (on the "10" calibration mark).

With the radio installed and the car antenna plugged in adjust antenna trimmer "G" (See sticker on case) for maximum volume with the radio turned to a weak station near 1400 KC.



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

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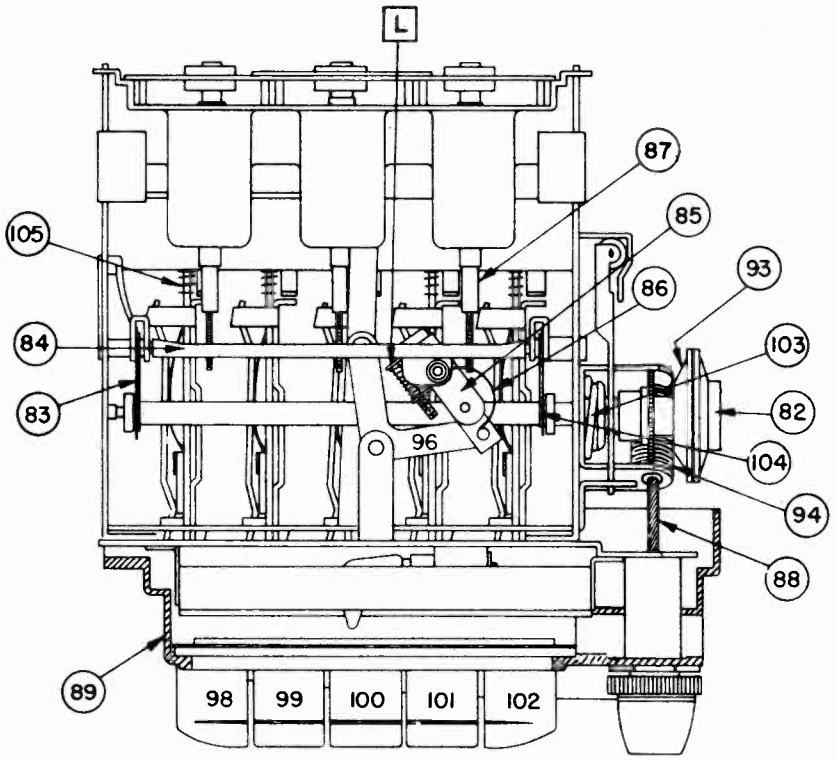
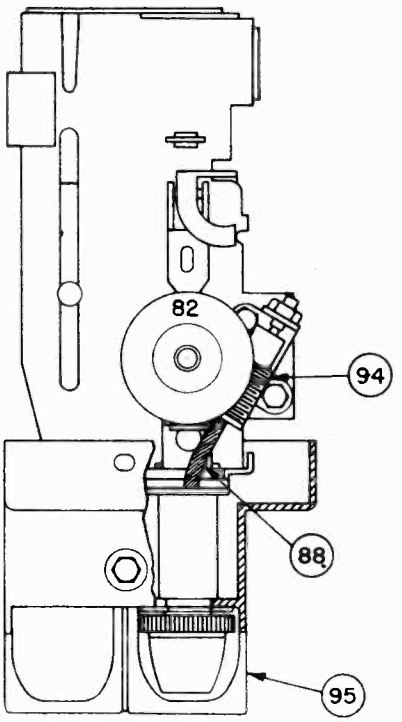
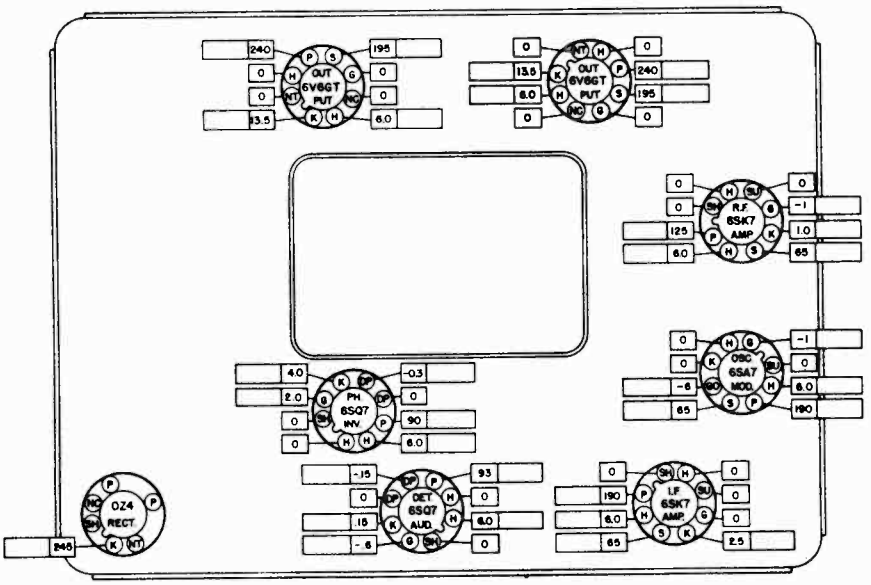
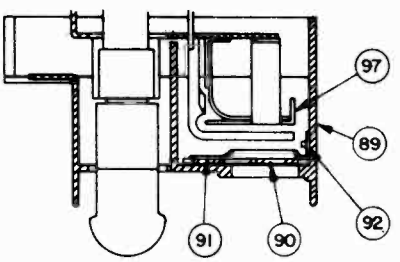




TUNER

TUBE SOCKET VOLTAGE CHART





ESCUTCHEON CROSS SECTION

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance_____Ohms Per Volt.

Readings taken with_____Volts at Spark Plate.

All voltages measured from socket terminals to chassis.

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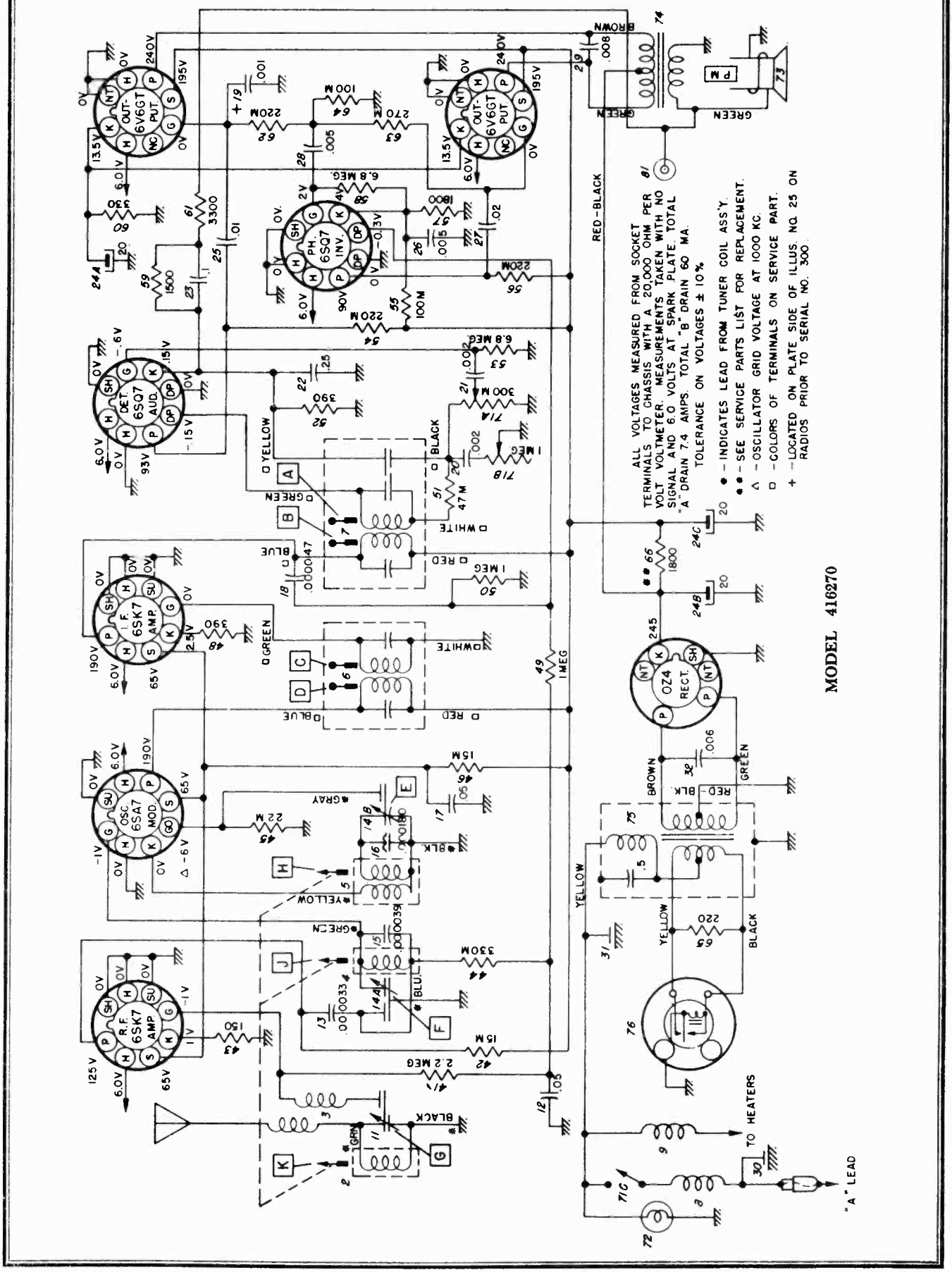

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MODEL 416270,
Packard

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		ELECTRICAL PARTS	
		Coils	
1	7258502	7258502	Antenna Series Choke
2	7258914	7258914	Antenna
3	7240251	7240251	Antenna Spark Choke
4	7258914	7258914	R. F.
5	7259687	7259687	Oscillator
6	7258849	1219508	1st I. F. Assembly
7	7258850	1219509	2nd I. F. Assembly
8	7259620	7259620	"A" Spark Choke
9	7259619	1217846	Hash Choke
		Condensers	
11	7259597	7259597	Antenna Trimmer
12	7236842	E503	.05 Mfd. 200 V. Tubular
13	7258222	G330	.000033 Mfd. Molded
14	7242454	7242454	Dual Trimmer
14A			R. F. Section
14B			Oscillator
15	7258223	G390	.000039 Mfd. Ceramic
16	7257424	7257424	.000180 Mfd. Compensating
17	7258125	E503	.05 Mfd. 400 V Tubular
18	1219551	G470	.000047 Mfd. Molded
19	1218883	E102	.001 Mfd. 600 V Tubular
20	7237836	E202	.002 Mfd. 600 V Tubular
21	7237836	E202	.002 Mfd. 600 V Tubular
22	1211202	E254	.25 Mfd. 200 V. Tubular
23	7238789	E104	.1 Mfd. 200 V Tubular
24	7240724	M908	Electrolytic
24A			20 Mfd. 25 V
24B			20 Mfd. 400 V
24C			20 Mfd. 400 V
25	1209309	E103	.01 Mfd. 400 V Tubular
26	7230767	E502	.005 Mfd. 600 V Tubular
27	7238882	E203	.02 Mfd. 400 V Tubular
28	7230767	E502	.005 Mfd. 600 V Tubular
29	1219594	H802	.008 Mfd. 800 V Tubular
30	7259600	7259600	Spark Plate-"A" Connector Choke Assy.
31	1217848	1217848	Chassis Plate Assy.
32	7240906	H602	.006 Mfd. 1600 V Tubular
		Resistors	
41	1211147	A225	2.2 Megohms ½ W Insulated
42	7237595	B153	15,000 Ohms 1 W Insulated
43	1213220	A151	150 Ohms ½ W Insulated
44	7240732	A334	330,000 Ohms ½ W Insulated
45	1211192	A223	22,000 Ohms ½ W Insulated
46	7233653	C153	15,000 Ohms 2 W Insulated
48	1213482	A391	390 Ohms ½ W Insulated
49	7238873	A105	1 Megohm ½ W Insulated
50	7238873	A105	1 Megohm ½ W Insulated
51	7240731	A473	47,000 Ohms ½ W Insulated
52	1213482	A391	390 Ohms ½ W Insulated
53	7241937	A685	6.8 Megohms ½ W Insulated
54	1214555	A224	220,000 Ohms ½ W Insulated
55	1213270	A104	100,000 Ohms ½ W Insulated
56	1214555	A224	220,000 Ohms ½ W Insulated
57	7241616	7241616	1800 Ohms ½ W Insulated
58	7241937	A685	6.8 Megohms ½ W Insulated
59	1213237	A152	1500 Ohms ½ W Insulated
60	7233773	C331	330 Ohms 1 W Wire Wound
61	1213481	A332	3300 Ohms ½ W Insulated
62	1214555	A224	220,000 Ohms ½ W Insulated
63	1214556	A274	270,000 Ohms ½ W Insulated
64	1213270	A104	100,000 Ohms ½ W Insulated
65	7237994	B221	220 Ohms 1 W Insulated
66	1214573	B562	1800 Ohms 2 W Wire Wound (or Replace
		C272	with 2700 Ohms 2 W and 5600 Ohms 1 W in Parallel)

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MODEL 416270,
Packard

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		Tubes	
	7237751	5229	6SK7
	7237752	5222	6SA7
	7237753	5231	6SQ7
	1213793	5241	6V6GT
	1211924	5003	OZ4
		Miscellaneous Electrical	
71	7259601	7259601	Control - Volume, Tone, & Switch
71A			Volume Control
71B			Tone Control
71C			Switch
72	125588	55	Lamp - Dial
73	7259608	7259608	Speaker P. M.
74	7259615	7259615	Transformer - Output
75	7259614	6060	Transformer - Power
76	7239124	8542	Vibrator - Non-Synchronous
		MECHANICAL PARTS	
		(Chassis)	
80	7239475	7239475	Socket - Antenna
	1219662	1219662	Socket - Dial Light
	7236279	7236279	Socket - Octal Tube
81	1216747	1216747	Socket - Rear Seat Speaker
	7239125	7239125	Socket - Vibrator
		(Tuner)	
	147481	147481	Ball Bearings (10)
82	7258072	7258072	Clutch Disc-Driven
83	7258203	7258203	Connecting Link-Core Bar
84	7258210	7258210	Core Guide Bar
85	7256271	7256271	Connecting Link - Pointer
86	7255992	7255992	Spring - Pointer Connecting Link
87	7258468	7258468	Core - Iron Tuning
88	7259606	7259606	Drive Shaft - Manual
89	7259570	7259570	Escutcheon Assy.
90	7259569	7259569	Dial Glass
91	7259567	7259567	Dial Backplate
92	7259565	7259565	Dial Retainer (2)
	7259633	7259633	Filter - Dial Light
93	7259539	7259539	Gear and Bushing - Clutch
94	7259556	7259556	Gear and Bracket - Worm
95	7259568	7259568	Guard - Control Knob
	7259656	7259656	Knob - Control
	7259550	7259550	Knob - Tone & Dummy
96	7259584	7259584	Pointer Assembly
	1219663	1219663	Pointer Tip Plate
97	7259676	7259676	Pointer Backplate
98	1219664	1219664	Push Button and Slide No. 1
99	1219665	1219665	Push Button and Slide No. 2
100	1219666	1219666	Push Button and Slide No. 3
101	1219667	1219667	Push Button and Slide No. 4
102	1219668	1219668	Push Button and Slide No. 5
103	7258756	7258756	Spring - Clutch
104	7257415	7257415	Spring - Core Bar Connecting Link
105	7259540	7259540	Spring - Slide Return
		INSTALLATION PARTS	
	7259642	7259642	"A" Lead and Fuse Connector
	7259644	7259644	Capacitor - Generator
	7259643	7259643	Capacitor - Ignition Coil
	7259646	7259646	Distributor Suppressor
	147685	147685	Fuse 14 Amps

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MODEL 416387,
Packard

SUBJECT: SERVICE INSTRUCTIONS - PACKARD MODEL 416387

GENERAL

MOUNTING—All 24 Series Packard Cars.

TUBES—Seven, Plus Rectifier.

SPEAKER — 6" x 9" Elliptical, Permanent Magnet.

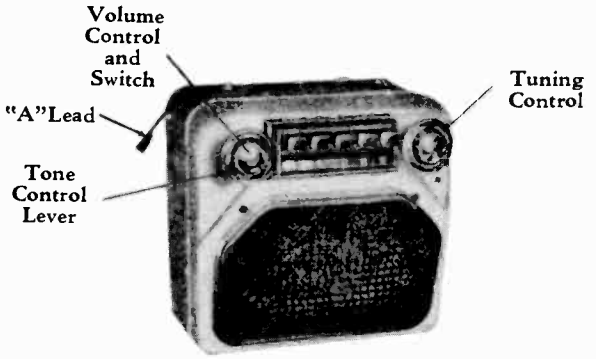
TUNING—Manual and 5 P.B. Mechanical.

ANTENNA TRIMMER COMPENSATION—0.000050 - 0.000090 Mfd.

TUNING RANGE—540 - 1600 KC.

PUSHBUTTON SET-UP

Pull pushbutton to the left and out. Tune in desired station manually. Push button all the way in.



MODEL 416387

ALIGNMENT PROCEDURE:

Output Meter Connection ..... Across Voice Coil

Signal Generator Return ..... To Chassis

Dummy Antenna ..... In Series With Generator

Volume Control ..... Maximum Volume

Tone Control ..... Treble

Generator Output ..... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	L**

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

**"L" is the pointer adjustment screw on the pointer connecting link (See tuner drawing). Adjust so pointer reads 1000 KC (on the "10" calibration mark).

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

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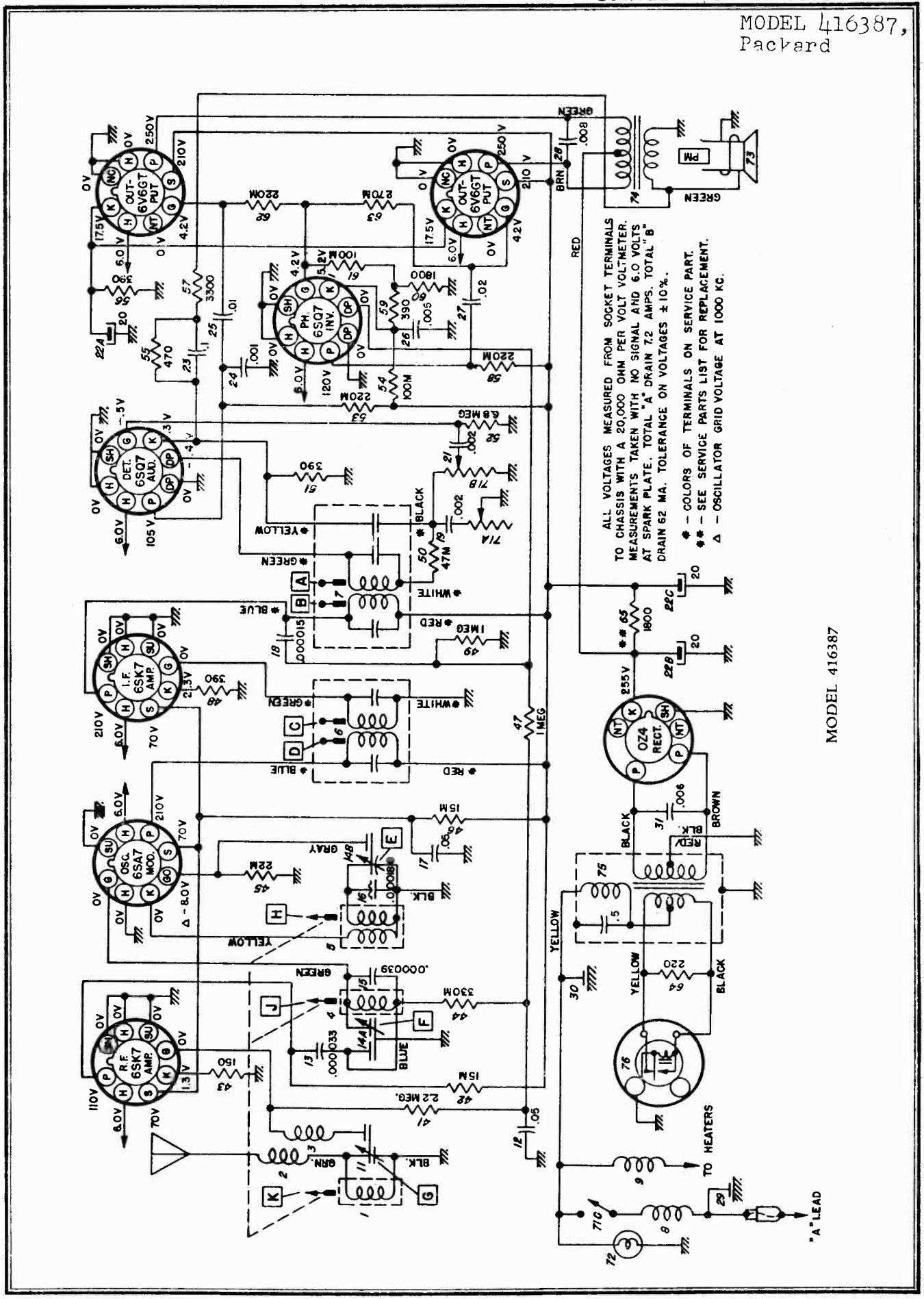
MODEL 416387,
Packard



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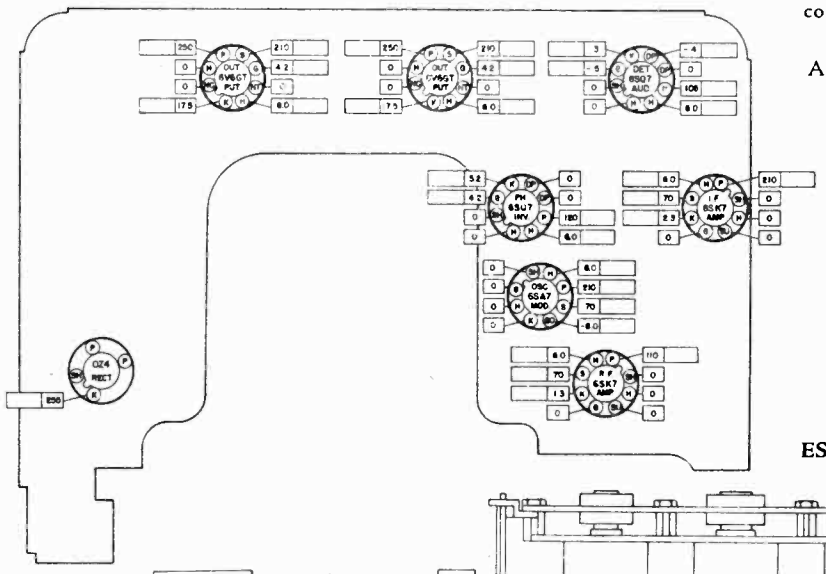
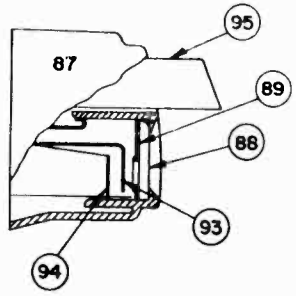
TUBE SOCKET VOLTAGE CHART

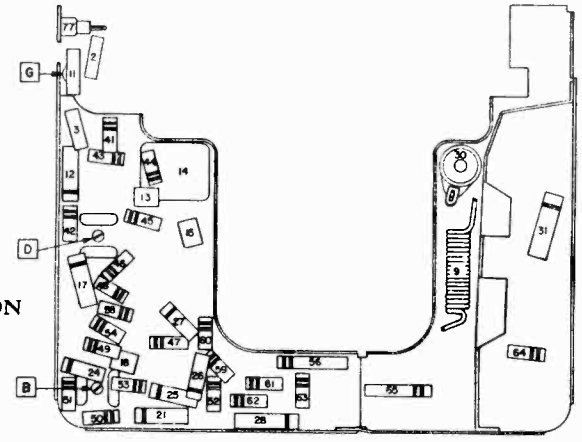
The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown

All voltages measured from socket terminals to chassis.

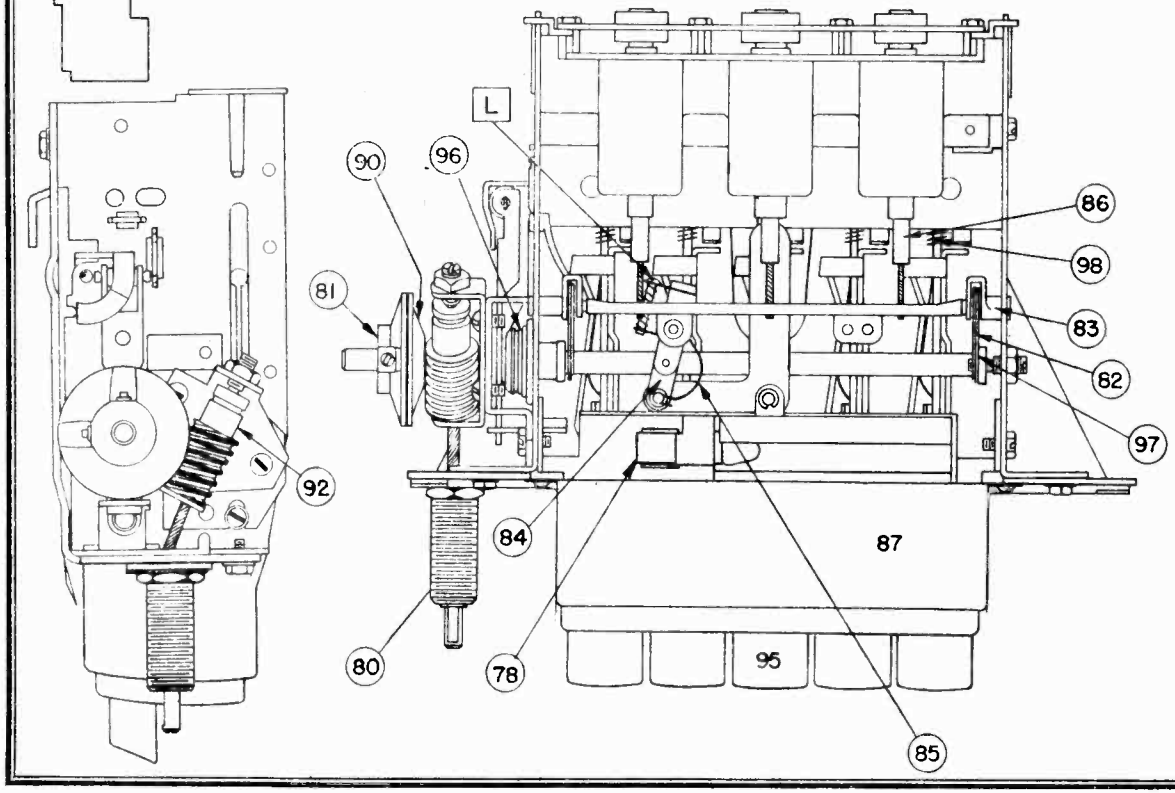


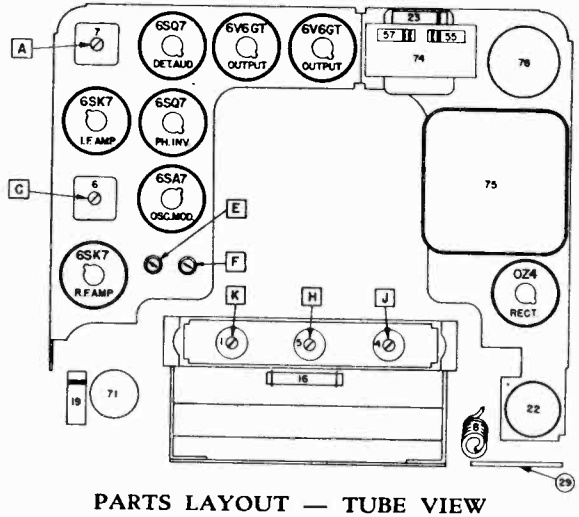


ESCUTCHEON CROSS SECTION



PARTS LAYOUT — CHASSIS VIEW





PARTS LAYOUT — TUBE VIEW

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MODEL 416387,
Packard

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7258914	7258914	Antenna
2	7255738	7255738	Antenna Series Choke
3	7240251	7240251	Antenna Spark Choke
4	7258914	7258914	R.F.
5	7259687	7259687	Oscillator
6	7258849	1219508	1st I.F.
7	7258850	1219509	2nd I.F.
8	7259187	7259187	"A" Spark Choke
9	7237846	1217846	Hash Choke
			Condensers
11	7260158	7260158	Antenna Trimmer
12	7236842	E-503	.05 mfd. 200V Tubular
13	7258222	G-330	.000033 mfd. Molded
14	7242454	7242454	Dual Trimmer
14A			R.F.Section
14B			Oscillator
15	7258221	G-390	.000039 mfd. Molded
16	7257424	7257424	.000180 mfd. Compensating
17	7258125	E-503	.05 mfd. 400V Tubular
18	7230955	G-150	.000015 mfd. Molded
19	7237836	E-202	.002 mfd. 600V Tubular
21	7237836	E-202	.002 mfd. 600V Tubular
22	7260065	7260065	Electrolytic
22A			20 mfd. 25V
22B			20 mfd. 400V
22C			20 mfd. 400V
23	7238789	E-104	.1 mfd. 200V Tubular
24	1218883	E-102	.001 mfd. 600V Tubular
25	1209309	E-103	.01 mfd. 400V Tubular
26	7230767	E-502	.005 mfd. 600V Tubular
27	7238882	E-203	.02 mfd. 400V Tubular
28	1219594	H-802	.008 mfd. 800V Tubular
29	7241259	7241259	Spark Plate
30	1217848	1217848	Chassis Plate
31	7240906	H-602	.006 mfd. 1600V Tubular
			Resistors
41	1211147	A-225	2.2 megohms ½ W Insulated
42	7237595	B-153	15,000 ohms 1 W Insulated
43	1213220	A-151	150 ohms ½ W Insulated
44	7240732	A-334	330,000 ohms ½ W Insulated
45	1211192	A-223	22,000 ohms ½ W Insulated
46	7233653	C-153	15,000 ohms 2 W Insulated
47	7238873	A-105	1 megohm ½ W Insulated
48	1213482	A-391	390 ohms ½ W Insulated
49	7238873	A-105	1 megohm ½ W Insulated
50	7240731	A-473	47,000 ohms ½ W Insulated
51	1213482	A-391	390 ohms ½ W Insulated
52	7241937	A-685	6.8 megohms ½ W Insulated
53	1214555	A-224	220,000 ohms ½ W Insulated
54	1213270	A-104	100,000 ohms ½ W Insulated
55	1213486	A-471	470 ohms ½ W Insulated
56	1219690	1219690	390 ohms 2 W Wire Wound
57	1213481	A-332	3300 ohms ½ W Insulated
58	1214555	A-224	220,000 ohms ½ W Insulated
59	1213482	A-391	390 ohms ½ W Insulated
60	7241616	7241616	1800 ohms ½ W Insulated
61	1213270	A-104	100,000 ohms ½ W Insulated
62	1214555	A-224	220,000 ohms ½ W Insulated
63	1214556	A-274	270,000 ohms ½ W Insulated
64	1219738	B-221	220 ohms 1 W Insulated
65	1214573	C-272 or B-562	1800 ohms 2 W Wire Wound (or replace with 2700 ohms 2 W and 5600 ohms 1 W in parallel)

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MODEL 416387,
Packard

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		Tubes	
	7237751	5229	6SK7
	7237752	5222	6SA7
	7237753	5231	6SQ7
	1213793	5241	6V6GT
	1211924	5003	0Z4
		Miscellaneous Electrical	
71	7260139	7260139	Control - Volume, Tone and Switch
71A			Volume Control
71B			Tone Control
71C			Switch
72	187189	44	Light - Dial
73	7260362	7260362	Speaker - 6 x 9 p. m.
74	7260167	7260167	Transformer - Output
75	7259375	7255881	Transformer - Power
76	7239124	8542	Vibrator - Non-Synchronous
		MECHANICAL PARTS	
		Chassis	
77	7256742	7256742	Socket - Antenna
78	1219747	1219747	Socket - Dial Light
	7236279	7236279	Socket - Octal Tube
	7239125	7239125	Socket - Vibrator
		Tuner	
	147481	147481	Ball Bearings (10)
80	7260163	7260163	Bushing & Manual Drive Shaft Assy.
	7260162	7260162	Manual Drive Shaft
81	7258072	7258072	Clutch Disc - Driven
82	7258203	7258203	Connecting Link - Core Bar
83	7260403	7260403	Core Guide Bar
84	7256271	7256271	Connecting Link - Pointer
85	7255992	7255992	Spring - Pointer Connecting Link
86	7258468	7258468	Core - Iron Tuning
87	7260325	7260325	Escutcheon Assy.
88	7260141	7260141	Dial
89	7260125	7260125	Dial Backplate
	7259494	7259494	Retainer Spring - Left Hand
	7259495	7259495	Retainer Spring - Right Hand
90	7256495	7256495	Gear & Bushing - Clutch
92	7260212	7260212	Gear & Bracket - Worm
93	7260199	7260199	Pointer Assembly
94	7260265	7260265	Pointer Backplate
95	1219200	1219200	Push Button and Slide Assy.
96	7258756	7258756	Spring - Clutch
97	7257415	7257415	Spring - Core Bar Connecting Link
98	7255984	7255984	Spring - Slide Return
		INSTALLATION PARTS	
	7260148	7260148	"A" Lead and Fuse Holder Assy.
	7259644	7259644	Condenser - Generator
	7259643	7259643	Condenser - Ignition Coil
	7259646	6007	Distributor Suppressor
	147685	147685	Fuse - 14 Amps
	7260187	7260187	Knob - Control
	7260147	7260147	Lever - Tone Control
	7260149	7260149	Trimplate - Control Knob

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MODEL 416394,
Packard

GENERAL

MOUNTING—All 24 Series Packard Cars.

TUBES—Seven, Plus Rectifier and Trigger.

SPEAKER — 6" x 9" Elliptical, Permanent Magnet.

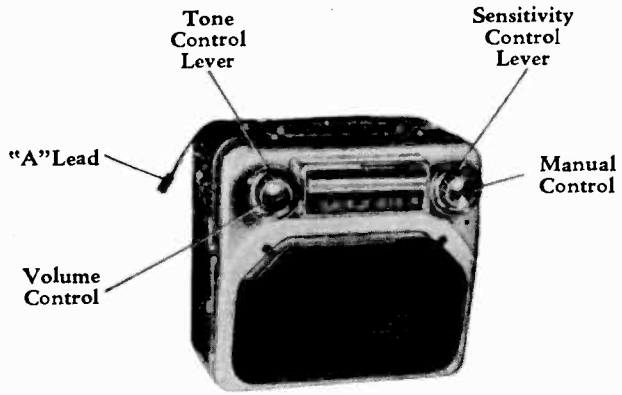
TUNING—Electronic and Manual.

ANTENNA TRIMMER COMPENSATION — 0.000058 - 0.000090 Mfd.

TUNING RANGE—540 - 1600 KC.

PUSHBUTTON SET-UP

No pushbutton set-up is necessary. However, the number of stations on which the tuner will stop can be controlled by the use of the Sensitivity Control.



MODEL 416394

SIGNAL SEEKING TUNER ALIGNMENT PROCEDURE:

NOTE: When aligning the signal seeker tuner type radio, be sure to use a vacuum tube voltmeter as indicated and be sure to follow the alignment sequence given—(Notice that the primary of the 2nd I.F. is aligned first.)

Output Meter Connection ..... VTVM From [2] To Chassis (see parts layout page 2)
Generator Return ..... Receiver Chassis
Dummy Antenna ..... In Series With Generator
Volume Control ..... Maximum Volume
Sensitivity Control ..... Maximum Sensitivity
Tone Control ..... Treble
Generator Output ..... Not To Exceed 2 Volts at VTVM

Step	Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin 8)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	600 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	Signal Gen. Signal	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	**L

*Before making this adjustment, check the setting of oscillator core "H." The rear of the core should be $1\frac{35}{64}$" from the mounting end of the coil form. This measurement is readily made by inserting a suitable plug in the mounting end of the coil form. The core adjustment is made from the mounting end of the coil form with an insulated screwdriver. (It will be necessary to steady the core guide bar by applying a downward pressure at the antenna core end of the bar while making these adjustments.) If this adjustment is necessary, first dissolve the glyptal seal on the core stud and be sure to re-seal after making the adjustment.

**"L" is the pointer adjustment screw on the end of the core guide bar—adjust so pointer reads 1000 KC.

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

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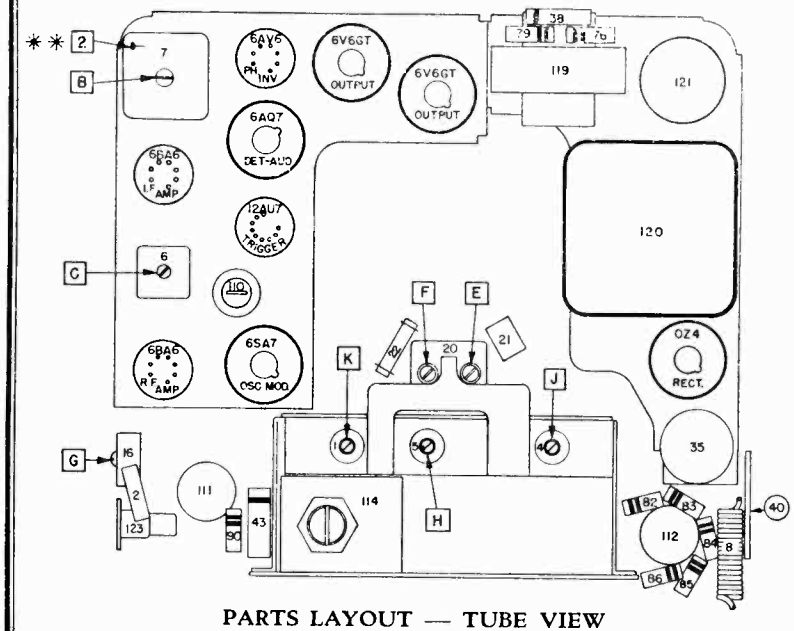
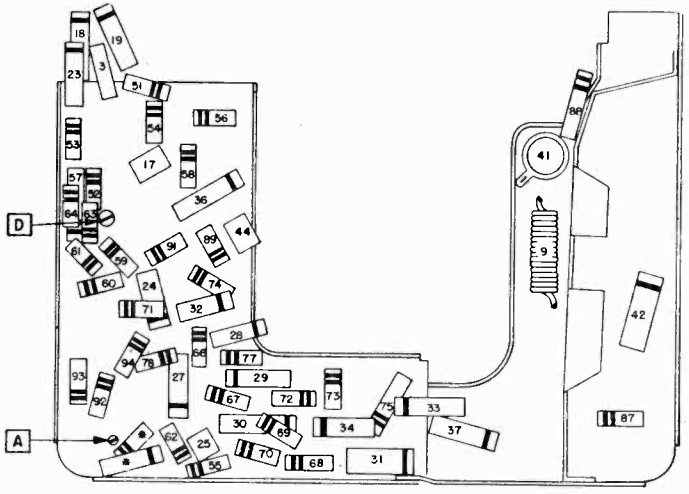


PARTS LAYOUT — TUBE VIEW

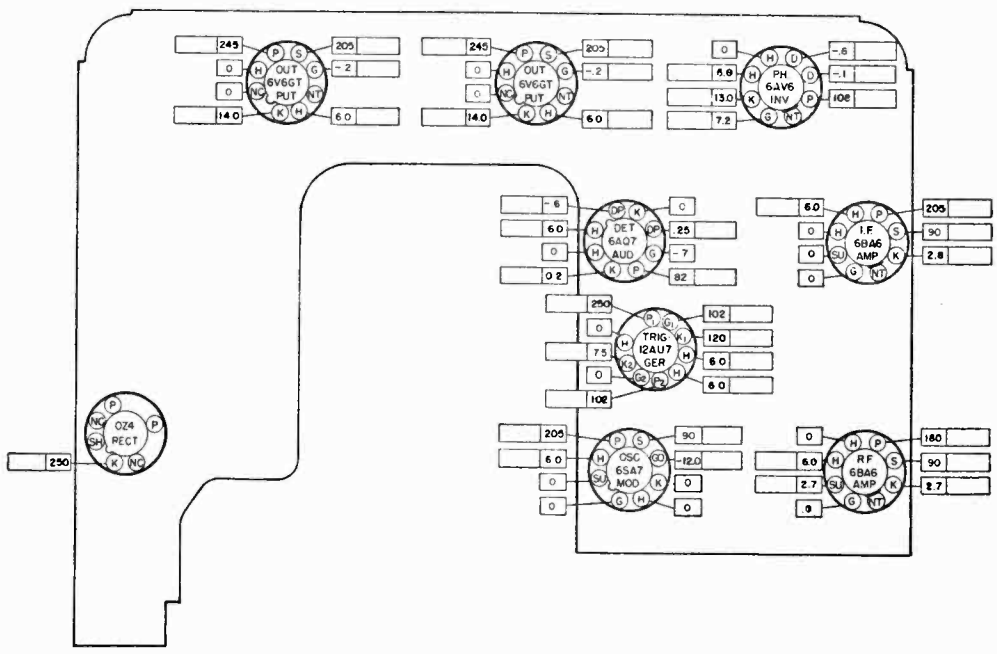


PARTS LAYOUT — CHASSIS VIEW

*Condenser and resistor are included in the 2nd I.F. Coil Assembly.

**Connect a VTVM from this point to ground for output indications during alignment.

TUBE SOCKET VOLTAGE CHART



The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance ..... Ohms Per Volt.

Readings taken with ..... Volts At Spark Plate.

All voltages measured from socket terminals to chassis.

TUNER ADJUSTMENT PROCEDURE:

CATHODE DELAY ADJUSTOR (Illustration #110) (This adjustment should be necessary only if the delay adjustor has been replaced or the adjustment has definitely been proven to be faulty).

With exactly 6.0 volts on the spark plate, set the delay adjustor (Illus. 110) so that the voltage at K_2 of the 12AU7 trigger tube (Pin #8) is exactly 7.5 volts.

NOTE: For all other tuner adjustments, see Bulletin 6D-620.

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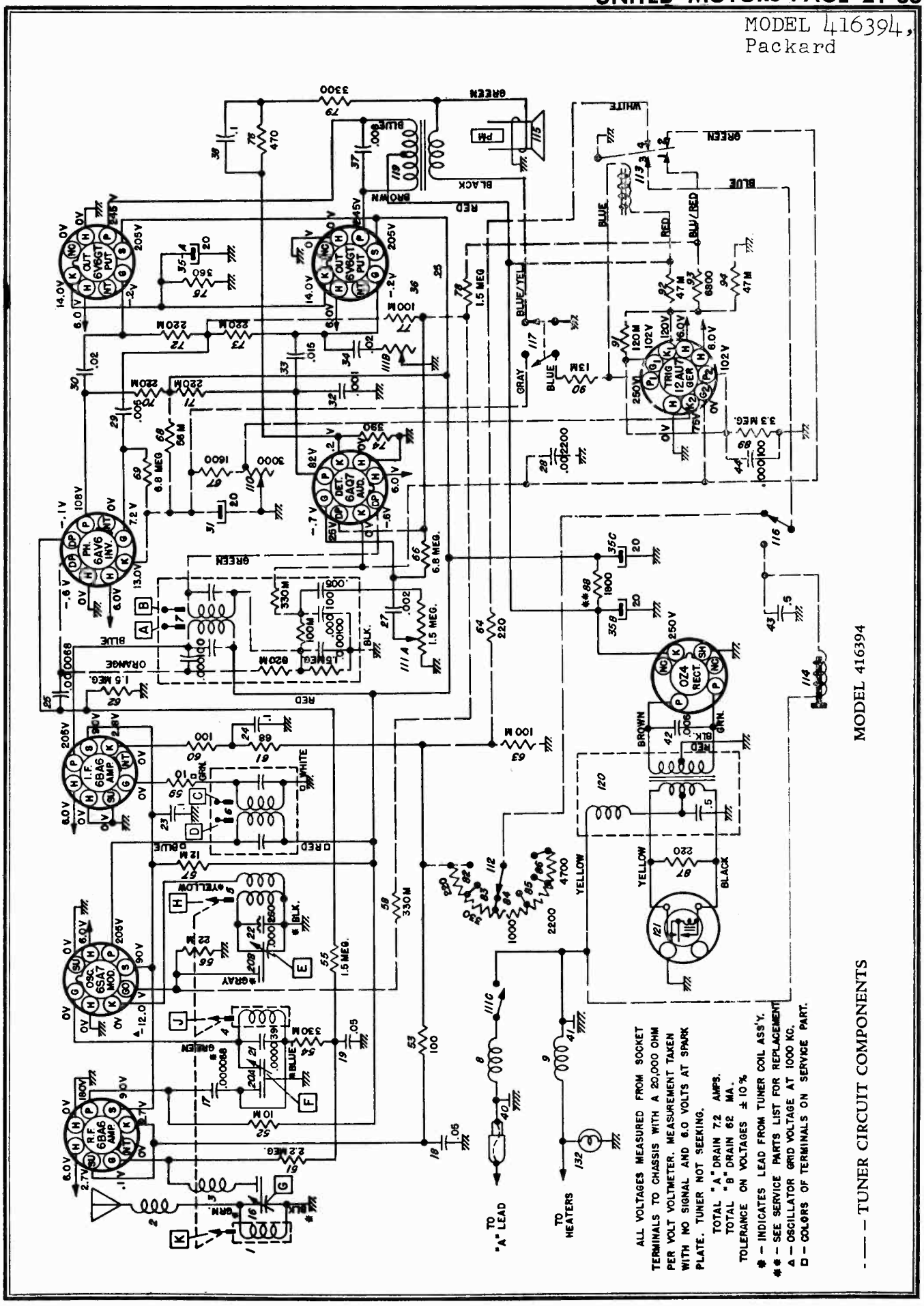
MODEL 416394,
Packard



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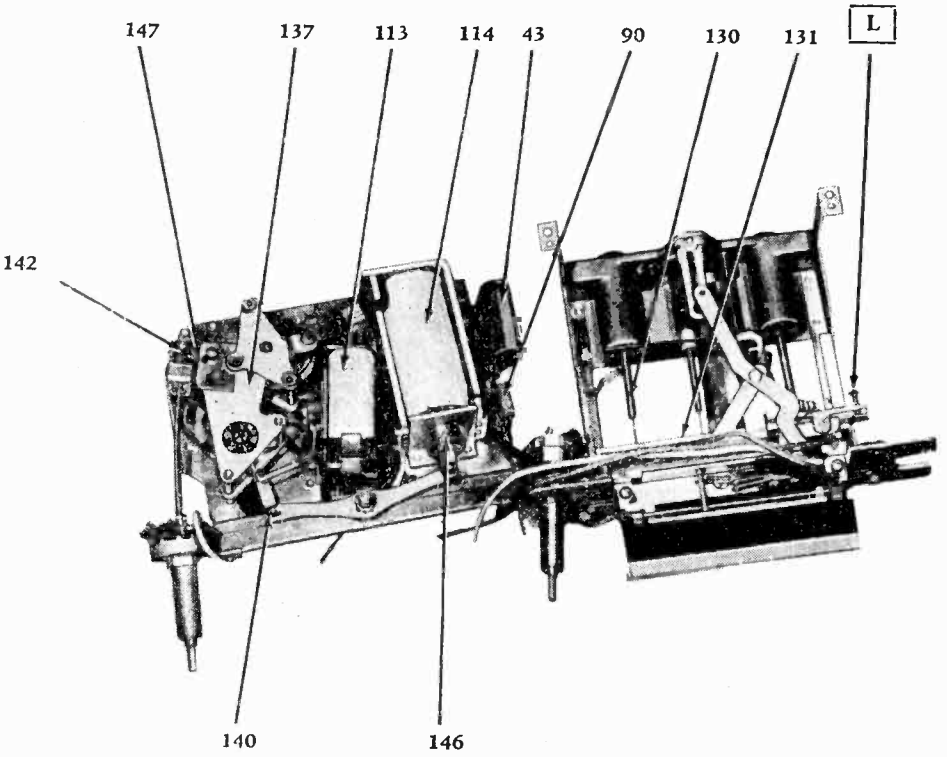
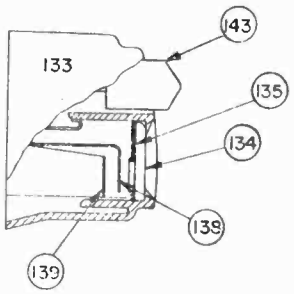
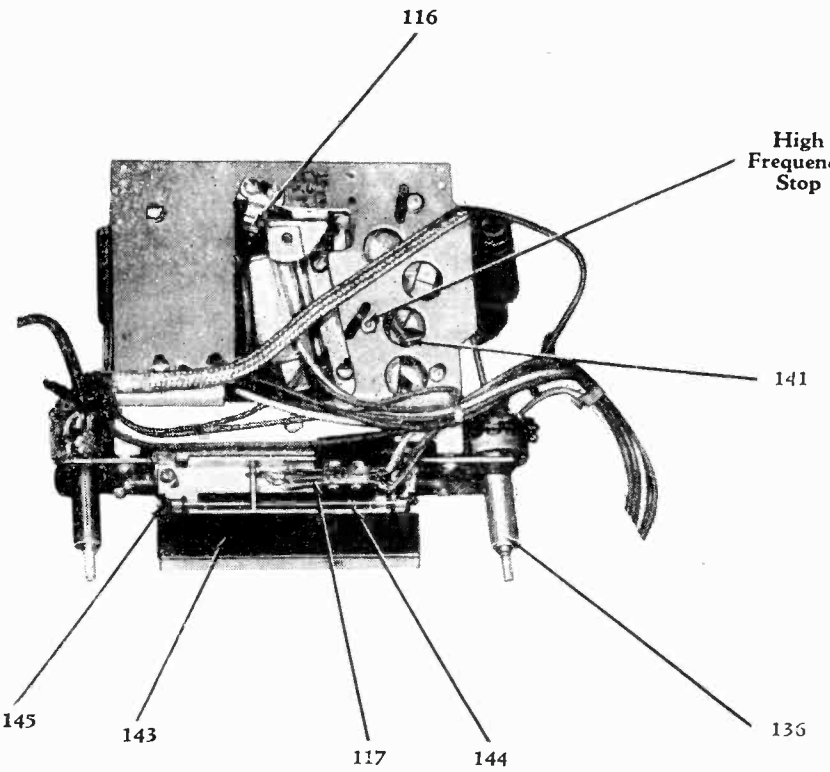
MODEL 416394,
Packard



TUNER — OPEN



ESCUTCHEON
CROSS-SECTION



TUNER

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MODEL 416394, Packard

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7257979	7257979	Antenna
2	7255738	7255738	Antenna Series Choke
3	7240251	7240251	Antenna Spark Choke
4	7257979	7257979	R. F.
5	7259184	7259184	Oscillator
6	7259790	1219508	1st I. F.
7	7259290	1219602	2nd I. F.
8	7259187	7259187	"A" Spark Choke
9	7256931	1217846	Hash Choke
			Condensers
16	7260158	7260158	Antenna Trimmer
17	1219550	G 680	.000068 mfd. Molded
18	1210697	E 503	.05 mfd. 200V Tubular
19	1210697	E 503	.05 mfd. 200V Tubular
20	7242454	7242454	Dual Trimmer
20A			R. F. Section
20B			Oscillator Section
21	7258221	G 390	.000039 mfd. Molded
22	7257567	7257567	.000260 mfd. Compensating
23	7238788	E 104	.1 mfd. 400V Tubular
24	7238789	E 104	.1 mfd. 200V Tubular
25	1219550	G 680	.000068 mfd. Molded
27	7237836	E 202	.002 mfd. 600V Tubular
28	1219553	1219553	.0022 mfd. 600V Tubular
29	7230767	E 502	.005 mfd. 600V Tubular
30	7238882	E 203	.02 mfd. 400V Tubular
31	1219660	1219660	20 mfd. 50V Electrolytic
32	1218883	E 102	.001 mfd. 600V Tubular
33	7237719	7237719	.015 mfd. 600V Tubular
34	7238882	E 203	.02 mfd. 400V Tubular
35	7240724	M 908	Electrolytic
35A			20 mfd. 25 Volt
35B			20 mfd. 400 Volt
35C			20 mfd. 400 Volt
36	1209817	E 254	.25 mfd. 200V Tubular
37	1219594	H 802	.008 mfd. 800V Tubular
38	7238789	E 104	.1 mfd. 200V Tubular
40	7241259	7241259	Spark Plate
41	1217848	1217848	Chassis Plate
42	7240906	H 602	.006 mfd. 1600V Tubular
43	1219511	E 504	.5 mfd. 100V Tubular
44	1219499	G 101	.000100 mfd. Molded
			Resistors
51	1211147	A 225	2.2 Megohms ½W Insulated
52	1211085	B 103	10,000 Ohms 1W Insulated
53	1213217	A 101	100 Ohms ½W Insulated
54	7240732	A 334	330,000 Ohms ½W Insulated
55	1213283	A 155	1.5 Megohms ½W Insulated
56	1211192	A 223	22,000 Ohms ½W Insulated
57	1212491	1212491	12,000 Ohms 2W Insulated
58	1214557	A 334	330,000 Ohms ½W Insulated
59	1215107	A 100	10 Ohms ½W Insulated
60	1213217	A 101	100 Ohms ½W Insulated
61	1215558	1215558	68 Ohms ½W Insulated
62	1213283	A 155	1.5 Megohms ½W Insulated
63	1213270	A 104	100,000 Ohms ½W Insulated
64	7237835	A 221	220 Ohms ½W Insulated
66	7241937	A 685	6.8 Megohms ½W Insulated
67	1219504	1219504	1600 Ohms ½W Insulated
68	1213509	1213509	56,000 Ohms 1W Insulated
69	7241937	A 685	6.8 Megohms ½W Insulated
70	1214555	A 224	220,000 Ohms ½W Insulated
71	1214555	A 224	220,000 Ohms ½W Insulated
72	1214555	A 224	220,000 Ohms ½W Insulated
73	1214555	A 224	220,000 Ohms ½W Insulated
74	1213482	A 391	390 Ohms ½W Insulated
75	7234563	7234563	360 Ohms 1W Wire Wound
76	1213486	A 471	470 Ohms ½W Insulated
77	1213270	A 104	100,000 Ohms ½W Insulated
78	1213283	A 155	1.5 Megohm ½W Insulated
79	1213481	A 332	3300 Ohms ½W Insulated
82	7237835	A 221	220 Ohms ½W Insulated
83	1213224	A 331	330 Ohms ½W Insulated
84	1213235	A 102	1,000 Ohms ½W Insulated
85	1214545	A 222	2200 Ohms ½W Insulated
86	1214547	A 472	4700 Ohms ½W Insulated

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MODEL 416394,
Packard

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		Resistors (Continued)	
87	7237994	B 221	220 Ohms 1W Insulated
88	1214573	{ C 272 { B 562	1800 Ohm 2W Wire Wound (Use 2700 Ohm 2W and 5600 Ohm 1W in parallel)
89	1214564	A 335	3.3 Megohm ½W Insulated
90	7231539	7231539	13,000 Ohms 1W Insulated
91	1213271	1213271	120,000 Ohms ½W Insulated
92	1216157	B 473	47,000 Ohms 1W Insulated
93	1216154	1216154	6800 Ohms 1W Insulated
94	1216157	B 473	47,000 Ohms 1W Insulated
		Tubes	
	1217690	5252	6BA6
	7237752	5222	6SA7
	1218506	5262	6AV6
	1219484	5278	6AQ7GT
	1213793	5241	6V6GT
	1211924	5003	OZ4
	1219485	5328	12AU7
		MISCELLANEOUS ELECTRICAL	
	7260328	7260328	"A" Lead and Fuse Holder Assy. (Male)
110	7259408	7259408	Adjustor - Cathode Delay
111	7260230	7260230	Control - Volume - Tone - Switch
111A			Volume Control
111B			Tone Control
111C			Switch
112	7260222	7260222	Control - Sensitivity
113	7259009	7259009	Relay
114	7259010	1219661	Solenoid
115	7260362	7260362	Speaker
116	7259011	7259011	Switch - Tuner Return
117	7259012	7259012	Switch - Station Selector
119	7260006	7260006	Transformer - Output
120	7259375	7255881	Transformer - Power
121	7239124	8542	Vibrator
		MECHANICAL PARTS	
		Chassis	
123	7256742	7256742	Antenna Connector
	7236279	7236279	Socket - Octal Tube
	7259307	7259307	Socket - 9 Pin Miniature Tube
	7258073	7258073	Socket - 7 Pin Miniature Tube
	7239125	7239125	Socket - Vibrator
	1219747	1219747	Socket - Dial Light
		Tuner	
130	7259201	7259201	Core - Tuning
131	7259178	7259178	Core Guide Bar
132	187189	44	Dial Light
133	7260373	7260373	Escutcheon Assy.
134	7260262	7260262	Dial
135	7260125	7260125	Dial Backplate
	7259494	7259494	Retainer Spring - L. H.
	7259495	7259495	Retainer Spring - R. H.
136	7260357	7260357	Manual Drive Shaft
137	7259197	1219610	Motor Gear Train Assy.
138	7260309	7260309	Pointer Assembly
139	7260501	7260501	Pointer Backplate
140	7259100	6047	Spring Clip
141	7259055	7259055	Spring - Motor Power
142	7259207	7259207	Spring - Worm Anti-rattle
	1219751	1219751	Station Selector Bar Pkg.
	7256121	7256121	"C" Washer
143	7260223	7260223	Station Selector Bar and Shaft
144	7259122	7259122	Retainer Spring
145	7259111	7259111	Spring
	7259125	7259125	Switch Operating Ring
			Toggle Plate
146	7259164	7259164	Solenoid Plunger
147	7259026	7259026	Worm Gear and Bracket Assy.
		INSTALLATION PARTS	
	7260148	7260148	"A" Lead and Fuse Holder Assy.
	7259644	7259644	Condenser - Generator
	7259643	7259643	Condenser - Ignition
	7259646	6007	Distributor - Suppressor
	147685	147685	Fuse - 14 Amps.
	7260187	7260187	Knob - Control
	7260147	7260147	Lever - Tone and Sensitivity
	7260218	7260218	Trimplate - Sensitivity
	7260219	7260219	Trimplate - Tone

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MODEL 980899,
Buick

GENERAL

MOUNTING—All 1950 Buick Cars.

TUBES—Seven, Plus Rectifier.

SPEAKER—8" Round, Permanent Magnet.

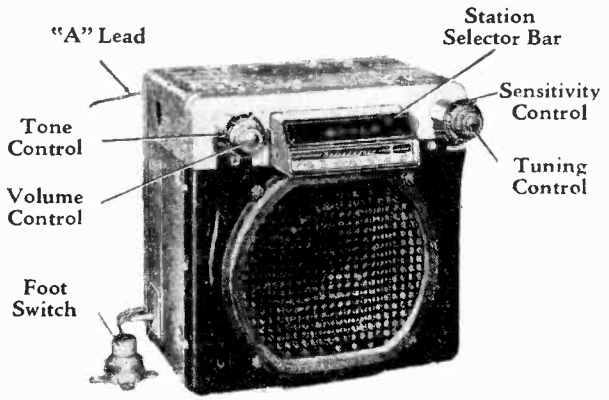
TUNING—Manual and Electronic.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000072 - 0.000088 Mfd.

TUNING RANGE—550 - 1600 KC.

PUSH BUTTON SET-UP PROCEDURE

No push button set-up is necessary. However, the number of stations on which the tuner will stop can be controlled through use of the Sensitivity Control.



MODEL 980899

SIGNAL SEEKING TUNER ALIGNMENT PROCEDURE

NOTE: When aligning the signal seeker tuner type radio, be sure to use a vacuum tube voltmeter as indicated and be sure to follow the alignment sequence given—(Notice that the primary of the 2nd I. F. is aligned first.)

Output Meter Connection ..... VTVM from [2] to chassis (see parts layout
Generator Return ..... Receiver Chassis
Dummy Antenna ..... In series with generator
Volume Control ..... Maximum Volume
Tone Control ..... Treble
Generator Output ..... Not to exceed 2 volts at VTVM

Step	Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence For Max. Output
1	0.1 mfd	6SA7 Grid (Pin 8)	260 KC	*High Frequency Stop	A, B, C, D
2	0.000082 mfd	Antenna Connector	1615 KC	High Frequency Stop	**E, F, G
3	0.000082 mfd	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	0.000082 mfd	Antenna Connector	1615 KC	Signal Generator Signal	F, G
5	0.000082 mfd	Antenna Connector	1000 KC	Signal Generator Signal	***L

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

**Before making this adjustment, check the setting of oscillator core "H." The rear of the core should be $1\frac{33}{64}$" from the mounting end of the coil form. This measurement is readily made by inserting a suitable plug in the mounting end of the coil form. The core adjustment is made from the mounting end of the coil form with an insulated screwdriver. (It will be necessary to steady the core guide bar while making these adjustments. This can be done by applying a downward pressure on the guide bar at the antenna coil end.) If this adjustment is necessary, first dissolve the glyptal seal on the core stud and be sure to re-seal after making the adjustment.

***"L" is the pointer adjustment screw on the end of the core guide bar—adjust so pointer reads 1000 KC.

With the radio installed and the antenna plugged in, adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case.)

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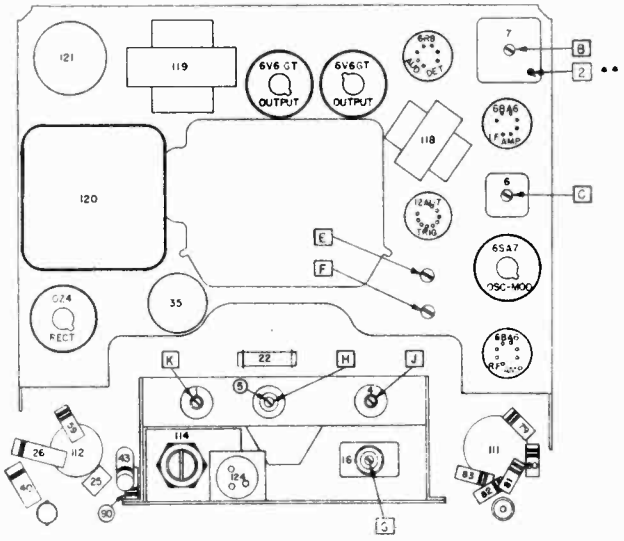
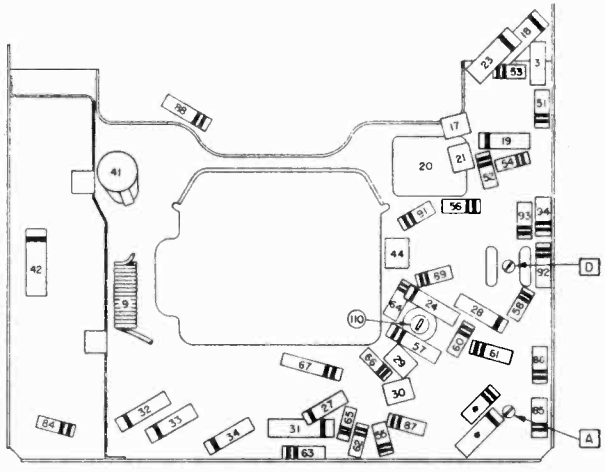


PARTS LAYOUT — TUBE VIEW

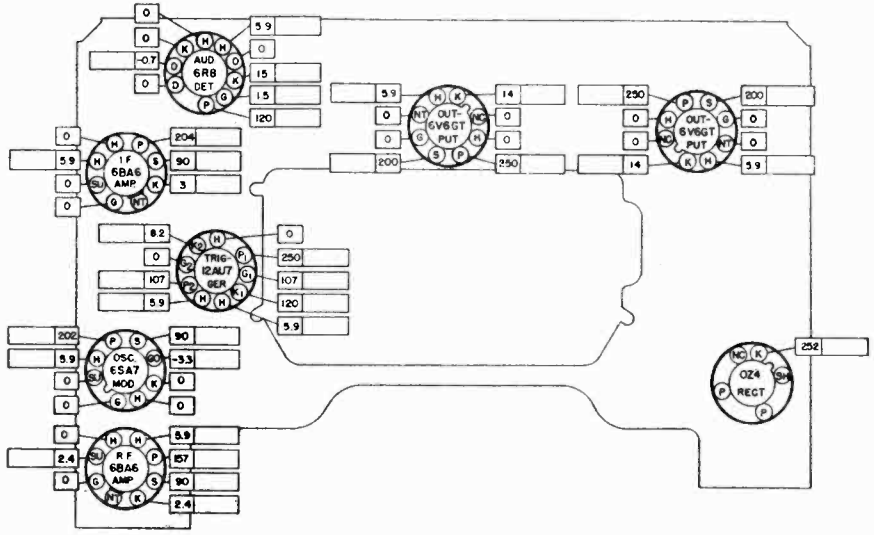


PARTS LAYOUT — CHASSIS VIEW

*The condenser and resistor are included in the 2nd IF Coil Assy.

**Connect VTVM between this point and ground for output indications during alignment procedure.

TUBE SOCKET VOLTAGE CHART



The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance ..... Ohms Per Volt.

Readings taken with ..... Volts at Spark Plate.

All voltages measured from socket terminals to chassis.

TUNER ADJUSTMENT PROCEDURE:

CATHODE DELAY ADJUSTOR (Illustration #110) (This adjustment should not be made unless it is necessary to replace the Delay Adjustor or the setting is definitely proven to be faulty).

1. Disconnect antenna and turn radio on.
2. Allow set to warm up.
3. Momentarily depress station selector bar.
4. Set voltage at K_2 of the 12AU7 trigger tube (Pin #8) to 8.0 volts by adjusting Illustration 110 while the tuner is seeking and with exactly 6.0 volts at the spark plate.

NOTE: For all other tuner adjustments, see Bulletin 6D-620.

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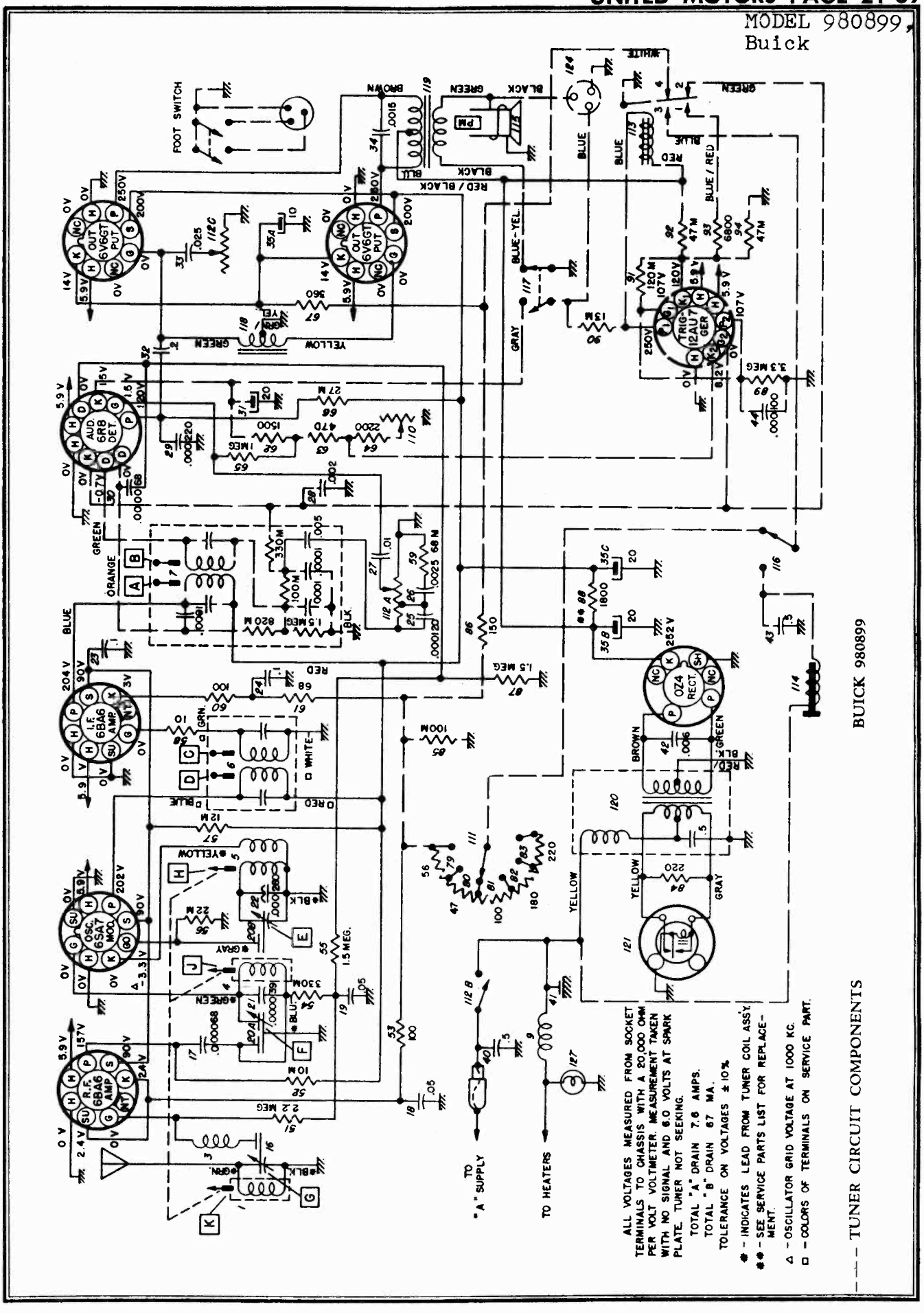
MODEL 980899
Buick



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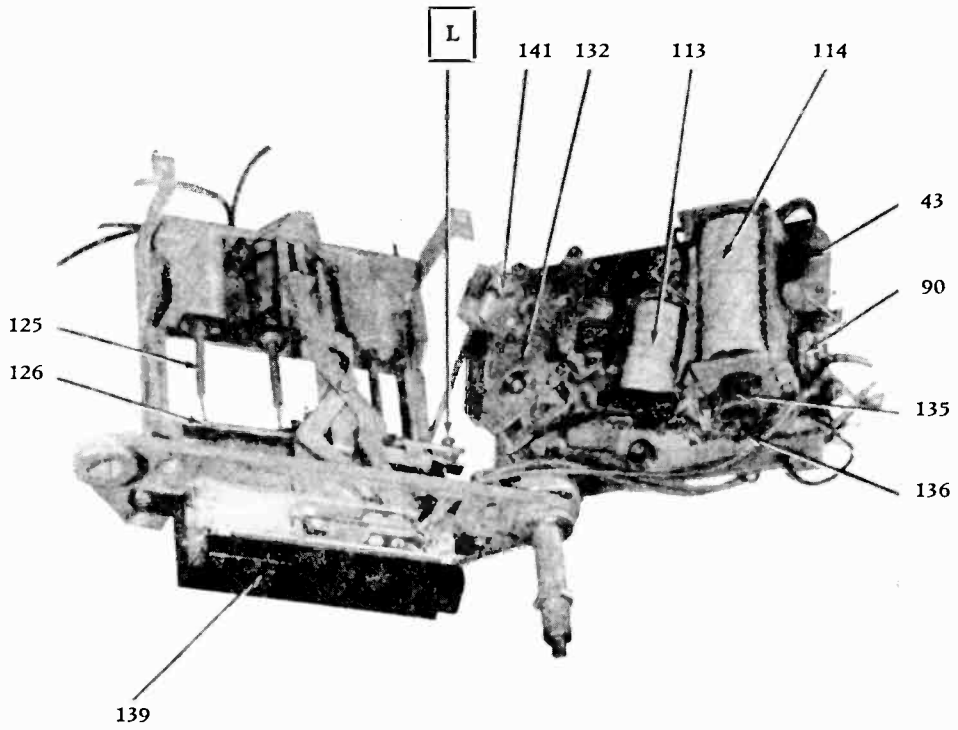
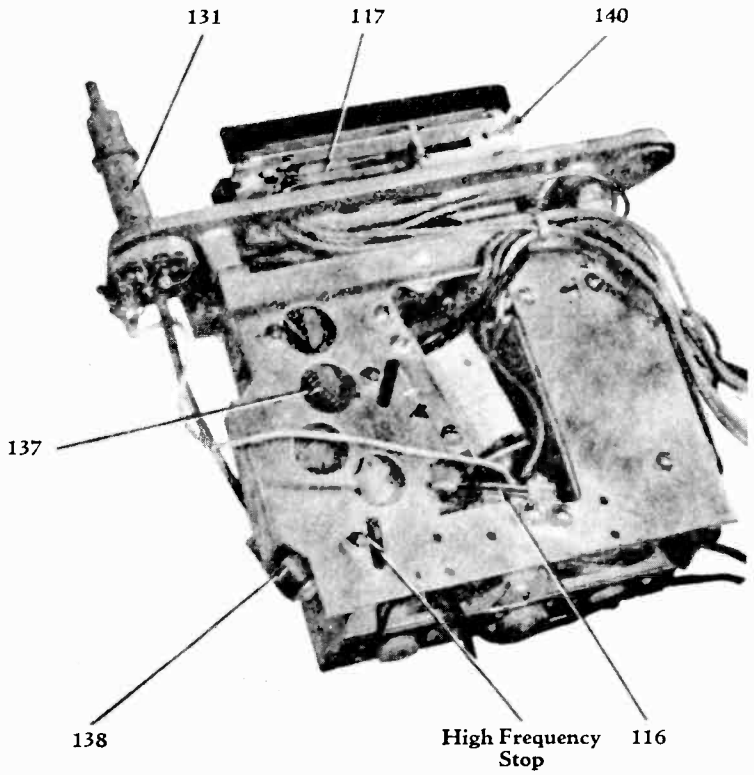
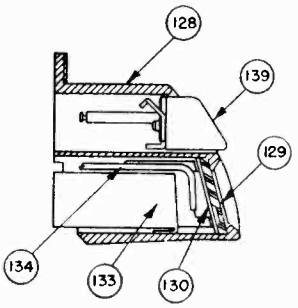
MODEL 980899,
Buick



TUNER UNFOLDED





ESCUTCHEON
CROSS-SECTION

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MODEL 980899, Buick

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7257979	7257979	Antenna
3	7240251	7240251	Antenna Spark Choke
4	7257979	7257979	R.F.
5	7259184	7259184	Oscillator
6	7258849	1219508	1st I.F.
7	7259350	1219602	2nd I.F.
9	7240690	1217846	Hash Choke
			Condensers
16	7259308	7259308	Antenna Trimmer
17	1219550	G 680	.000068 mfd Mica
18	7236842	E 503	.05 mfd 200 V Tubular
19	7236842	E-503	.05 mfd 200 V Tubular
20	7242454	7242454	Dual Trimmer
20A			RF Section
20B			Oscillator Section
21	7258221	G 390	.000039 mfd Ceramic
22	7257567	7257567	.000260 mfd Compensating
23	7238788	E 104	.1 mfd 400 V Tubular
24	7238789	E 104	.1 mfd 200 V Tubular
25	7240577	7240577	.000120 mfd Mica
26	7240578	7240578	.0025 mfd 400 V Tubular
27	7237957	E 103	.01 mfd 400 V Tubular
28	7237836	E 202	.002 mfd 600 V Tubular
29	7238792	G 221	.000220 mfd Mica
30	1219550	G 680	.000068 mfd Mica
31	1219660	1219660	20 mfd 50 V Electrolytic
32	7240579	E 204	.2 mfd 400 V Tubular
33	1211232	1211232	.025 mfd 400 V Tubular
34	7236134	7236134	.0015 mfd 800 V Tubular
35	7259128	7259128	Electrolytic
35A			10 mfd 100 V
35B			20 mfd 400 V
35C			20 mfd 400 V
40	7236621	E 504	.5 mfd 200 V Tubular
41	1217848	1217848	Chassis Plate Condenser
42	7240906	H 602	.006 mfd 1600 V Tubular
43	1219511	E 504	.5 mfd 100 V Tubular
44	7239184	G 101	.000100 mfd Mica
			Resistors
51	1211147	A 225	2.2 Megohms ½ W Insulated
52	1211085	B 103	10,000 Ohms 1 W Insulated
53	1213217	A 101	100 Ohms ½ W Insulated
54	7240732	A 334	330,000 Ohms ½ W Insulated
55	1211142	A 155	1.5 Megohms ½ W Insulated
56	1211192	A 223	22,000 Ohms ½ W Insulated
57	1212491	1212491	12,000 Ohms 2 W Insulated
58	1215107	A 100	10 Ohms ½ W Insulated
59	1213844	A 683	68,000 Ohms ½ W Insulated
60	1213217	A 101	100 Ohms ½ W Insulated
61	1215558	1215558	68 Ohms ½ W Insulated
62	1219488	1219488	1500 Ohms ½ W Insulated
63	1219487	1219487	470 Ohms ½ W Insulated
64	1214545	A 222	2200 Ohms ½ W Insulated
65	1213282	A 105	1 Megohm ½ W Insulated
66	7236080	B 273	27,000 Ohms 1 W Insulated
67	7234563	7234563	360 Ohms 1 W (Wire Wound)
79	1214540	1214540	56 Ohms ½ W Insulated
80	1213489	A 470	47 Ohms ½ W Insulated
81	1213217	A 101	100 Ohms ½ W Insulated
82	1215559	1215559	180 Ohms ½ W Insulated
83	7237835	A 221	220 Ohms ½ W Insulated
84	7237994	B 221	220 Ohms 1 W Insulated
85	1211118	A 104	100,000 Ohms ½ W Insulated
86	1213220	A 151	150 Ohms ½ W Insulated
87	1211142	A 155	1.5 Megohms ½ W Insulated
88	1214573	{ C272 { B562	1,800 Ohms 2 W Wire Wound (or replace with 2700 Ohms 2 W and 5600 Ohms 1 W in parallel)
89	1214564	A 335	3.3 Megohms ½ W Insulated
90	7231539	7231539	13,000 Ohms 1 W Insulated
91	1213271	1213271	120,000 Ohms ½ W Insulated
92	1216157	B 473	47,000 Ohms 1 W Insulated
93	1216154	1216154	6800 Ohms 1 W Insulated
94	1216157	B 473	47,000 Ohms 1 W Insulated

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MODEL 980899,
Buick

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		Tubes	
	1211924	5003	0Z4
	1213793	5241	6V6GT
	1219496	5541	6R8
	1217690	5252	6BA6
	1219485	5328	12AU7
	7237752	5222	6SA7
		Miscellaneous Electrical	
	7242034	7242034	"A" Lead Connector
112	7258683	7258683	Control - Volume - Tone and Switch
112A			Volume
112B			Tone
112C			Switch
111	7259311	7259311	Control - Sensitivity
110	7242204	7242204	Delay Adjustor
113	7259009	7259009	Relay
114	7259010	1219661	Solenoid
115	7259502	7259502	Speaker 8" PM
	7258903	7258903	Switch - Foot Switch Assy.
116	7259011	7259011	Switch - Tuner Return
117	7259012	7259012	Switch - Station Selector
118	7258941	7258941	Transformer - Input
119	7259336	7259336	Transformer - Output
120	7258889	6060	Transformer - Power
121	7239124	8542	Vibrator - Non-synchronous
		MECHANICAL PARTS	
		Chassis	
	7242035	7242035	Antenna Connector
124	7259392	7259392	Socket - Foot Switch
	7236279	7236279	Socket - Octal Tube
	7259307	7259307	Socket - 9 Pin Miniature
	7258073	7258073	Socket - 7 Pin Miniature
	7239125	7239125	Socket - Vibrator
		Tuner	
125	7259201	7259201	Core - Powdered Iron
126	7259178	7259178	Core Guide Bar
127	125588	55	Dial Light
128	7259347	7259347	Escutcheon Assy.
129	7259310	7259310	Dial
130	7256886	7256886	Dial Backplate
131	7259341	7259341	Manual Drive Assy.
132	1219610	1219610	Motor Gear Train Assy.
133	7259498	7259498	Pointer Backplate
134	1219093	1219093	Pointer Tip Pkg.
135	7259164	7259164	Solenoid Plunger
136	7259100	7259100	Spring Clip
137	7259055	7259055	Spring - Motor Power
138	7259207	7259207	Spring - Worm Anti-Rattle
	1219612	1219612	Station Selector Bar Pkg.
139	7259309	7259309	Station Selector Bar Toggle Plate
140	7259111	7259111	Spring (2) "C" Washer
	1219124	1219124	Push Bar Insert "B"
	1219125	1219125	Push Bar Insert "U"
	1219126	1219126	Push Bar Insert "I"
	1219127	1219127	Push Bar Insert "C"
	1219128	1219128	Push Bar Insert "K"
141	7259026	7259026	Worm and Bracket Assy.
		INSTALLATION PARTS	
	1321178	1321178	"A" Lead Assy.
	1336763	6030	Condenser - Generator
	1910147	6030	Condenser - Ignition
	120151	120151	Fuse - 15 Amp.
	1341337	1341337	Knob - Sensitivity
	1341536	1341536	Knob - Tone Control
	1341566	1341566	Knob - Tuning Control
	7258903	7258903	Switch - Foot Control
	1853686	1853686	Suppressor - Adapter
	1217820	1217820	Suppressor - Distributor

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MODELS 982543, 982579, Oldsmobile

SUBJECT: SERVICE INSTRUCTIONS—OLDSMOBILE 1950 MODELS 982543 AND 982579 DELUXE AUTO RADIO. (These models differ only in accessory parts, the receiver itself being identical in each case. The accessory parts supplied with Model 982543 are for use with 1950 Oldsmobile cars Models 76 and 88. The accessory parts supplied with Model 982579 are for use with 1950 Oldsmobile cars, Model 98).

GENERAL

MOUNTING..Model 982543 in 1950 Oldsmobile cars Models 76 and 88.
..Model 982579 in 1950 Oldsmobile cars Model 98.

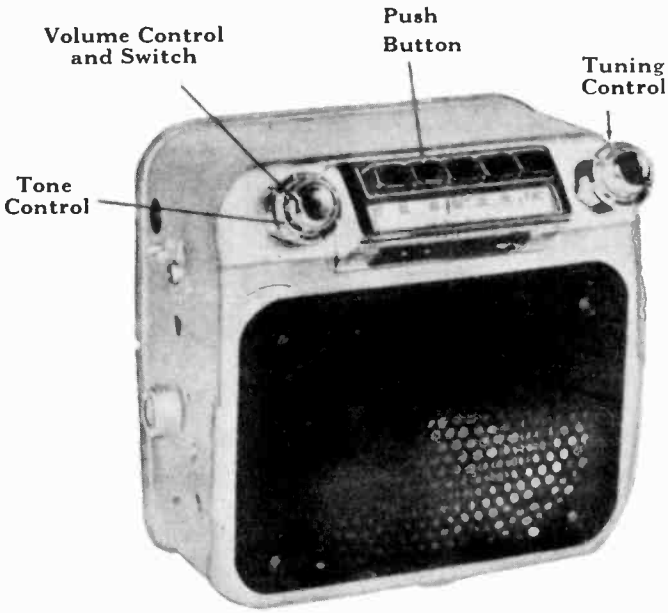
TUBES..... Six, plus rectifier

SPEAKER.....
..6"x9" Elliptical Permanent Magnetic

TUNING.. Manual and 5 P.B. Mechanical

ANTENNA TRIMMER COMPENSATION..... For antennas between 0.000055 - 0.000090 Mfd.

TUNING RANGE.....535 - 1610 KC.



MODELS 982543 and 982579

PUSH BUTTON SET-UP

Pull push button to the left and then out. Tune in desired station manually. Push button all the way in.

ALIGNMENT PROCEDURE:

Output Meter Connection.....Across Voice Coil
Generator Return.....To Receiver Chassis
Dummy Antenna.....In Series With Generator
Volume Control Position.....Maximum Volume
Tone Control Position.....Treble
Generator Output.....Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence For Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	257.5 KC.	High Frequency Stop	A, B, C, D
2	0.00007 Mfd.	Antenna Connector	1610 KC.	High Frequency Stop	E, F, G

Low frequency alignment not required.

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC.

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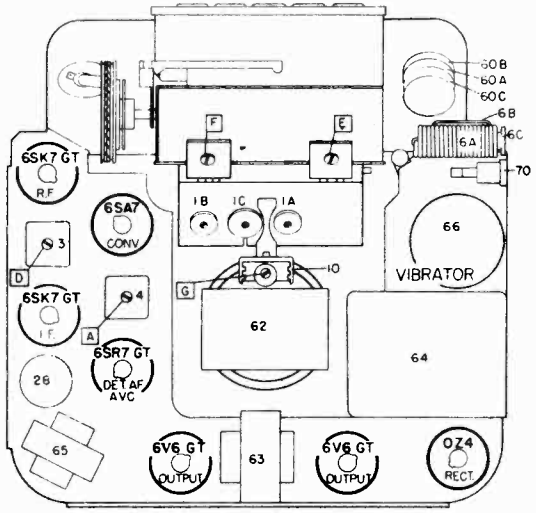
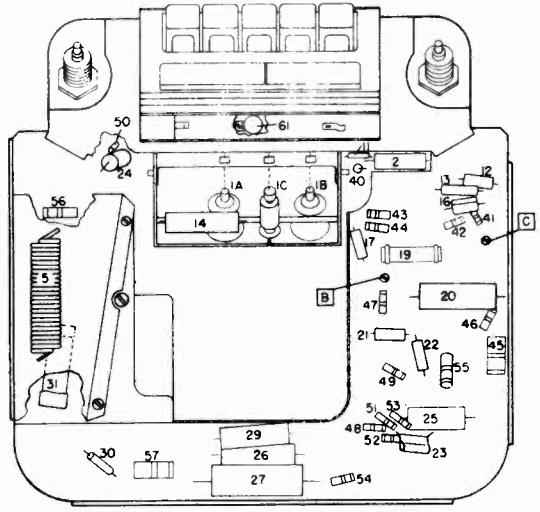
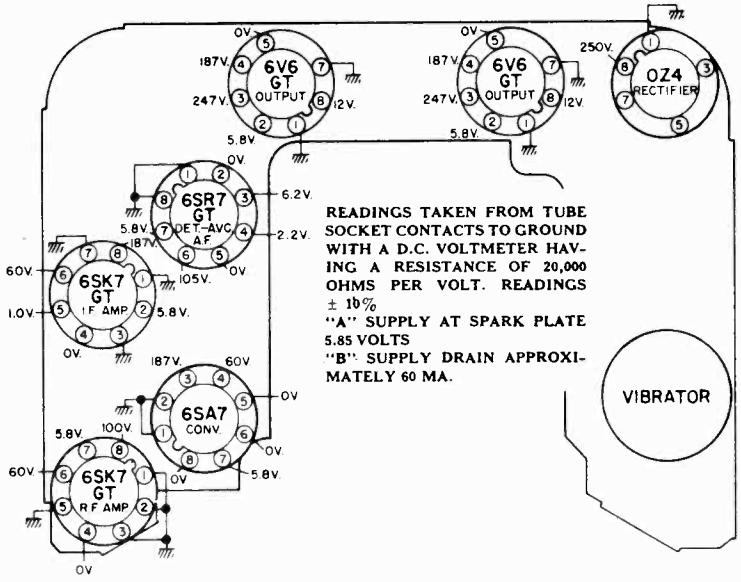


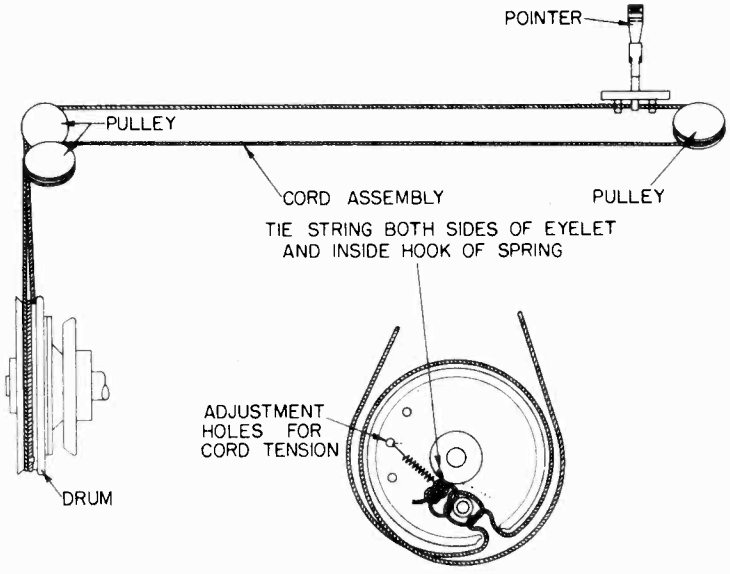
PARTS LAYOUT—TUBE VIEW



PARTS LAYOUT—CHASSIS VIEW



TUBE SOCKET VOLTAGE CHART



POINTER STRING HOOKUP

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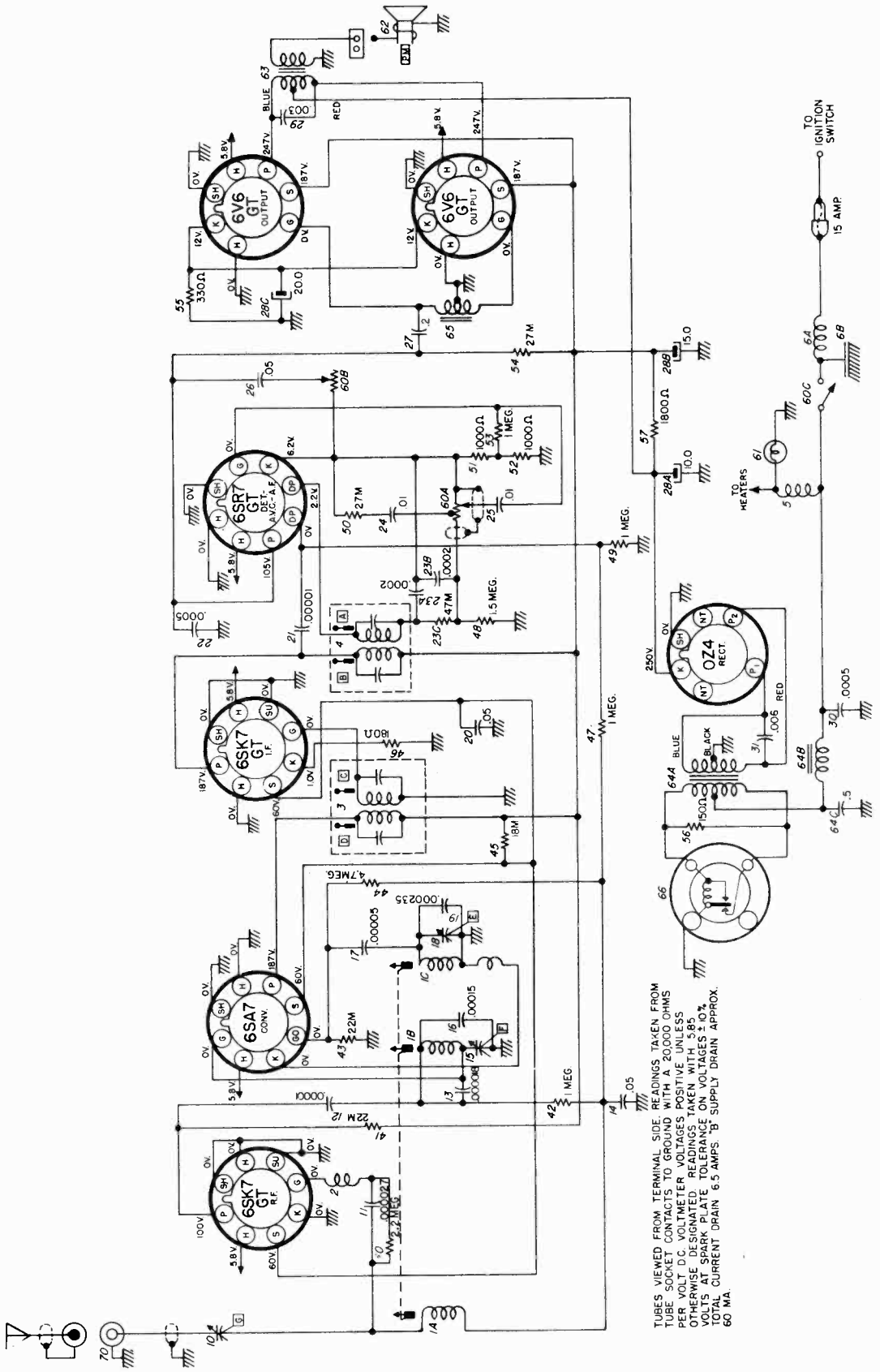
MODELS 982543, 982579, Oldsmobile



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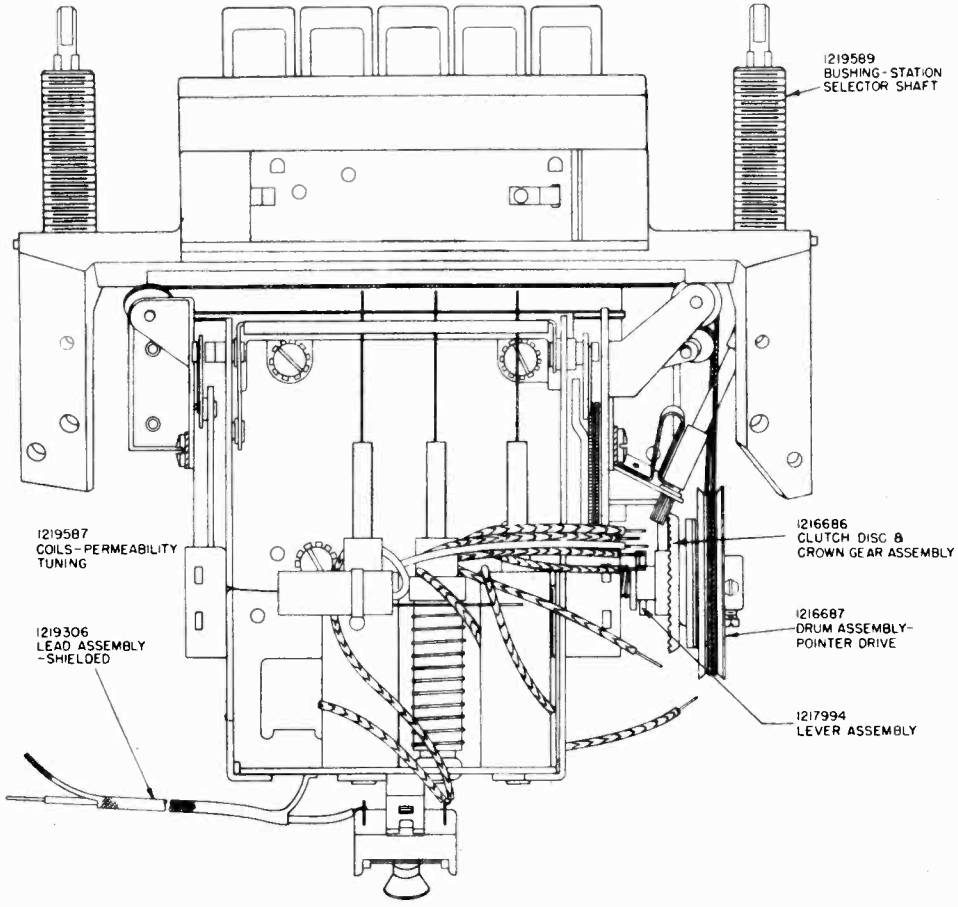

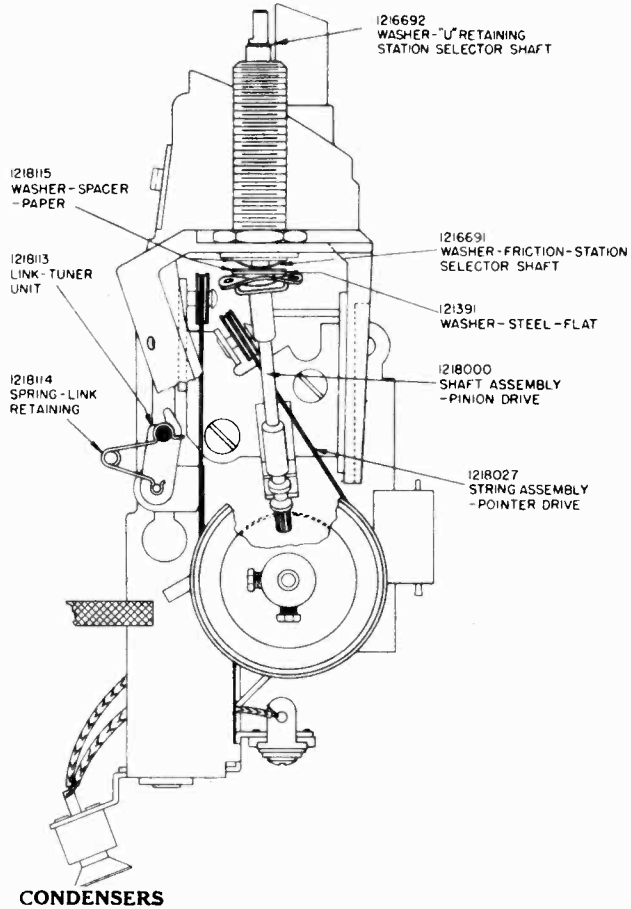

TUNER

Illus. No.	Service Part No.	Production Part No.	Description
			ELECTRICAL PARTS
			COILS
1		1219587	Coils—Permeability Tuning
1 A			Antenna Coil
1 B			R.F. Coil
1 C			Oscillator Coil
2		1214382	Antenna Choke
3		1219583	1st I.F. Assembly
4		1219584	2nd I.F. Assembly
5		1217996	Filament Choke
6		1219310	Spark Filter & "A" Connector Assembly
A			Spark Choke
B			Spark Plate

CONDENSERS

10	1219312	Antenna Trimmer
11	7256259	.000027 Mfd.—Molded
12 G 100	7234242	.00001 Mfd.—Molded
13	1217733	.000018 Mfd.—Molded
14 E 503	7230592	.05 Mfd.—100 V.—Tubular
15	1218046	R.F. Trimmer
16 G 151	7230893	.00015 Mfd.—Molded
17 G 470	1207625	.00005 Mfd.—Molded
18	1218043	Oscillator Trimmer
19	1219305	.000235 Mfd. Temperature Compensating
20 E 503	7230592	.05 Mfd.—200 V.—Tubular
21 G 100	7234242	.00001 Mfd.—Molded
22 G 471	7238879	.0005 Mfd.—Ceramic or Molded
23	1219563	Diode—Filter Unit
A		.0002 Mfd.
B		.0002 Mfd.
C		47,000 Ohm
24 E 103	7237957	.01 Mfd.—100 V.—Tubular
25 E 103	7237957	.01 Mfd.—100 V.—Tubular
26 E 503	7230592	.05 Mfd.—200 V.—Tubular

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MODELS 982543, 982579, Oldsmobile

Illus. No.	Service Part No.	Production Part No.	Description
27	E 204	1217876	.2 Mfd.—200 V.—Tubular
28		1218009	Electrolytic Condenser
A			10 Mfd.—350 V.
B			15 Mfd.—350 V.
C			20 Mfd.—25 V.
29		1219301	.003 Mfd.—600 V.—Tubular
30	G 471	7238879	.0005 Mfd.—Ceramic or Molded
31		1219591	.006 Mfd.—1600 V.—Tubular
		RESISTORS	
40	A 225	1214563	2.2 Megohm—1/2 W. Insulated
41	A 223	1214550	22,000 Ohm—1/2 W. Insulated
42	A 105	1213282	1 Megohm—1/2 W. Insulated
43	A 223	1214550	22,000 Ohm—1/2 W. Insulated
44	A 475	1214566	4.7 Megohm—1/2 W. Insulated
45	C 183	7239157	18,000 Ohm—2 W. Insulated
46	A 181	1215559	180 Ohm—1/2 W. Insulated
47	A 105	1213282	1 Megohm—1/2 W. Insulated
48	A 155	1213283	1.5 Megohm—1/2 W. Insulated
49	A 105	1213282	1 Megohm—1/2 W. Insulated
50	A 273	1214551	27,000 Ohm—1/2 W. Insulated
51	A 102	1213235	1000 Ohm—1/2 W. Insulated
52	A 102	1213235	1000 Ohm—1/2 W. Insulated
53	A 105	1213282	1 Megohm—1/2 W. Insulated
54	A 273	1214551	27,000 Ohm—1/2 W. Insulated
55	B 331	7233773	330 Ohm—1 W. Insulated
56	B 151	1211005	150 Ohm—1 W. Insulated
57	C 182	1214573	1800 Ohm—2 W. Insulated
		TUNER PARTS	
		1219589	Bushing—Station Selector Shaft
		1219597	Background Assembly
		1219588	Dial Glass—Calibrated
		1218030	Pointer & Slide Assembly
		1218027	String Assembly—Pointer Drive
		1219595	Spring & Sleeve Assembly—Core Lock
		1219596	Plate & Socket Assembly—Dial Lamp
		1219309	Tuner Unit Assembly—Mechanical portion only (includes Push Buttons, Clutch Disc, and crown gear assembly)
		1216687	Drum Assembly—Pointer Drive
		1216686	Clutch Disc & Crown Gear Assembly
		1214876	Spring—Clutch Compression
		1217999	Lever Actuating Plate Assembly
		1217994	Lever Assembly
		1218113	Link—Tuner Unit
		1218114	Spring—Link Retaining
		1217992	Screw—10-32 Special
		1216692	Washer—"U" Retaining—Station Selector Shaft
		1216691	Washer—Friction—Station Selector Shaft
		1218115	Washer—Spacing—Paper
		TUBES	
	5230	1214292	6SK7GT—R.F. Amplifier
	5222	7237752	6SA7—Oscillator—Translator
	5230	1214292	6SK7GT—I.F. Amplifier
	5233	1218149	6SR7GT—Detector—AVC—1st Audio
	5241	1213793	6V6GT—Audio Output
	5241	1213793	6V6GT—Audio Output
	5003	1211924	OZ4—Rectifier
		MISCELLANEOUS ELECTRICAL PARTS	
60		1219582	Control—Volume, Tone & Switch
60A			Volume Control
60B			Tone Control
60C			Switch
61		187189	Lamp—Dial (Mazda #44)
62		1219291	Speaker—6" x 9" Elliptical Permanent Magnet
63		1219314	Transformer—Output
64		1219316	Power Transformer & Filter Assembly
64A			Transformer—Power
64B			Hash Choke
64C			Condenser—.5 Mfd.—100 V.
65		1219315	Transformer—Audio Input.
66	8542	1218006	Vibrator

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MODELS 982543, 982579, Oldsmobile

Service Part No.	Production Part No.	Description
		MECHANICAL PARTS
		CHASSIS
70	1219311	Antenna Connector Assembly
	7236279	Socket—Tube—8 Prong—Octal
	1216041	Socket—Vibrator
	1219586	Clip—IF Mounting
	1219585	Cover Assembly—Case Back
		INSTALLATION PARTS MODEL 982543
	414997	Washer—Flat 33/64 I.D.
	7255287	Nut—1/2—28 Hex.
	7258813	Knob—Tone and Dummy
	7257400	Washer—Wave—3/16 I.D. (Anti-Rattle) Tuning and Volume Control
	7259663	Knob—Tuning and Volume Control Includes Set Screw
	7256654	Bracket—Receiver Mounting
	554519	Bracket—Side Mounting
	554690	Bolt—1/4-20x3/8 Truss Head
	121797	Bolt—1/4-20x3/8 Hex. Head
	120706	Bolt—1/4-20x1/2 Hex. Head
	120392	Washer—Flat—17/64 I.D. 5/8 O.D.
	103319	Washer—Lock—1/4 (Split)
	120423	Washer—Lock—1/4 (Internal-Tooth)
	7256717	Spacer—Instrument panel to gasket
	554691	"A" Lead Connector and Filter Condenser Assembly
	120151	Fuse—15 Amp. 25 V.
	1912757	Condenser—Ignition Coil—0.3 Mfd.
	or	
	555437	Condenser—Ignition Coil—0.3 Mfd.
	1911095	Condenser—Generator—0.3 Mfd.
6030	1912900	Condenser—Voltage Regulator—0.5 Mfd.
	or	
	557531	Condenser—Voltage Regulator—0.5 Mfd.
	7257239	Distributor—Suppressor—15,000 Ohms
	414237	Insulating Elbow
	415823	Static Collector (Front Wheel)
	555348	Clip—Hood Grounding
	164349	Screw—8-32x1/4 Phillips Head Self-Tapping
	7256684	Gasket—Speaker Baffle
	7259626	Panel—Radio Control
		INSTALLATION PARTS MODEL 982579
	414997	Washer—Flat—33/64 I.D.
	7255287	Nut—1/2-28 Hex.
	7258813	Knob—Tone and Dummy
	7257400	Washer—Wave—3/16 I.D. (Anti-Rattle) Tuning and Colume Control
	7259663	Knob—Tuning and Volume Control Includes Set Screw
	120706	Bolt—1/4-20x1/2 Hex. Head
	103319	Washer—Lock—1/4 (Split)
	554845	Washer—Flat
	554691	"A" Lead & Filter Condenser Assembly
	120151	Fuse—15 Amp. 25 V.
	1912757	Condenser—Ignition Coil—0.3 Mfd.
	or	
	555437	Condenser—Ignition Coil—0.3 Mfd.
	1911095	Condenser—Generator—0.3 Mfd.
6030	1912900	Condenser—Voltage Regulator—0.5 Mfd.
	or	
	557531	Condenser—Voltage Regulator—0.5 Mfd.
	7257239	Distributor Suppressor—15,000 Ohms
	414237	Insulating Elbow
	415823	Static Collector (Front Wheel)
	555348	Clip—Hood Grounding
	164349	Screw #8-32x1/4 Phillips Head Self-Tapping
	7258815	Panel—Radio Control
	558956	Gasket—Speaker Baffle

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MODELS 982544,
982573, Oldsmobile

GENERAL

MOUNTING—982544 - All 1950 - 76 & 88 Series Oldsmobile Cars.
982573 - All 1950 - 98 Series Oldsmobile Cars.

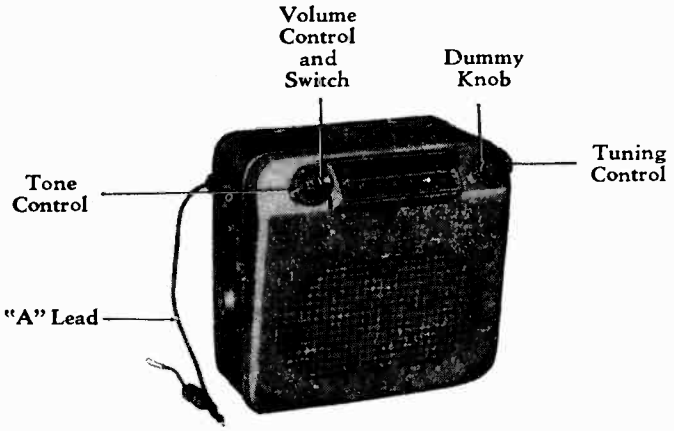
TUBES—Six, Plus Rectifier.

SPEAKER—6″x 9″ Elliptical Permanent Magnet.

TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000050 — 0.000070 Mfd.

TUNING RANGE—540 - 1600 KC.



MODELS 982544
982573

PUSHBUTTON SET-UP

Pull pushbutton to the left and out. Tune in desired station manually. Push button all the way in.

ALIGNMENT PROCEDURE:

Output Meter Connection ..... Across Voice Coil
Generator Return ..... To Receiver Chassis
Dummy Antenna ..... In Series With Generator
Volume Control Position ..... Maximum Volume
Tone Control Position ..... Treble
Generator Output ..... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence For Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1400 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	**L

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

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

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC. (See sticker on case.)

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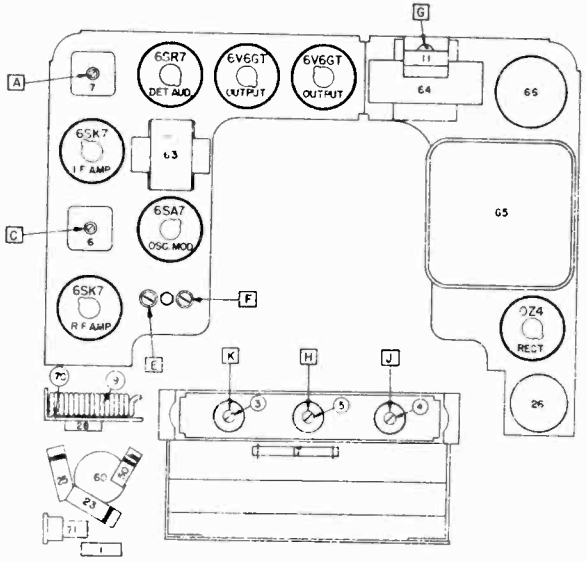
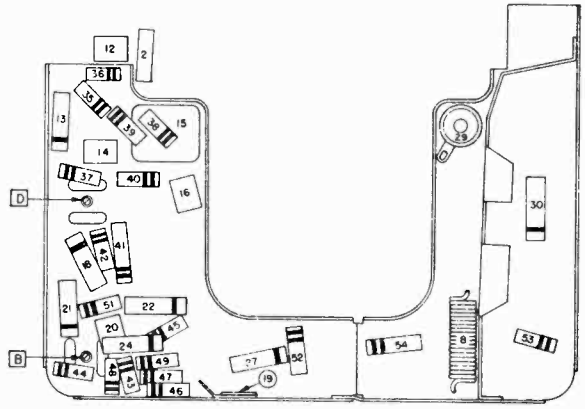
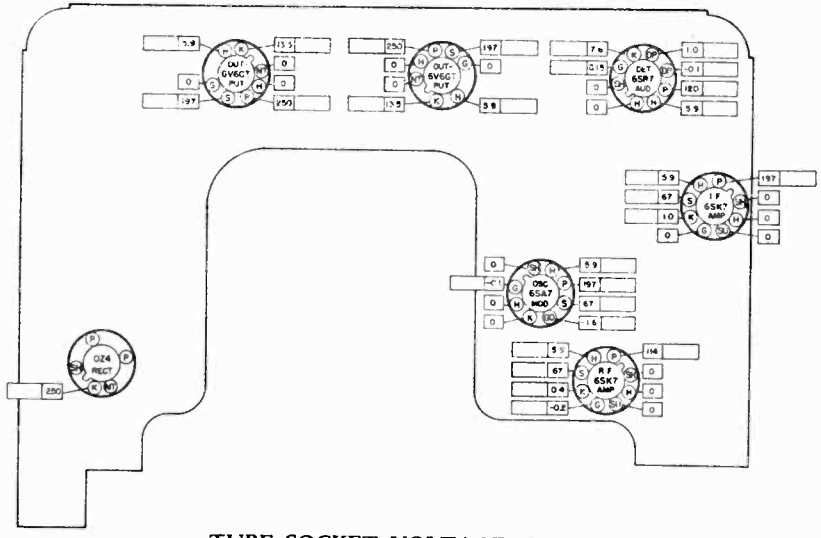


PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

The tube socket voltages as measured at the factory and under the conditions shown on the schematic diagram on Page 3 are shown here. The blank spaces are provided so the serviceman may fill in the actual readings as taken with his own equipment. A normal operating radio should be used for these measurements.



TUBE SOCKET VOLTAGE CHART

VOLTMETER RESISTANCE ..... OHMS PER VOLT. READING TAKEN WITH ..... VOLTS AT SPARK PLATE. THE VOLTAGES ARE MEASURED FROM TUBE SOCKET TERMINALS TO CHASSIS AND ARE POSITIVE UNLESS MARKED OTHERWISE.

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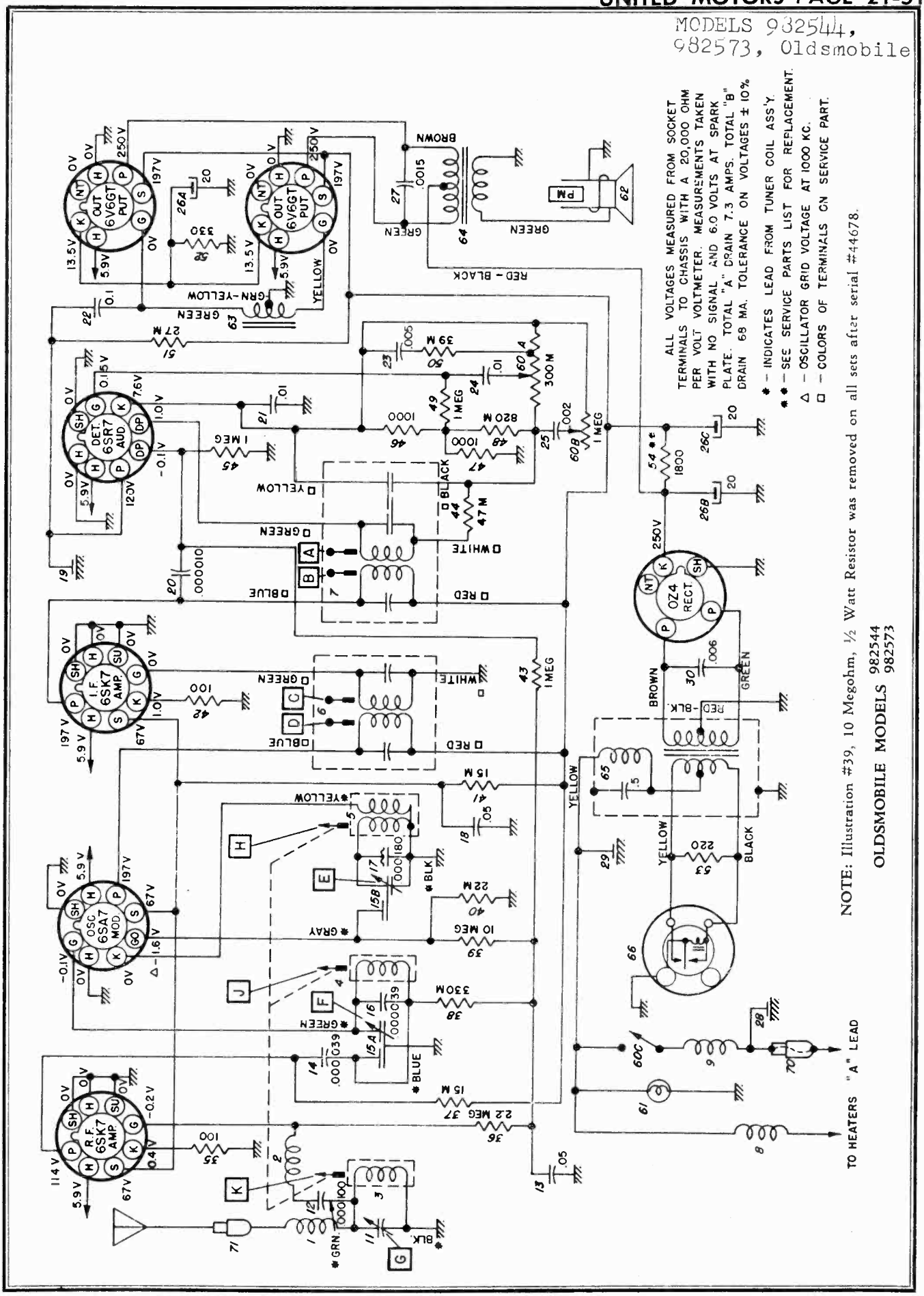
MODELS 982544,
982573, Oldsmobile



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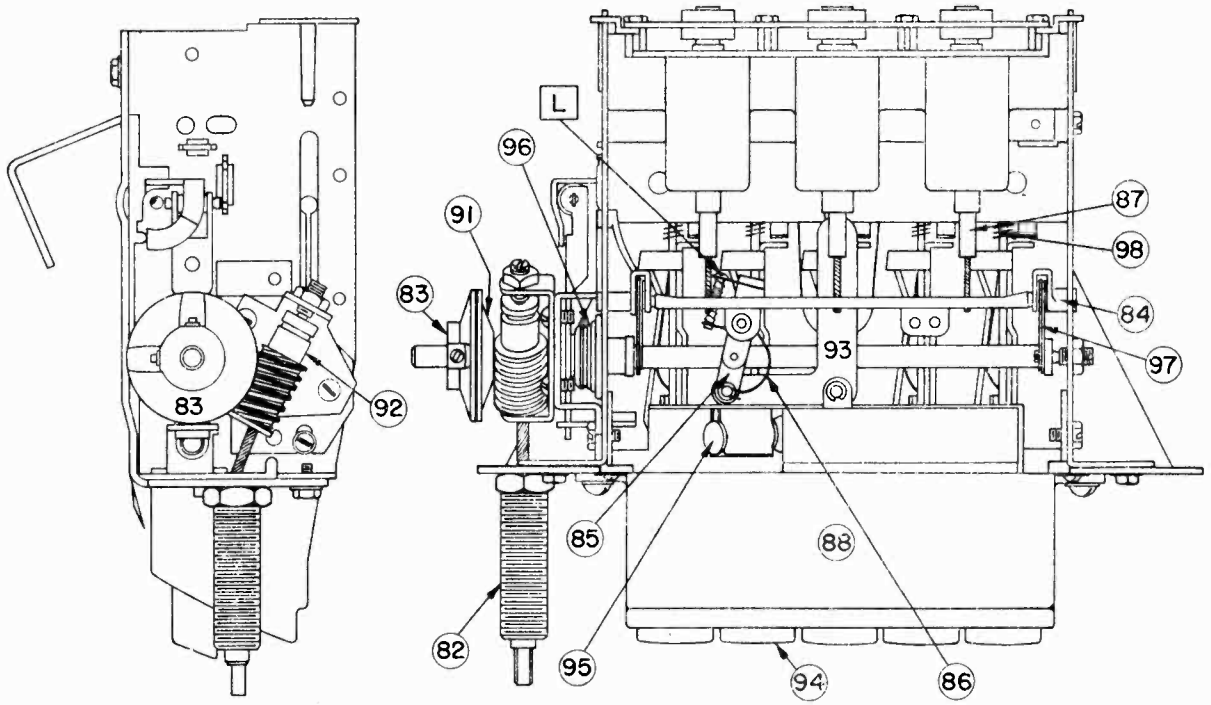
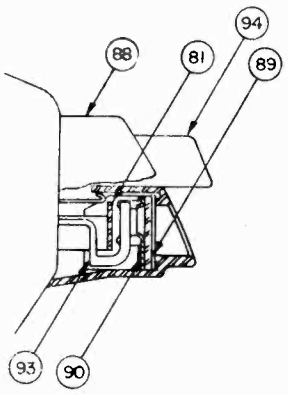
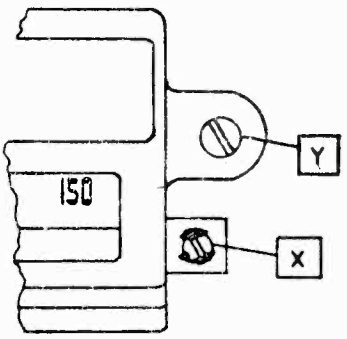
MODELS 982544,
982573, Oldsmobile



TUNER



ESCUTCHEON CROSS SECTION



ESCUTCHEON MOUNTING

SPECIAL INSTRUCTIONS

Unless special precautions are taken in removing the dial escutcheon, there is a possibility that the dial pointer tip will be broken. Therefore, in removal of the escutcheon the ollowing procedure is recommended:

1. Loosen, but do not remove, the two screws holding the pointer back plate ("X" in Escutcheon Mounting Drawing Above) and loosen the shellac so that the back plate is free to move.
2. Remove the escutcheon mounting screws "Y" (see Escutcheon Mounting).
3. Carefully lift off the escutcheon (DO NOT FORCE). If the dial backplate is free to move slightly downward the escutcheon will come off easily.

The same caution should be exercised when replacing the escutcheon.

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MODELS 982544, 982573, Oldsmobile

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7255738	7255738	Antenna Series Choke
2	7240251	7240251	Antenna Spark Choke
3	7258914	7258914	Antenna
4	7258914	7258914	R.F.
5	7259687	7259687	Oscillator
6	1219508	1219508	1st I.F.
7	1219509	1219509	2nd I.F.
8	1217846	1217846	Hash Choke
9	7258434	7258434	Spark Choke
			Condensers
11	7258160	7258160	Antenna Trimmer
12	1210275	G 101	.000100 mfd. Mica
13	7236842	E 503	.05 mfd. 200 V Tubular
14	7258221	G 390	.000039 mfd. Mica
15	7242454	7242454	Dual Trimmer
15 A			R.F. Section
15 B			Oscillator Section
16	7258221	G 390	.000039 mfd. Mica
17	7257424	7257424	.000180 mfd. Compensating
18	7230892	E 503	.05 mfd. 400 V Tubular
19	1217848	1217848	Chassis Plate Cond.
20	1215189	G 100	.000010 mfd. Mica
21	7237870	E 103	.01 mfd. 400 V Tubular
22	1219495	E 104	.1 mfd. 400 V Tubular
23	7232956	E 502	.005 mfd. 600 V Tubular
24	7238881	E 103	.01 mfd. 400 V Tubular
25	7237836	E 202	.002 mfd. 600 V Tubular
26	7240724	M 908	Electrolytic
26 A			20 mfd. 25 V
26 B			20 mfd. 400 V
26 C			20 mfd. 400 V
27	7236134	7236134	.0015 mfd. 800 V Tubular
28	1212278	1212278	Spark Plate Condenser (included in 7258434)
29	1217848	1217848	Chassis Plate Condenser
30	7240906	H 602	.006 mfd. 1600 V Tubular
			Resistors
35	1213217	A 101	100 ohms ½ W Insulated
36	1211147	A 225	2.2 megohms ½ W Insulated
37	7237595	B 153	15,000 ohms 1 W Insulated
38	7240732	A 334	330,000 ohms ½ W Insulated
*39	1215548	A 106	10 megohms ½ W Insulated
40	1211192	A 223	22,000 ohms ½ W Insulated
41	7233653	C 153	15,000 ohms 2 W Insulated
42	1213217	A 101	100 ohms ½ W Insulated
43	7238873	A 105	1 megohm ½ W Insulated
44	7240731	A 473	47,000 ohms ½ W Insulated
45	7238873	A 105	1 megohm ½ W Insulated
46	1213235	A 102	1,000 ohms ½ W Insulated
47	1213235	A 102	1,000 ohms ½ W Insulated
48	1214561	1214561	820,000 ohms ½ W Insulated
49	7238873	A 105	1 megohm ½ W Insulated
50	1217436	A 393	39,000 ohms ½ W Insulated
51	7236080	B 273	27,000 ohms 1 W Insulated
52	7233773	B 331	330 ohms 1 W Insulated
53	7237994	B 221	220 ohms 1 W Insulated
54	1214573	C 272 / B 562	1800 ohms 2 W Wire Wound (or replace with 2700 ohm 2 W and 5600 ohm 1 W in parallel)

*This Resistor was removed on all sets above serial #44678

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MODELS 982544, 982573, Oldsmobile

SERVICE PARTS LIST (Cont.)

Illus. No.	Production Part No.	Service Part No.	Description
		Tubes	
	1218107	5233	6SR7
	1213793	5241	6V6GT
	7237751	5229	6SK7
	7237752	5222	6SA7
	1211924	5003	0Z4
		Miscellaneous Electrical	
60	7259447	7259447	Control - Volume, Tone and Switch
60 A			Volume Control
60 B			Tone Control
60 C			Switch
61	187189	44	Lamp - Dial Light
62	7258146	7258146	Speaker - 6 x 9 P.M.
63	7258941	7258941	Transformer - Input
64	7259419	7259419	Transformer - Output
65	7255881	7255881	Transformer - Power
66	7239124	8542	Vibrator - Non-synchronous
		MECHANICAL PARTS	
		Chassis	
70	7258434	7258434	Connector "A" Lead
71	7256742	7256742	Connector - Antenna
	7236279	7236279	Socket - Octal Tube
	7239125	7239125	Socket - Vibrator
		Tuner	
81	7256688	7256688	Backplate - Pointer
	147481	147481	Ball Bearing Pkg. (12)
82	7259443	7259443	Bushing and Manual Drive Shaft
83	7258072	7258072	Clutch Disc - Driven
84	7258211	7258211	Core Guide Bar - Parallel
85	7256271	7256271	Pointer Connecting Link
86	7255992	7255992	Spring - Pointer Connecting Link
87	7258468	7258468	Core - Powdered Iron
88	7259429	7259429	Escutcheon Assy.
89	7259430	7259430	Dial
90	7259496	7259496	Dial Backplate
91	7256495	7256495	Gear and Bushing - Clutch
92	7256705	7256705	Gear and Bracket - Worm
93	7257898	7257898	Pointer Assy.
	1219174	1219174	Pointer Tip Pkg.
94	1219173	1219173	Push Button and Slide Assy.
95	1217820	1217820	Socket - Dial Light
96	7258756	7258756	Spring - Clutch
97	7257415	7257415	Spring - Core Bar Connecting Link
98	7255984	7255984	Spring - Slide Return
		INSTALLATION PARTS	
	554691	554691	"A" Lead, Condenser, and Fuse Connector, Male
		6016	Condenser - "A" Lead
	1911095	6030	Condenser - Generator
	1912757	6030	Condenser - Ignition Coil
	1912900	6030	Condenser - Voltage Regulator
	120151	120151	Fuse - 15 Amps
	555348	555348	Hook Ground Clip
	7259663	7259663	Knob Control
	7258813	7258813	Knob - Tone Control and Dummy
	7240138	6013	Static Collector
	7257239	7257239	Suppressor - Distributor
	414237	414237	Suppressor - Insulator
	7258815	7258815	Trim Plate (98 series)
	7259626	7259626	Trim Plate (76 and 88 series)

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MODELS 982582,
982583, Oldsmobile

GENERAL

MOUNTING—982582 - All 1950 - 76 & 88 Series Oldsmobile Cars.
982583 - All 1950 - 98 Series Oldsmobile Cars.

TUBES—Seven, Plus Rectifier.

SPEAKER—6" x 9" Elliptical Permanent Magnet.

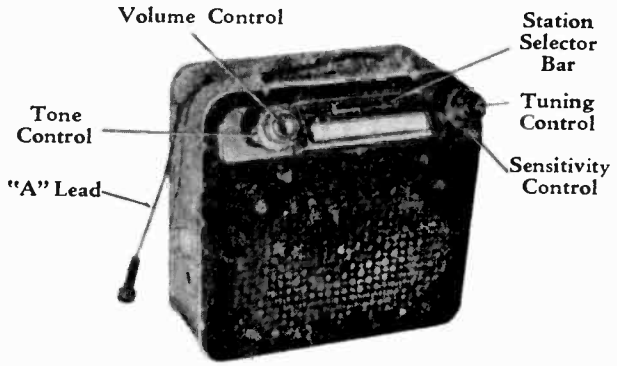
TUNING—Manual and Electronic.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000050 - 0.000070 Mfd.

TUNING RANGE—540 - 1600 KC.

PUSHBUTTON SET-UP

No Pushbutton Set-up is required. However, the number of stations on which the tuner will stop can be regulated by use of the Sensitivity Control.



MODELS 982582
982583

SIGNAL SEEKING TUNER ALIGNMENT PROCEDURE:

NOTE: When aligning the signal seeker tuner type radio, be sure to use a vacuum tube voltmeter as indicated and be sure to follow the alignment sequence given—(Notice that the primary of the 2nd I.F. is aligned first.)

Output Meter Connection ..... VTVM From [2] To Chassis (see parts layout page 2)
Generator Return ..... Receiver Chassis
Dummy Antenna ..... In Series With Generator
Volume Control ..... Maximum Volume
Tone Control ..... Treble
Generator Output ..... Not to Exceed 2 Volts at VTVM

Step	Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence For Max. Output
1	0.1 mfd	6SA7 Grid (Pin 8)	260 KC	*High Frequency Stop	A, B, C, D
2	0.000068 mfd	Antenna Connector	1615 KC	High Frequency Stop	**E, F, G
3	0.000068 mfd	Antenna Connector	600 KC	Signal Generator Signal	J, K
4	0.000068 mfd	Antenna Connector	1615 KC	Signal Generator Signal	F, G
5	0.000068 mfd	Antenna Connector	1000 KC	Signal Generator Signal	***L

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

**Before making this adjustment, check the setting of oscillator core "H." The rear of the core should be $1\frac{55}{32}$" from the mounting end of the coil form. This measurement is readily made by inserting a suitable plug in the mounting end of the coil form. The core adjustment is made from the mounting end of the coil form with an insulated screwdriver. (It will be necessary to steady the core guide bar by applying a downward pressure at the antenna core end of the bar while making these adjustments.) If this adjustment is necessary, first dissolve the glyptal seal on the core stud and be sure to re-seal after making the adjustment.

***"L" is the pointer adjustment screw on the end of the core guide bar—adjust so pointer reads 1000 KC.

With the radio installed and the antenna plugged in, adjust the antenna trimmer "C" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case).

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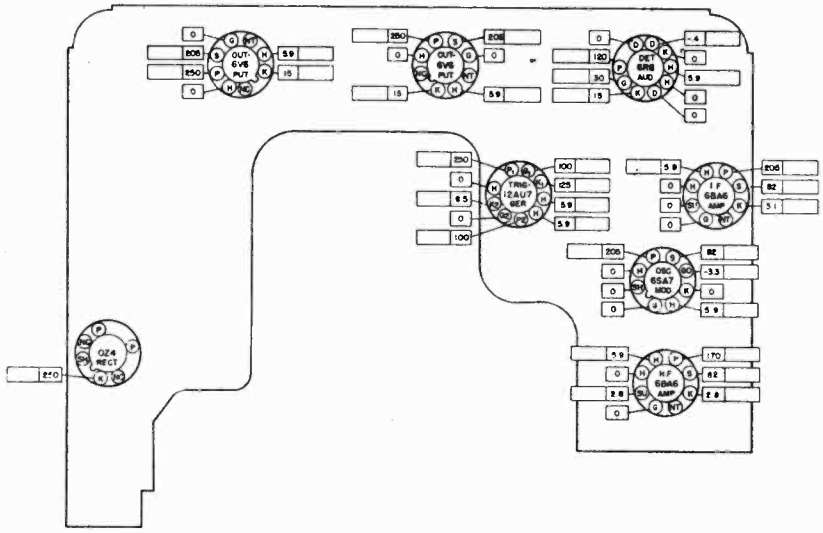
TUBE SOCKET VOLTAGE CHART



The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance.....Ohms Per Volt.

Readings taken with .....Volts at Spark Plate.

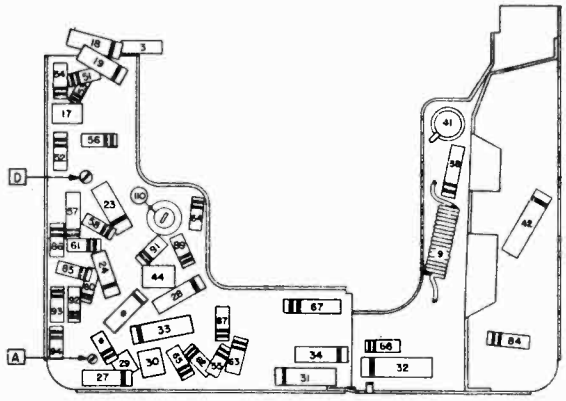
All voltages measured from socket terminals to chassis.

TUNER ADJUSTMENT PROCEDURE:

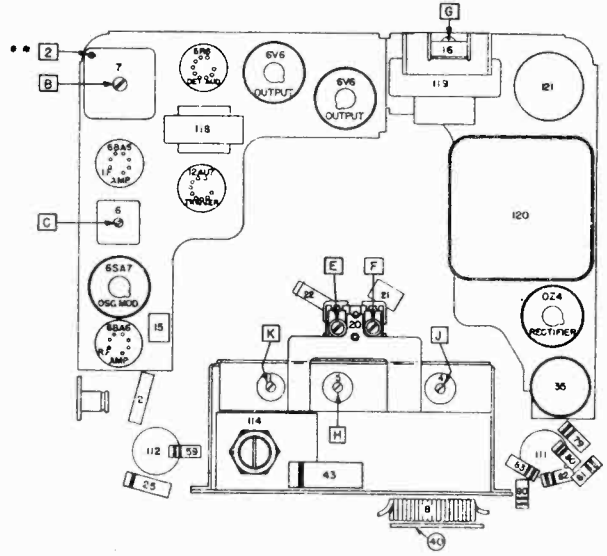
CATHODE DELAY ADJUSTOR (Illustration #110) (This adjustment should not be made unless it is necessary to replace the Delay Adjustor or the setting is definitely proven to be faulty).

1. Disconnect antenna and turn radio on.
2. Allow set to warm up.
3. Depress station selector bar.
4. Set voltage at K_2 of the 12AU7 trigger tube (Pin #8) to 8.0 volts by adjusting Illustration 110 while the tuner is seeking and with exactly 6.0 volts at the spark plate.

NOTE: For all other tuner adjustments, see Bulletin 6D-620.



PARTS LAYOUT — CHASSIS VIEW



PARTS LAYOUT — TUNER VIEW

*Resistor and condenser are included in the 2nd IF Assy.

**Connect vacuum tube voltmeter between this point and ground during alignment.

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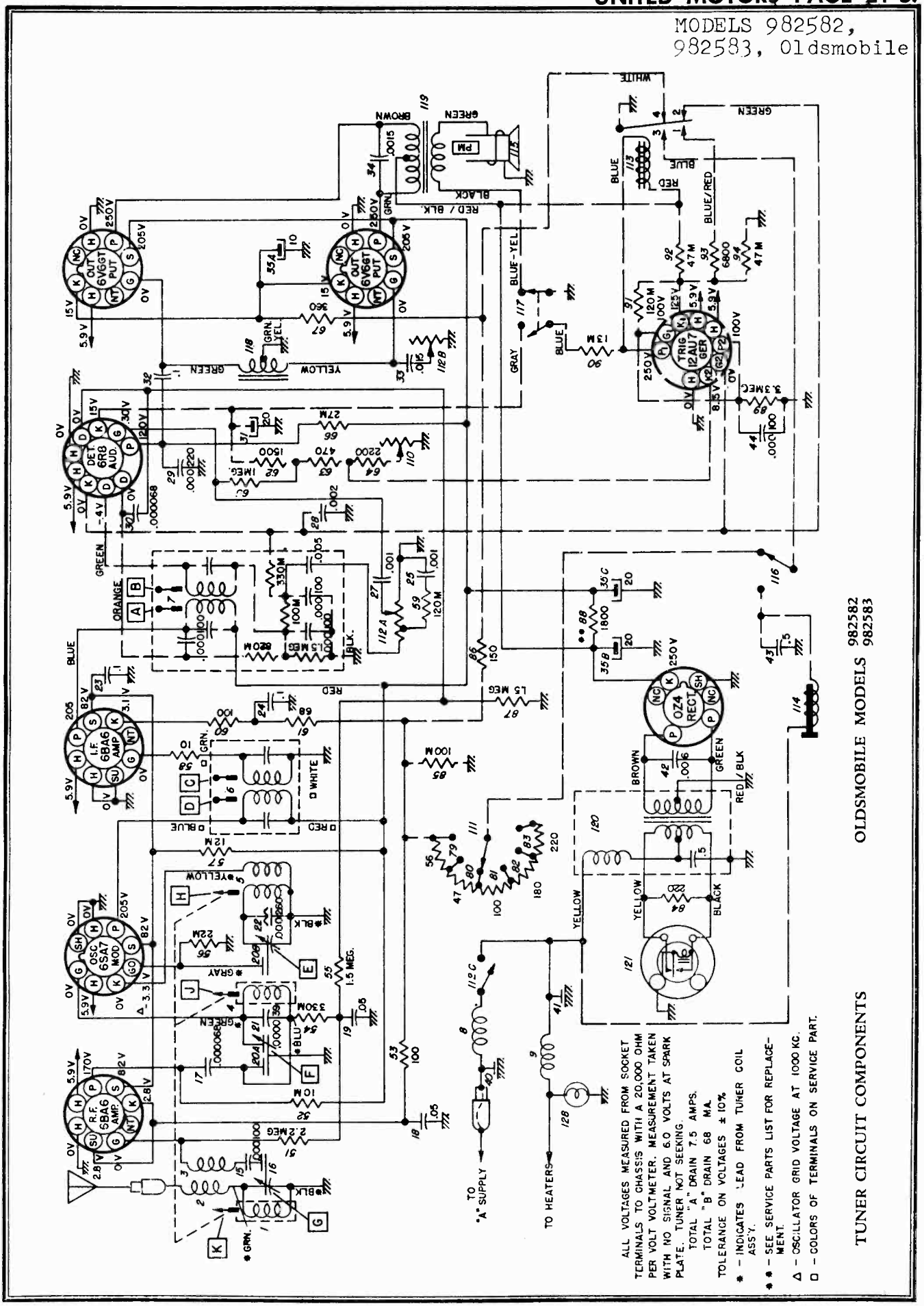
MODELS 982582, 982583, Oldsmobile



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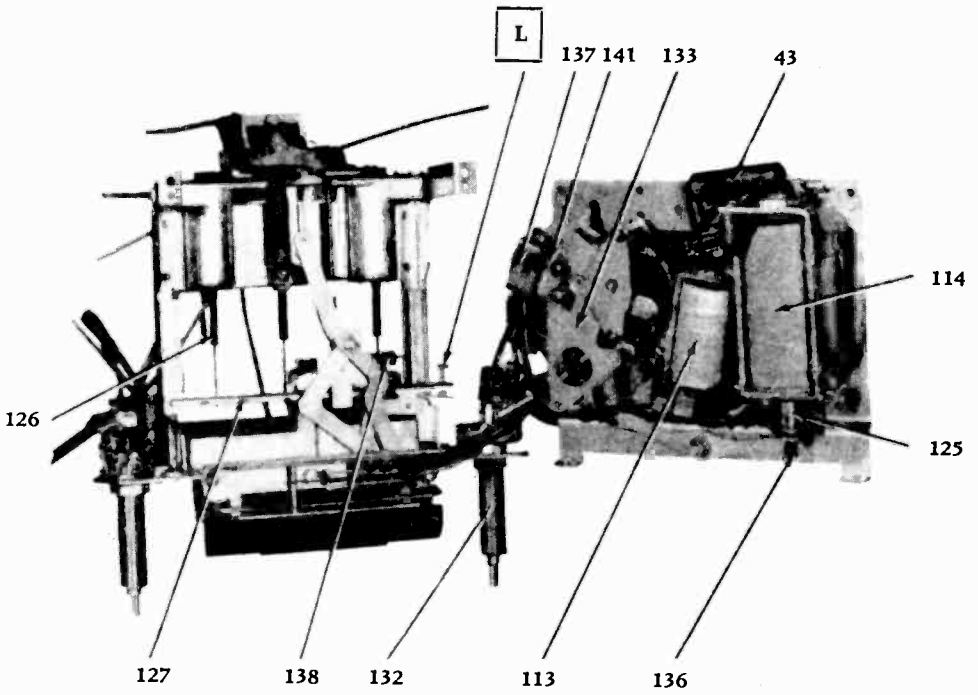
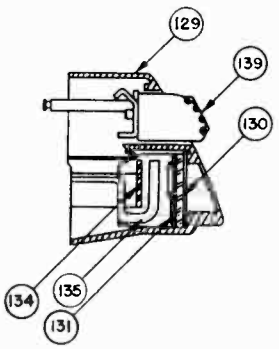
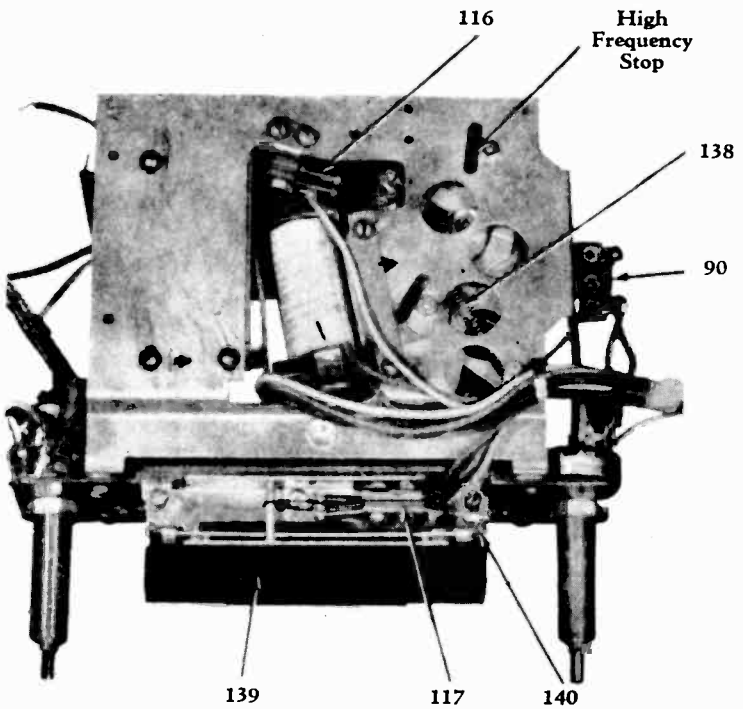
MODELS 982582,
982583, Oldsmobile



TUNER UNFOLDED



ESCUTCHEON
CROSS-SECTION



TUNER

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SERVICE PARTS LIST

MODELS 982582, 982583, Oldsmobile

Illus. No.	Production Part No.	Service Part No.	Description
		ELECTRICAL PARTS	
		Coils	
1	7257979	7257979	Antenna
2	7255738	7255738	Antenna Series Choke
3	7240251	7240251	Antenna Spark Choke
4	7257979	7257979	R.F.
5	7259665	7259665	Oscillator
6	7258849	1219508	1st I.F. Assy.
7	7259350	1219602	2nd I.F. Assy.
8	1217846	1217846	A Spark Choke
9	1217846	1217846	Hash Choke
		Condensers	
15	7239184	G 101	.000100 mfd Mica
16	7258160	7258160	Antenna Trimmer
17	7238793	G 680	.000068 mfd Mica
18	7236842	E 503	.05 mfd 200 V Tubular
19	7236842	E 503	.05 mfd 200 V Tubular
20	7242454	7242454	Dual Trimmer
20A			R.F. Section
20B			Oscillator Section
21	7258221	G 390	.000039 mfd Mica
22	7257567	7257567	.000260 mfd Compensating
23	7238788	E 104	.1 mfd 400 V Tubular
24	1209306	E 104	.1 mfd 200 V Tubular
25	1218883	E 102	.001 mfd 600 V Tubular
27	1218883	E 102	.001 mfd 600 V Tubular
28	7237836	E 202	.002 mfd 600 V Tubular
29	7238972	G 221	.000220 mfd Mica
30	1219550	G 680	.000068 mfd Mica
31	1219660	1219660	20 mfd 50 V Electrolytic
32	1219495	E 104	.1 mfd 400 V Tubular
33	7237719	7237719	.015 mfd 600 V Tubular
34	7236134	7236134	.0015 mfd 800 V Tubular
35	7259128	7259128	Electrolytic
35A			10 mfd 100 V
35B			20 mfd 400 V
35C			20 mfd 400 V
40	7241259	7241259	Spark Plate Assy.
41	1217848	1217848	Chassis Plate Condenser
42	7240906	H 602	.006 mfd 1600 V Tubular
43	1219511	E 504	.5 mfd 100 V Tubular
44	7239184	G 101	.000100 mfd Mica
		Resistors	
51	1211147	A 225	2.2 Megohms ½ W Insulated
52	1211085	B 103	10,000 Ohms 1 W Insulated
53	1213217	A 101	100 Ohms ½ W Insulated
54	7240732	A 334	330,000 Ohms ½ W Insulated
55	1211142	A 155	1.5 Megohms ½ W Insulated
56	1211192	A 223	22,000 Ohms ½ W Insulated
57	1212491	1212491	12,000 Ohms 2 W Insulated
58	1215107	A 100	10 Ohms ½ W Insulated
59	1213271	1213271	120,000 Ohms ½ W Insulated
60	1213217	A 101	100 Ohms ½ W Insulated
61	1215558	1215558	68 Ohms ½ W Insulated
62	1219488	1219488	1500 Ohms ½ W Insulated
63	1219487	1219487	470 Ohms ½ W Insulated
64	1214545	A 222	2200 Ohms ½ W Insulated
65	7238873	A 105	1 Megohm ½ W Insulated
66	1213342	B 273	27,000 Ohms 1 W Insulated
67	7234563	7234563	360 Ohms 1 W Insulated
79	1214540	1214540	56 Ohms ½ W Insulated
80	1213489	1213489	47 Ohms ½ W Insulated
81	1213217	A 101	100 Ohms ½ W Insulated
82	1215559	1215559	180 Ohms ½ W Insulated
83	7257835	A 221	220 Ohms ½ W Insulated
84	7237994	B 221	220 Ohms 1 W Insulated
85	1213270	A 104	100,000 Ohms ½ W Insulated
86	1213220	A 151	150 Ohms ½ W Insulated
87	1211142	A 155	1.5 Megohm ½ W Insulated
88	1214573	{ C 272 { B 562	{ 1800 Ohm 2 W Wire Wound (Replace with { C 272 and B 562 in parallel)
89	1214564	A 335	3.3 Megohm ½ W Insulated
*90	*7231539	*7231539	13,000 Ohms 1 W Insulated
91	1213271	1213271	120,000 Ohms ½ W Insulated

*This resistor was 15,000 Ohms until Serial # 82222 - 76 & 88 / 83179 - 98 —Use above Value in Service.

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MODELS 982582, 982583, Oldsmobile

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			Resistors (Continued)
92	1216157	B 473	47,000 Ohms 1 W Insulated
93	1216154	1216154	6800 Ohms 1 W Insulated
94	1216157	B 473	47,000 Ohms 1 W Insulated
			Tubes
	1217690	5252	6BA6
	7237752	5222	6SA7
	1219485	5328	12AU7
	1219496	5541	6R8
	1213793	5241	6V6GT
	1211924	5003	0Z4
			Miscellaneous Electrical
	7259352	7259352	A Lead and Fuse Holder Assy.
112	7259034	7259034	Control - Volume - Tone and Switch
112A			Volume
112B			Tone
112C			Switch
111	7259021	7259021	Control - Sensitivity
110	7242204	7242204	Delay Adjustor
113	7259009	7259009	Relay
114	7259010	1219661	Solenoid
125	7259164	7259164	Solenoid Plunger Assy.
115	7258146	7258146	Speaker
116	7259011	7259011	Switch - Tuner Return
117	7259012	7259012	Switch - Station Selector
118	7258941	7258941	Transformer - Input
119	7259324	7259324	Transformer - Output
120	7259375	7255881	Transformer - Power
121	7239124	8542	Vibrator - Non-Synchronous
			MECHANICAL PARTS
			Chassis
	7256742	7256742	Antenna Connector
	1217820	1217820	Socket - Dial Light
	7236279	7236279	Socket - Octal
	7259307	7259307	Socket - 9 Pin Miniature
	7258073	7258073	Socket - 7 Pin Miniature
	7239125	7239125	Socket - Vibrator
			Tuner
126	7259201	7259201	Core - Tuning Core
127	7259178	7259178	Core - Guide Bar
128	187189	44	Dial Light
129	7259287	7259287	Escutcheon Assy.
130	7259344	7259344	Dial
131	7259496	7259496	Dial Backplate
132	7259017	7259017	Manual Drive Shaft Assy.
133	1219610	1219610	Motor Gear Train Assy.
134	7256688	7256688	Pointer Backplate
135	1219174	1219174	Pointer Tip Pkg.
136	7259100	7259100	Spring Clip
137	7259207	7259207	Spring - Worm Anti-rattle
138	7259055	7259055	Spring - Motor Power
139	1219611	1219611	Station Selector Bar Pkg.
	7259028	7259028	Station Selector Bar & Shaft Assy.
	7259125	7259125	Switch Operating Ring
			Toggle Plate
140	7259111	7259111	Spring (2)
	7256121	7256121	"C" Washer
141	7259026	7259026	Worm and Bracket Assy.
			INSTALLATION PARTS
	554691	554691	"A" Lead & Condenser Assy.
	1911095	6030	Condenser - Generator
	1912757	6030	Condenser - Ignition
	1912900	6030	Condenser - Regulator
	555348	555348	Clip - Hood Bonding
	414237	414237	Distributor - Insulator Elbow
	7257239	7257239	Distributor - Suppressor
	120151	120151	Fuse - 15 Amps
	7259663	7259663	Knob - Tuner
	7259007	7259007	Knob - Tone Control
	7259008	7259008	Knob - Sensitivity Control
	7240138	6013	Static Collector
	7258815	7258815	Trim Plate - 98 Series
	7259626	7259626	Trim Plate - 88 and 76 Series

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MODEL 986388, Chevrolet

GENERAL

MOUNTING—All 1950 Chevrolet Cars.

TUBES—Five, plus rectifier.

SPEAKER—6″ x 9″ Elliptical, Permanent Magnet.

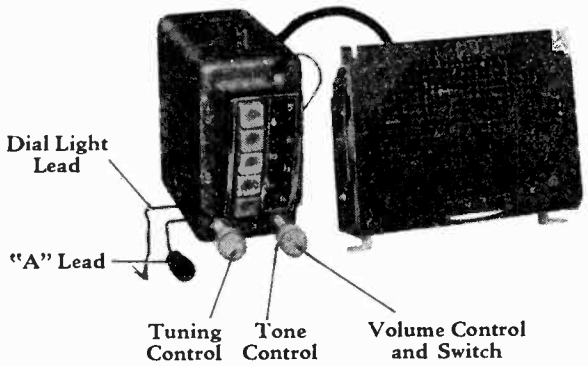
TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000058 - 0.000090 Mfd.

TUNING RANGE—550-1600 KC.

PUSH BUTTON SETUP PROCEDURE

Pull Push Button down and out. Tune in desired station manually. Push button all the way in.



MODEL 986388

ALIGNMENT PROCEDURE

Output Meter Connections	Across Voice Coil
Generator Return	To Receiver Chassis
Dummy Antenna	In Series With Generator
Volume Control Position	Maximum Volume
Tone Control Position	Treble
Generator Output	Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator to	Signal Generator Frequency	Tune Receiver to	Adjust in Sequence For Max. Output
1	0.1 Mfd.	6BE6 Grid (Pin #7)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1400 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	L**

*Before making this adjustment check mechanical setting of oscillator core "H." The rear of the core should be 1 25/32" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) If adjustment is necessary, first dissolve the glyptal seal on the core studs. Core adjustments should be made with an insulated screw driver, and core studs should be cemented in place with glyptal or household cement after alignment.

**L is the pointer adjustment screw which is on the connecting link, between the pointer assembly and core guide bar (See tuner Dwg.). It should be adjusted so that when looking directly at the dial the pointer is 3/16" below the 1000 KC mark. This setting is to give the correct relationship between the pointer and the dial when the radio is installed in a car.

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case).

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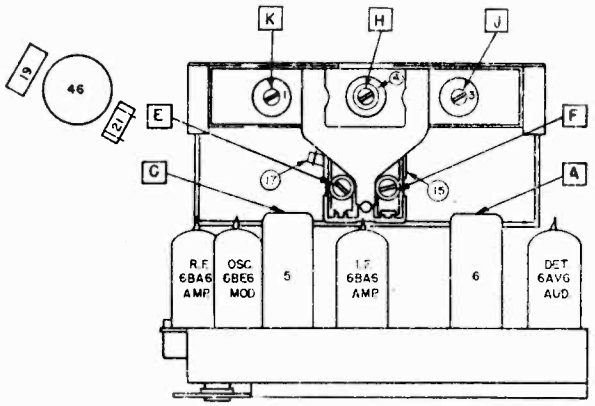
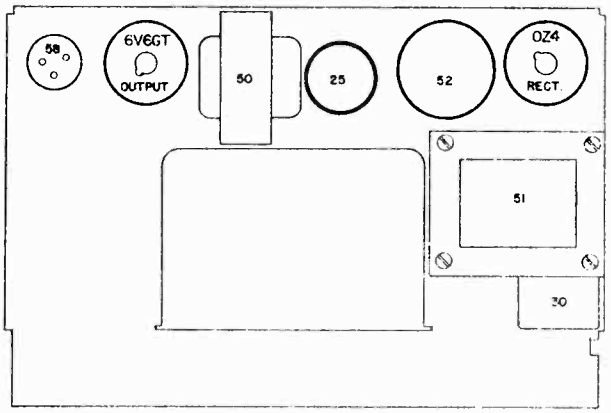
MODEL 986388,
Chevrolet

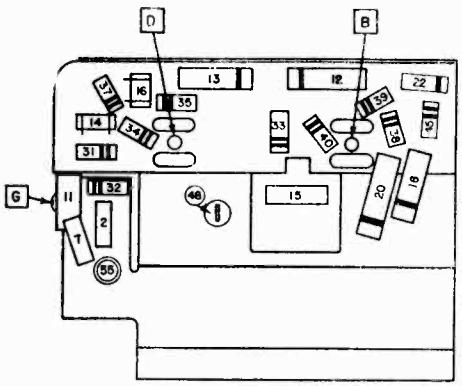


R.F. UNIT



AUDIO UNIT

PARTS LAYOUT — TUBE VIEW



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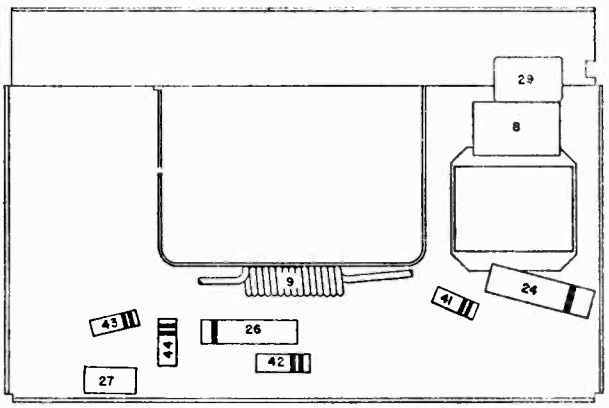
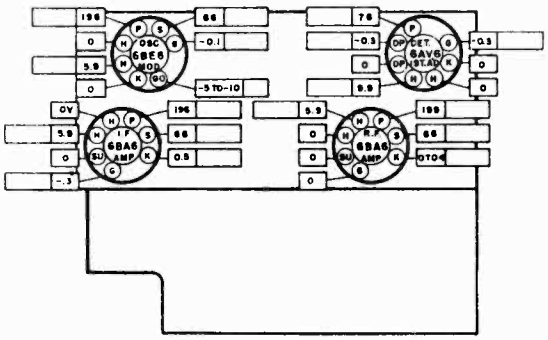


AUDIO UNIT

PARTS LAYOUT — CHASSIS VIEW



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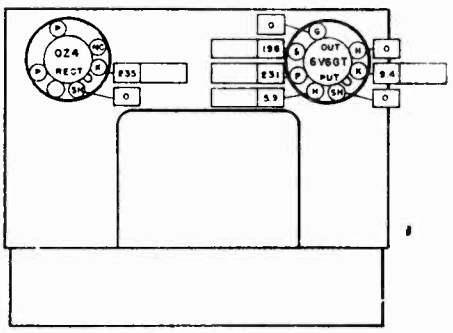

AUDIO UNIT

TUBE SOCKET VOLTAGE CHART

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram on page 3 are shown above. The blank spaces are provided so the service man may fill in the actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

VOLTMETER RESISTANCE..... OHMS PER VOLT

READINGS TAKEN WITH ..... VOLTS AT SPARK PLATE

Voltage measured from socket terminals to chassis and are positive unless marked otherwise.

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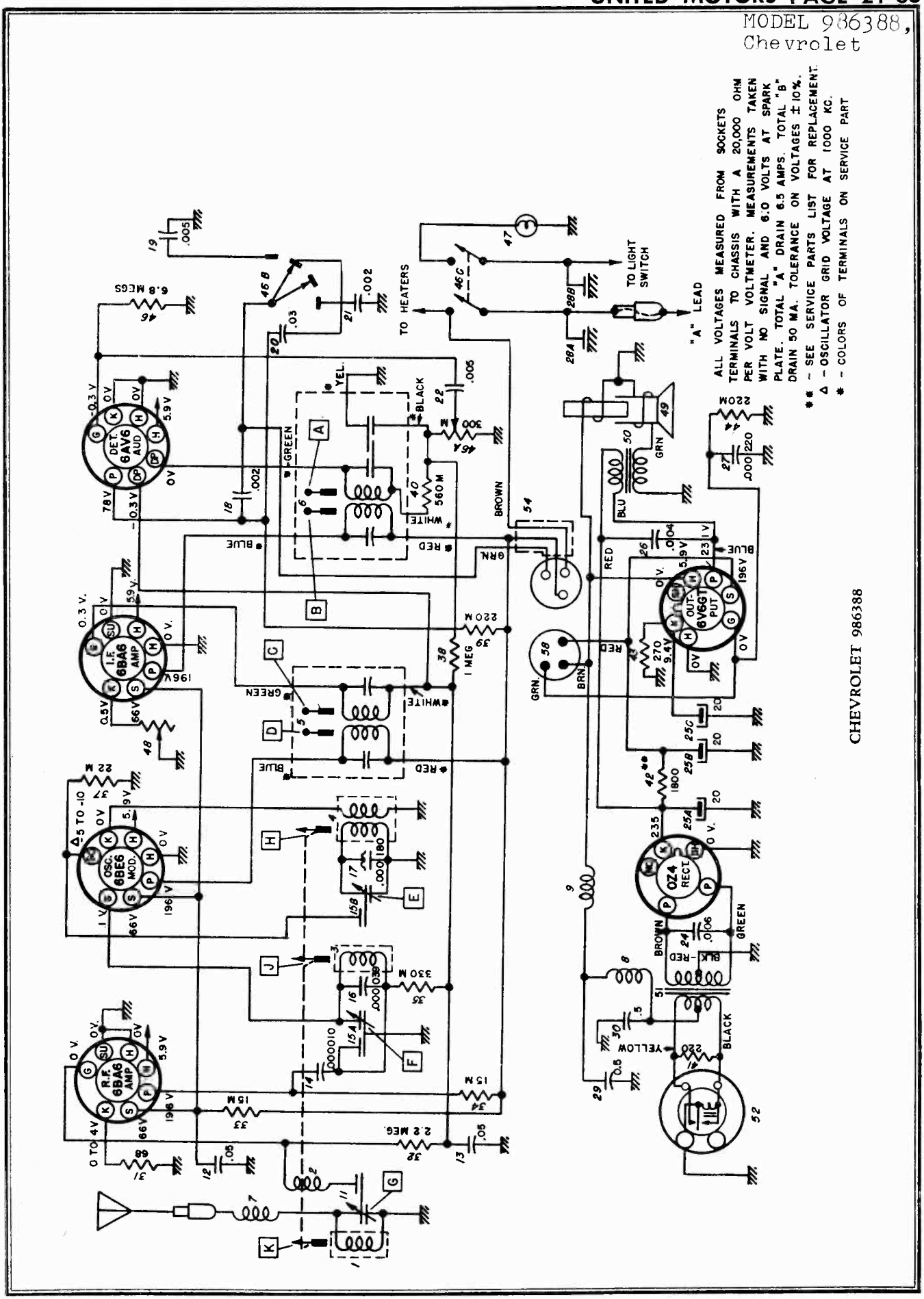
MODEL 986388, Chevrolet



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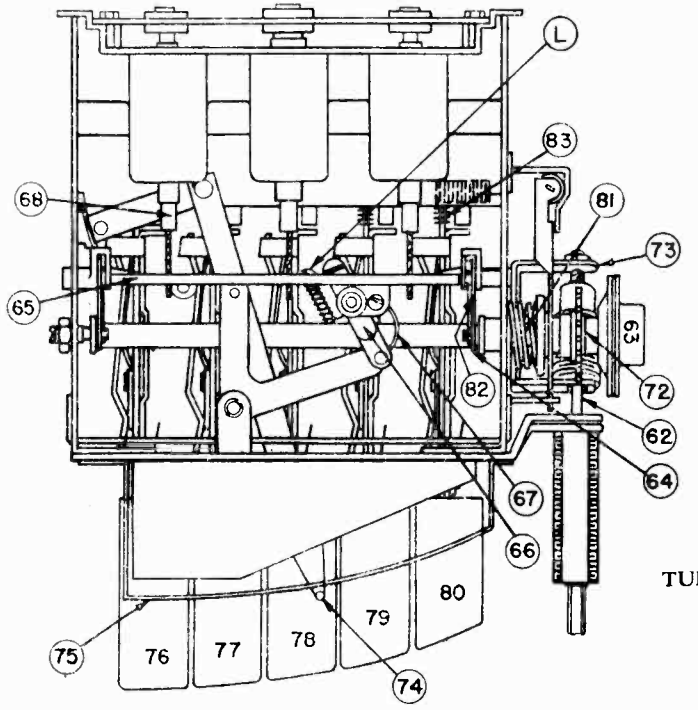
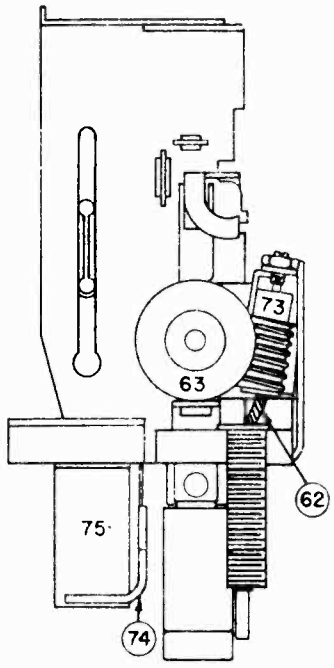
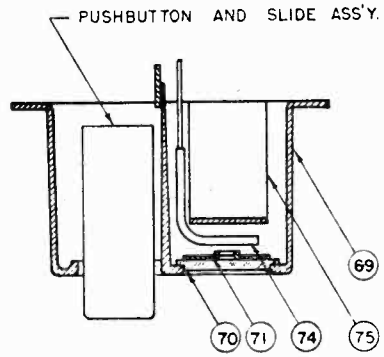


TUNER





ESCUTCHEON CROSS SECTION

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7258914	7258914	Antenna
2	7240251	7240251	Antenna Spark Choke
3	7258914	7258914	R.F.
4	7258911	7258911	Oscillator
5	7258188	1218725	1st IF
6	7258198	1218726	2nd IF
7	7258502	7258502	Antenna Series Choke
8	7258743	7258743	Hash Choke
9	7241708	7241708	Hash Choke
			Condensers
11	7258000	7258000	Antenna Trimmer Cond.
12	7236841	E 503	.05 mfd 400 V Tubular
13	7236842	E 503	.05 mfd 200 V Tubular
14	1218371	G 100	.000010 mfd Ceramic
15	7242454	7242454	Dual Trimmer
15A			RF Section
15B			Oscillator Section
16	7258221	G 390	.000039 mfd Ceramic
17	7257424	7257424	.000180 mfd Compensating
18	1219634	E 202	.002 mfd 600 V Tubular
19	7230767	E 502	.005 mfd 600 V Tubular
20	7242448	E 303	.03 mfd 400 V Tubular
21	1219632	E 202	.002 mfd 600 V Tubular
22	1219635	E 502	.005 mfd 600 V Tubular
24	7240906	H 602	.006 mfd 1600 V Tubular
25	7240724	M 908	Electrolytic
25A			20 mfd 400 V
25B			20 mfd 400 V
25C			20 mfd 25 V
26	7233243	H 402	.004 mfd 800 V Tubular
27	7236105	G 221	.000220 mfd Molded
28	7258332	7258332	Dual Spark Plate
28A			"A" Lead Section
28B			Dial Light Section
29	7257879	E 504	.5 mfd 100 V Tubular
30	7257879	E 504	.5 mfd 100 V Tubular

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SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			Miscellaneous Electrical Parts
46	7258084	7258084	Control - Volume, Tone and Switch
46A			Volume Control
46B			Tone Control
46C			Switch
47	115273	51	Lamp - Dial
48	7242204	7242204	Sensitivity Control
49	7249381	6111	Speaker - 6 x 9 Elliptical PM
50	7256009	7256009	Transformer - Output
51	7258747	7258747	Transformer - Power
52	7239124	8542	Vibrator - Non-synchronous
			MECHANICAL PARTS
			Chassis - RF Unit
54	7258022	7258022	Cable
55	7239475	7239475	Socket - Antenna
56	1218724	1218724	Socket - Dial Light
	7258073	7258073	Socket - 7 Pin Miniature
			Chassis - Audio Unit
58	7258111	7258111	Plug - Cable
	7236279	7236279	Socket - Octal Tube
	7239125	7239125	Socket - Vibrator
			Tuner
	147481	147481	Ball Bearings (10)
62	7258608	7258608	Drive Shaft - Manual
63	7258072	7258072	Clutch Disc - Driven
64	7258203	7258203	Connecting Link - Core Bar
65	7258206	7258206	Core Guide Bar
66	7256271	7256271	Connecting Link Pointer
67	7255992	7255992	Spring - Pointer Connecting Link
68	7258468	7258468	Core - Iron Tuning
69	7258963	7258963	Escutcheon
70	7258002	7258002	Dial
71	7258962	7258962	Dial Backplate
72	7259480	7259480	Gear and Bushing
73	7258052	7258052	Gear and Bracket - Worm
74	7258059	7258059	Pointer Assy.
	1218848	1218848	Pointer Tip Package
75	7258961	7258961	Pointer Backplate
76	1219558	1219558	Push Button and Slide No. 1
77	1219559	1219559	Push Button and Slide No. 2
78	1219560	1219560	Push Button and Slide No. 3
79	1219561	1219561	Push Button and Slide No. 4
80	1219562	1219562	Push Button and Slide No. 5
81	7258756	7258756	Spring - Clutch
82	7257415	7257415	Spring - Core Bar Connecting Link
83	7255984	7255984	Spring - Pushbutton Return

			INSTALLATION PARTS
	1912900	1912900	Condenser - Ammeter
	1911095	6030	Condenser - Generator
	1910147	6030	Condenser - Ignition Coil
	1912900	1912900	Condenser - Regulator
	1887829	6003	Distributor Suppressor
	7258880	7258880	Knob - Control
	7258879	7258879	Knob - Dummy
	7258882	7258882	Knob - Tone Control
	7257918	7257918	Nut - Speed
	1888204	1888204	Rubber Nipple - Distributor Suppressor
	7257920	7257920	Spacer - RF Mtg. (inner)
	7257922	7257922	Spacer - RF Mtg. (outer)
	7257925	7257925	Speaker Shroud
	494786	6009	Static Collector - Wheel
	7257917	7257917	Stud - Audio Unit Mtg.
	7257924	7257924	Trim Plate - Instrument Panel
	7257921	1218728	Fuse Holder Body - Male
	1912900	1912900	Condenser, Regulator
			Resistors
31	1215558	1215558	68 Ohms ½ W Insulated
32	1211147	A 225	2.2 Megohms ½ W Insulated
33	7233653	C 153	15,000 Ohms 2 W Insulated
34	7237595	B 153	15,000 Ohms 1 W Insulated
35	7240732	A 334	330,000 Ohms ½ W Insulated
37	1214550	A 223	22,000 Ohms ½ W Insulated
38	7238873	A 105	1 Megohm ½ W Insulated
39	1214555	A 224	220,000 Ohms ½ W Insulated
40	1214560	A 564	560,000 Ohms ½ W Insulated
41	7237994	B 221	220 Ohms 1 W Insulated
42	1214573	{ C 272 } B 562	1800 Ohms 2 W { Replace with C 272 and B 567 in parallel
43	1213846	B 271	270 Ohms 1 W Insulated
44	1214555	A 224	220,000 Ohms ½ W Insulated
45	7241937	A 685	6.8 Megohms ½ W Insulated
			Tubes
	1213793	5241	6V6GT
	1211924	5003	0Z4
	1217690	5252	6BA6
	1217691	5253	6BE6
	1218506	5262	6AV6

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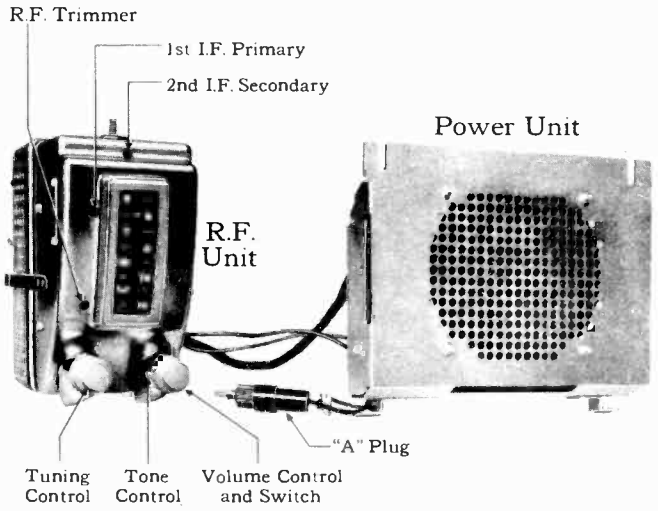
MODEL 986389,
Chevrolet

GENERAL

MOUNTING	All 1950 Chevrolet Cars
TUBES	Five, plus Rectifier
SPEAKER	6" Electro-Magnetic or 6" Permanent Magnet
TUNING	Manual
ANTENNA TRIMMER COMPENSATION —For Antennas Between 0.000060 - 0.000090 Mfd.	
TUNING RANGE	535 - 1610 KC.



MODEL 986389

ALIGNMENT PROCEDURE:

Output Meter Connection	Across Voice Coil
Generator Return	To Receiver Chassis
Dummy Antenna	In Series With Generator
Volume Control Position	Maximum Volume
Tone Control Position	Treble
Generator Output	Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence For Max. Output
1	0.02 Mfd.	6BE6 Grid (Pin #7)	257.5 KC.	High Frequency Stop	A, B, C, D
2	0.000065 Mfd	Antenna Connector	1610 KC.	High Frequency Stop	E, F, G
3	0.000065 Mfd.	Antenna Connector	1400 KC.	Signal Generator Signal	H, J, K
4	0.000065 Mfd.	Antenna Connector	1610 KC.	High Frequency Stop	F, G
5	0.000065 Mfd.	Antenna Connector	1400 KC.	Signal Generator Signal	*Pointer Adjust. Screw

*Refer to the Pointer String Hookup drawing This should be adjusted so the pointer reads 1400 KC.

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC.

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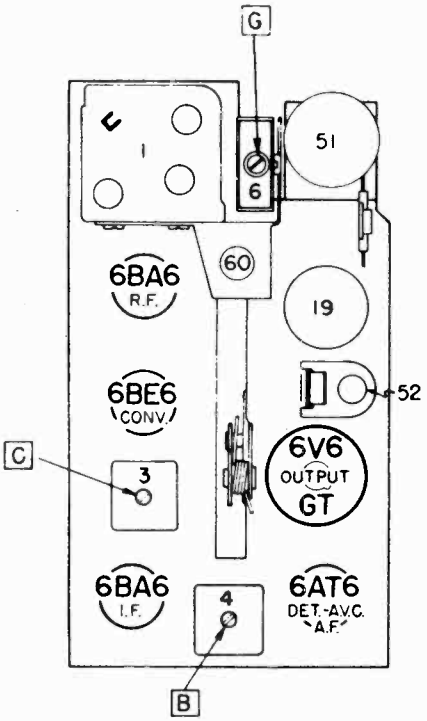
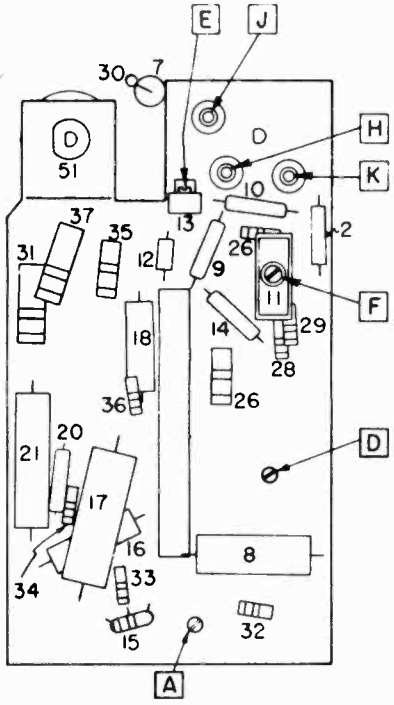
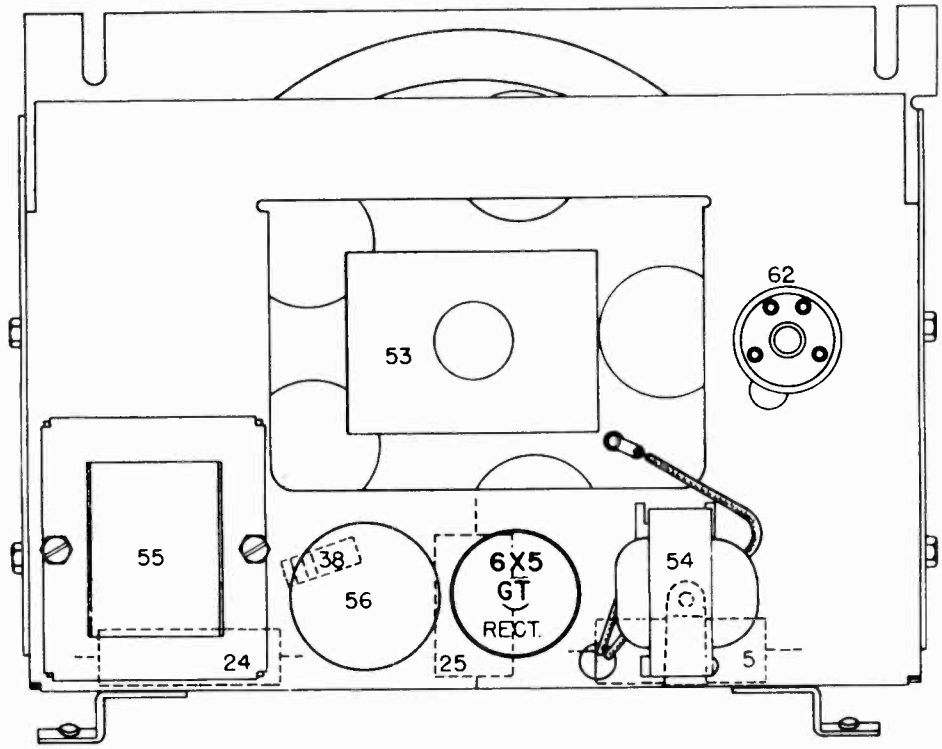
MODEL 986389,
Chevrolet



PARTS LAYOUT—TUBE VIEW



PARTS LAYOUT—CHASSIS VIEW



PARTS LAYOUT—POWER UNIT

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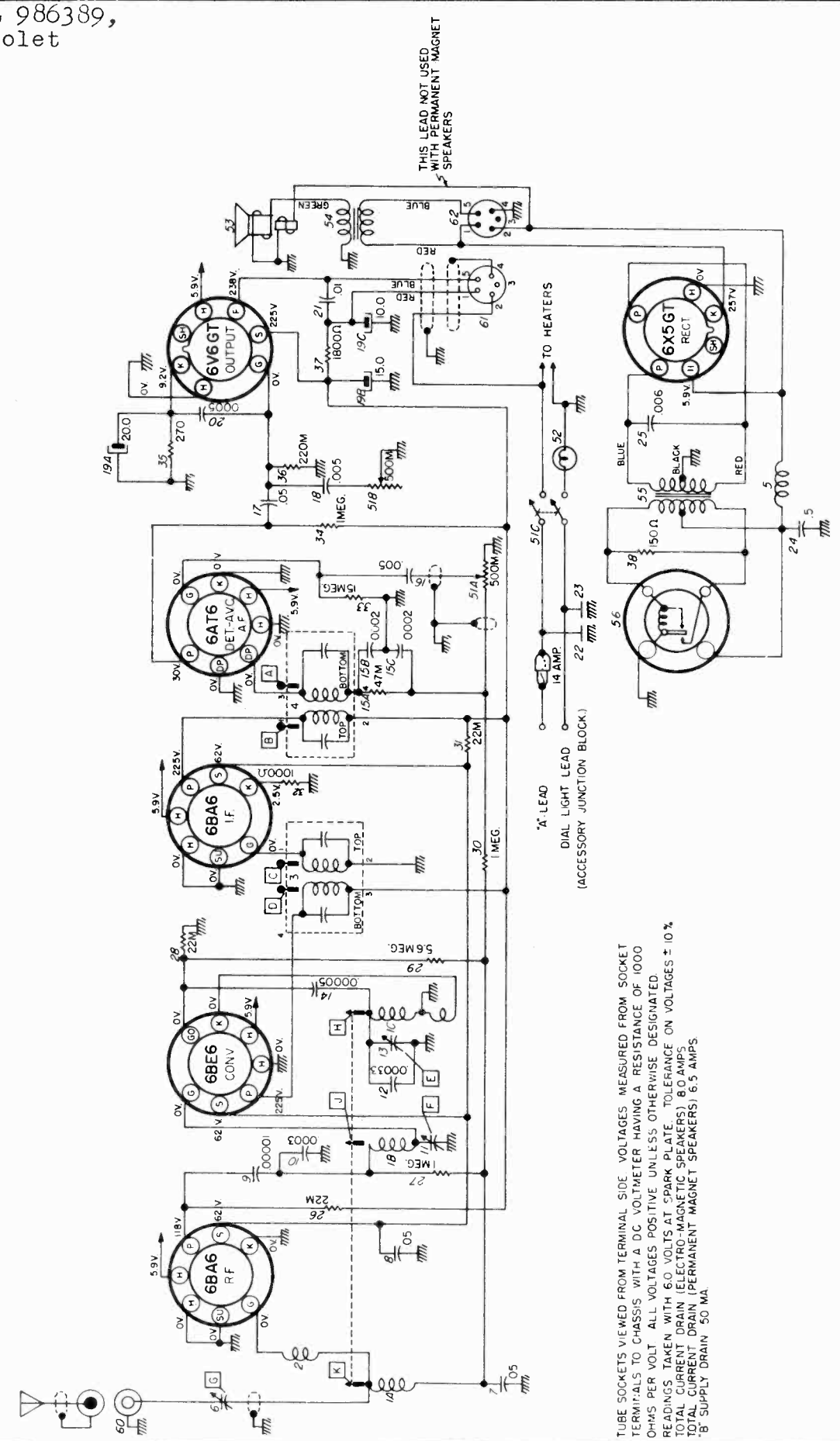
MODEL 986389,
Chevrolet



TUBE SOCKETS VIEWED FROM TERMINAL SIDE. VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH A DC VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT. ALL VOLTAGES POSITIVE UNLESS OTHERWISE DESIGNATED.
READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. TOLERANCE ON VOLTAGES ± 10 %.
TOTAL CURRENT DRAIN (ELECTRO-MAGNETIC SPEAKERS) 8.0 AMPS.
TOTAL CURRENT DRAIN (PERMANENT MAGNET SPEAKERS) 6.5 AMPS.
"B" SUPPLY DRAIN 50 MA.

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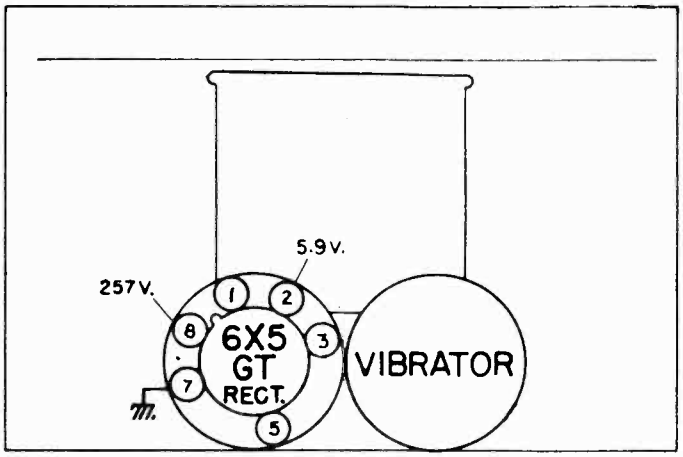
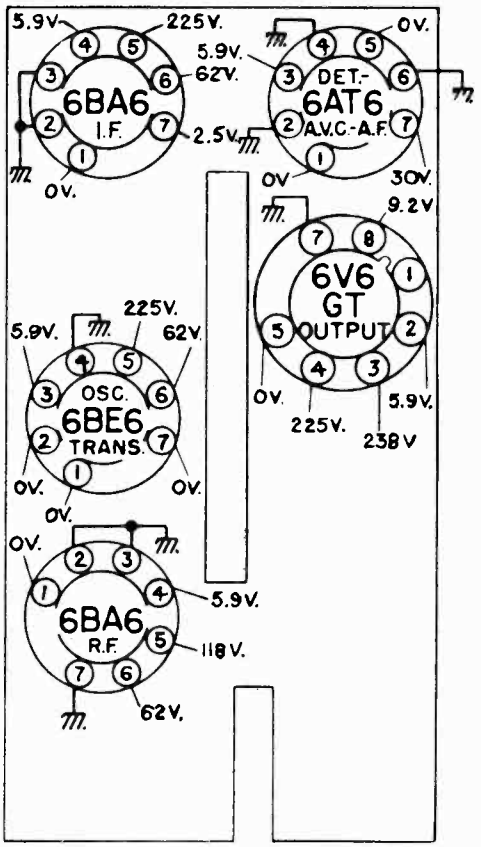
MODEL 986389,
Chevrolet



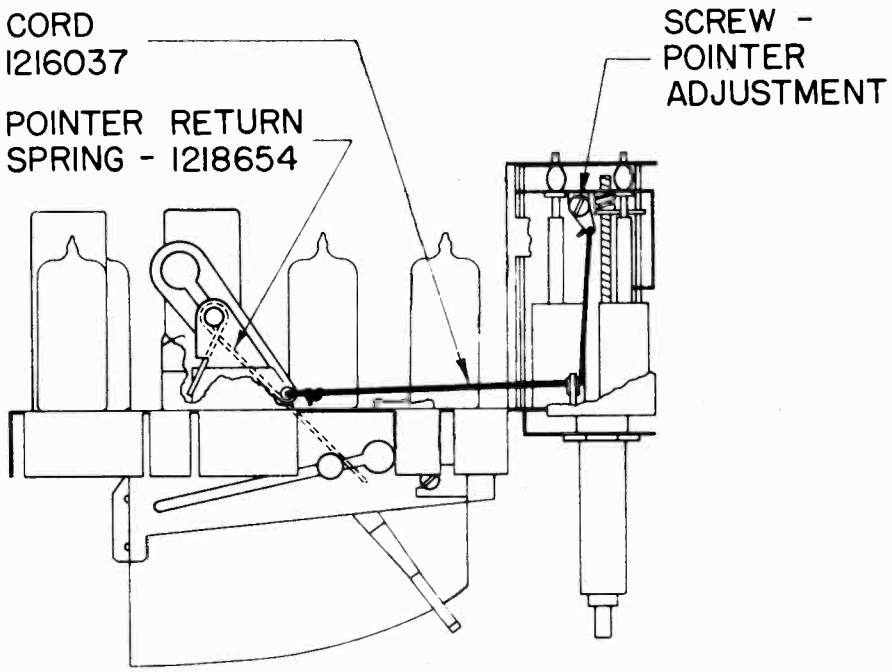


BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO CHASSIS WITH A D. C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT.

"A" SUPPLY AT SPARK PLATE 6.0 VOLTS
"B" SUPPLY DRAIN APPROXIMATELY 50 MA.

TUBE SOCKET VOLTAGE CHART



POINTER STRING HOOKUP

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ELECTRICAL PARTS

COILS

Illus. No.	Service Part No.	Production Part No.	Description
1		1219569	Coils-Permeability Tuning
1A			Antenna Coil
1B			R. F. Coil
1C			Oscillator Coil
2		1218639	Antenna Spark Choke
3		1219567	1st I. F. Assembly
4		1219568	2nd I.F. Assembly
5		1219572	Hash Choke

CONDENSERS

6		1218634	Antenna Trimmer
7	E503	7230592	.05 Mfd. 200 V. Tubular
8	E503	7230592	.05 Mfd. 200 V. Tubular
9	G100	1215189	.00001 Mfd. Molded
10	G271	1215553	.0003 Mfd. Molded
11		1218636	R.F. Trimmer
12		1219566	.00033 Mfd.—Silver Mica
13		1218635	Oscillator Trimmer
14	G470	7236141	.00005 Mfd. Molded
15		1219563	Diode Filter Unit
15A			47,000 Ohm
15B			.0002 Mfd.
15C			.0002 Mfd.
16		7230767	.005 Mfd. 100 V. Tubular
17	E503	7230592	.05 Mfd. 200 V. Tubular
18		7230767	.005 Mfd. 100 V. Tubular
19		1218009	Electrolytic Condenser
19A			20 Mfd. 25 V.
19B			15 Mfd. 350 V.
19C			10 Mfd. 350 V.
20		1216881	.0005 Mfd. Molded
21	E103	7233608	.01 Mfd. 600 V.
22		1219577	Spark Plate
23		1219577	Spark Plate
24		7240248	5 Mfd. 100 V. Tubular
25		1219320	.006 Mfd. 1600 V. Tubular

RESISTORS

26	B223	1216156	22,000 Ohm 1 W. Insulated
27	A105	1213282	1 Megohm ½ W. Insulated
28	A223	1214550	22,000 Ohm ½ W. Insulated
29		1215562	5.6 Megohm ½ W. Insulated
30	A105	1213282	1 Megohm ½ W. Insulated
31	C223	7240590	22,000 Ohm 2 W. Insulated
32	A102	1213235	1000 Ohm ½ W. Insulated
33	A156	1213289	15 Megohm ½ W. Insulated
34	A105	1213282	1 Megohm ½ W. Insulated
35	B271	1213846	270 Ohm 1 W. Insulated
36	A224	1214555	220,000 Ohm ½ W. Insulated
37	C182	1214573	1800 Ohm 2 W. Insulated
38	B151	1211005	150 Ohm 1 W. Insulated

TUBES

1217690		6BA6—R. F. Amplifier
1217691		6BE6—Oscillator—Translator
1217690		6BA6—I.F. Amplifier
1218105		6AT6—Detector—AVC—1st Audio
1213793		6V6GT—Audio Output
1213794		6X5GT—Rectifier

MISCELLANEOUS ELECTRICAL PARTS

Illus. No.	Service Part No.	Production Part No.	Description
51		1218641	Control-Volume, Tone & Switch
51A			Volume Control
51B			Tone Control
51C			On-Off Switch
52		125588	Lamp, Dial (Mazda 55)
53		1219575	Speaker—6" Electro-Magnetic
			or
53		1219576	Speaker—6" Perm. Magnet
54		1219573	Transformer—Output
55		1219571	Transformer—Power
56	8542	1218006	Vibrator

MECHANICAL PARTS

CHASSIS

60	1218651	Socket—Antenna Connector
	7236279	Socket—Octal
	1219570	Socket—Miniature
	7239125	Socket—Vibrator
	1218640	Clip—Pilot Lamp
	1219586	Clip—I. F. Transformer Mtg.
61	1218642	Cable & Socket—Power
	1218645	Lead Assy.—Dimmer
	1219574	Plug & Leads Assy.—Power Supply & Speaker
62	1218650	Plug—Plug & Leads Assy.
	1218655	Spring—Case Assembly Cover
	1219579	"A" Connector Assembly
	1219556	Case—Front

TUNER PARTS

1218621	Pointer Arm
1218623	Pointer Arm Assembly
1219564	Background—Dial
1219565	Background—Pointer
1218644	Dial
1218646	Link & Stud Assy.—Pointer
1218647	Nut—Speed—Dial & Dial Background
1218648	Pointer—Dial
1218654	Spring—Pointer Return
1218659	Stud—Top Mounting

INSTALLATION PARTS

7257921	Body, Fuse Holder
3690332	Bracket—Receiver Mtg.—Top
7257984	Block—Serrated—Radio Mtg.
7257922	Bushing—Control
3690333	Trim Plate
147685	Fuse—14 Amp.—25 V.
3693934	Knob—Tone
7258879	Knob—Dummy
7258880	Knob—Includes Set Screw—Volume & Tuning
6015 1911095	Condenser—Generator
1910147	Condenser—Ignition Coil
1912900	Condenser—Voltage Regulator
	or
557531	Condenser—Voltage Regulator
494786	Static Collector Assy.
1888204	Nipple—Suppressor
7257917	Stud—Power Supply Mtg.
7257925	Shroud—Speaker
1887829	Suppressor Distributor

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MODEL 986443, Chevrolet

MOUNTING—All 1950 Chevrolet Trucks.

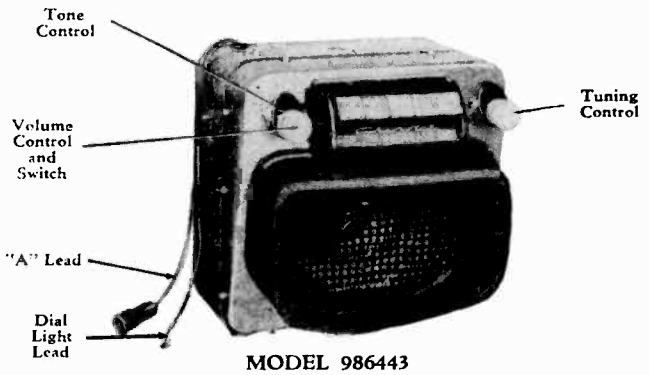
TUBES—Five, plus rectifier.

SPEAKER—6" x 9" Elliptical, Permanent Magnet.

TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000058 - 0.000090 Mfd.

TUNING RANGE—550-1600 KC.



MODEL 986443

PUSH BUTTON SET-UP PROCEDURE

Pull Push Button left and out. Tune in desired station manually. Push button all the way in.

ALIGNMENT PROCEDURE

Output Meter Connections ..... Across Voice Coil

Generator Return ..... To Receiver Chassis

Dummy Antenna ..... In Series With Generator

Volume Control Position ..... Maximum Volume

Tone Control Position ..... Treble

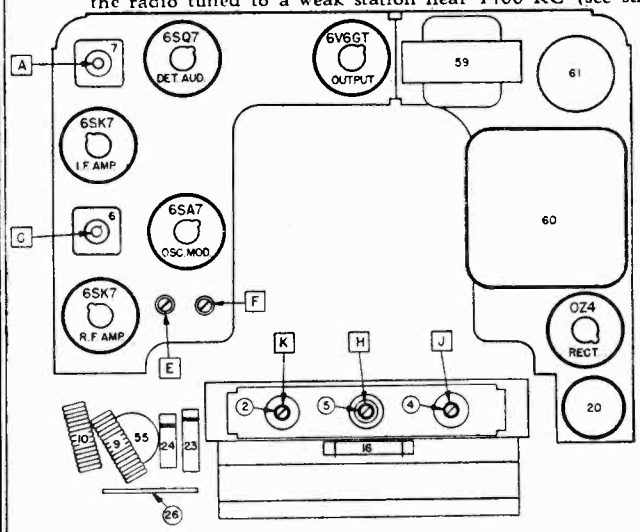
Generator Output ..... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator to	Signal Generator Frequency	Tune Receiver to	Adjust in Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	L**

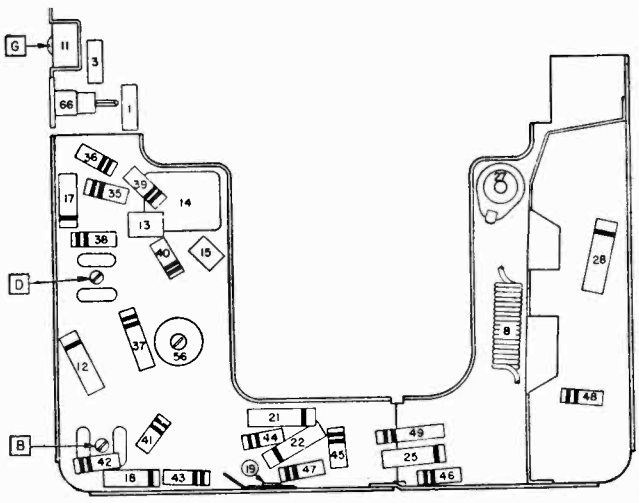
*Before making this adjustment check mechanical setting of oscillator core "H." The rear of the core should be 1 3/32" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) If adjustment is necessary, first dissolve the glyptal seal on the core studs. Core adjustments should be made with an insulated screw driver, and core studs should be cemented in place with glyptal or household cement after alignment.

**L is the pointer adjustment screw which is on the connecting link, between the pointer assembly and core guide bar (See tuner Dwg.) It should be adjusted so that when looking directly at the dial the pointer is on the 1100 KC mark. This setting is to give the correct relationship between the pointer and the dial when the radio is installed in a car.

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case).



PARTS LAYOUT—TUBE VIEW


PARTS LAYOUT—CHASSIS VIEW

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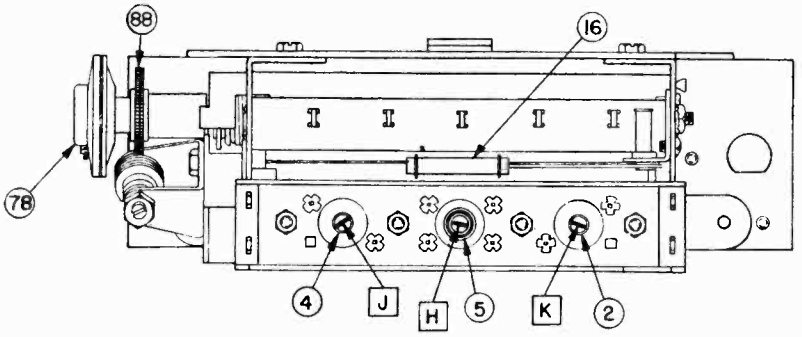
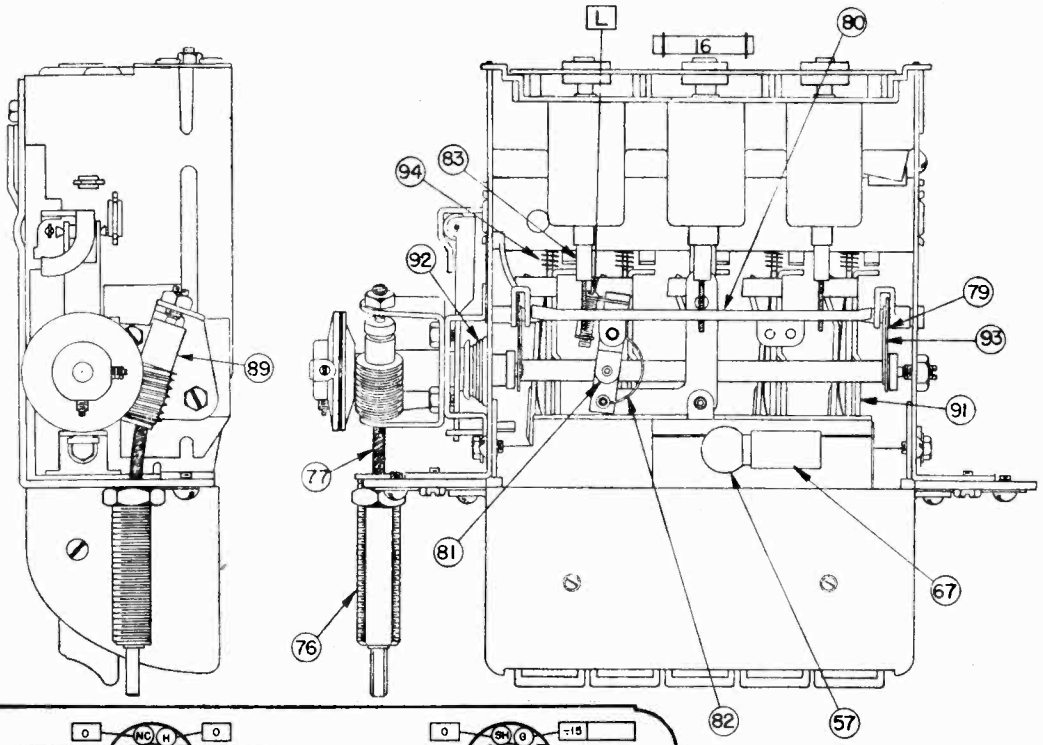
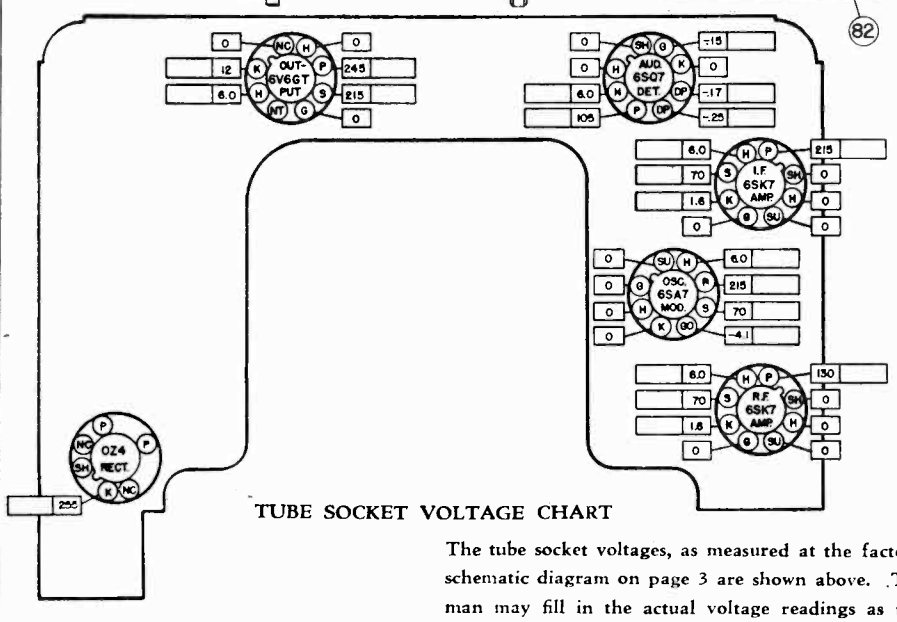
MODEL 986443,
Chevrolet

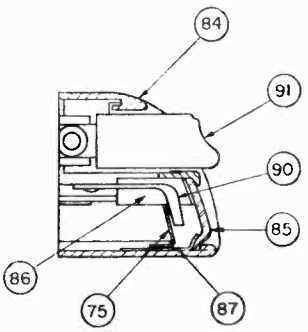


TUNER





TUBE SOCKET VOLTAGE CHART



ESCUTCHEON CROSS SECTION

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram on page 3 are shown above. The blank spaces are provided so the service man may fill in the actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

VOLTMETER RESISTANCE.....OHMS PER VOLT

READINGS TAKEN WITH.....VOLTS AT SPARK PLATE

Voltage measured from socket terminals to chassis and are positive unless marked otherwise.

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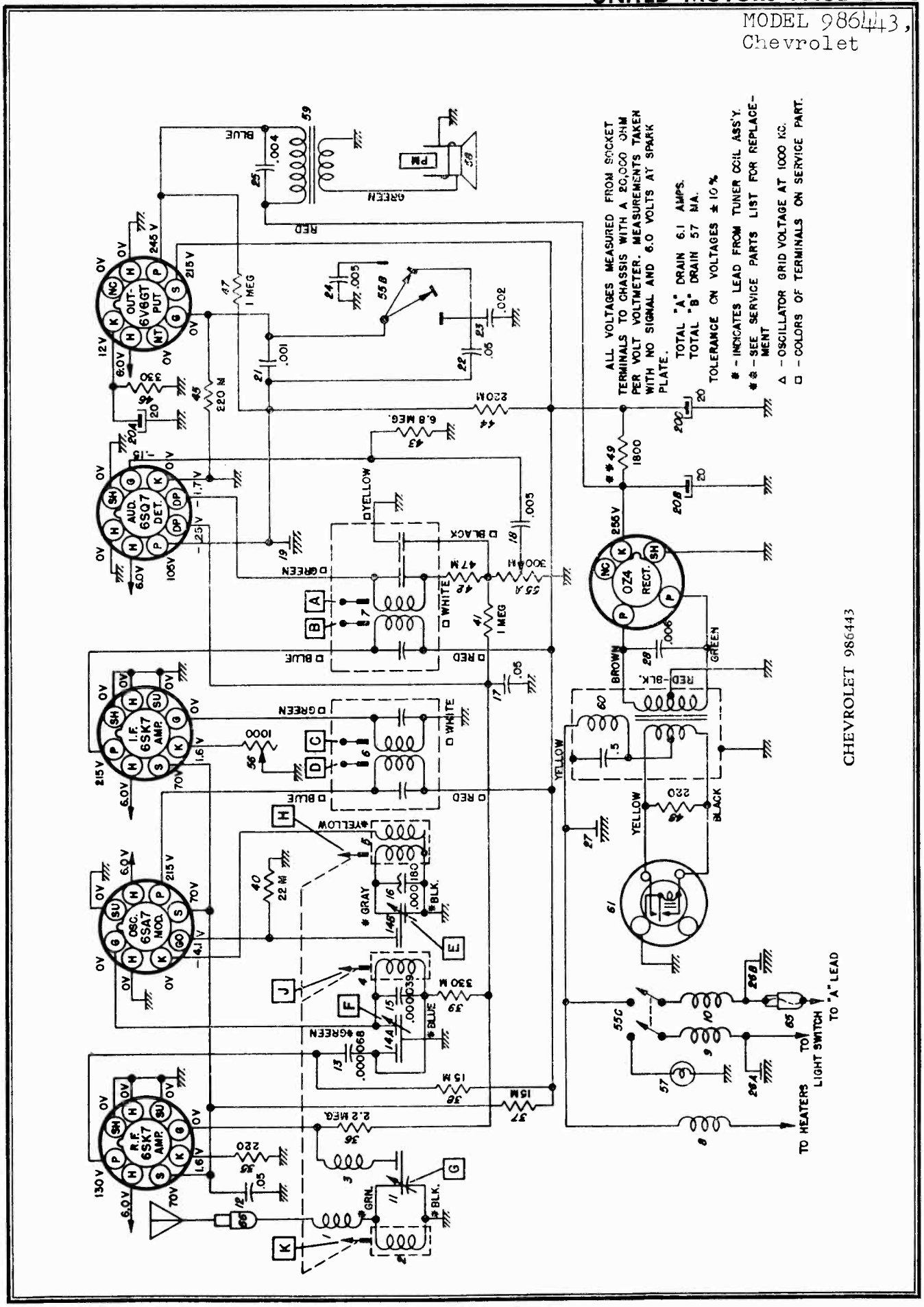
MODEL 986443,
Chevrolet



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MODEL 986443,
Chevrolet

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7255738	7255738	Antenna Series Choke
2	7258914	7258914	Antenna
3	7240251	7240251	Antenna Spark Choke
4	7258914	7258914	R.F.
5	7258911	7258911	Oscillator
6	7258188	1218725	1st I. F.
7	7258198	1218726	2nd I.F.
8	7255912	7255912	Hash Choke
9	7258554	1217846	"A" Spark Choke
10	7258554	1217846	"A" Spark Choke
			Condensers
11	7257959	7257959	Antenna Trimmer & Brkt.
12	7236841	E-503	.05 mfd. 400V Tubular
13	1219550	G 680	.000068 mfd. Mica
14	7242454	7242454	Dual Trimmer
14A			R.F. Section
14B			Oscillator Section
15	7258221	G 390	.000039 mfd. Mica
16	7257424	7257424	.000180 mfd. Compensating
17	7236842	E 503	.05 mfd. 200V Tubular
18	7230767	E 502	.005 mfd. 600V Tubular
19	1217848	1217848	Chassis Plate Cond.
20	7240724	M 908	Electrolytic
20A			20 mfd. 25V
20B			20 mfd. 400V
20C			20 mfd. 400V
21	7239188	E 102	.001 mfd. 600V Tubular
22	7230892	E 503	.05 mfd. 400V Tubular
23	1219632	E 202	.002 mfd. 600V Tubular
24	7232956	E 502	.005 mfd. 600V Tubular
25	7233243	H 402	.004 mfd. 800V Tubular
26	7258332	1219869	Spark Plate Cond.
26A			Pilot Light Section
26B			"A" Lead Section
27	1217848	1217848	Chassis Plate Cond.
28	7240906	H 602	.006 mfd. 1600V Tubular
			Resistors
35	7237835	A 221	220 ohms ½W Insulated
36	1211147	A 225	2.2 megohms ½W Insulated
37	7233653	C 153	15,000 ohms 2W Insulated
38	7237595	B 153	15,000 ohms 1W Insulated
39	7240732	A 334	330,000 ohms ½W Insulated
40	1214550	A 223	22,000 ohms ½W Insulated
41	7238873	A 105	1 megohm ½W Insulated
42	1214553	A 473	47,000 ohms ½W Insulated
43	7241937	A 685	6.8 megohms ½W Insulated
44	1213479	A 224	220,000 ohms ½W Insulated
45	1213479	A 224	220,000 ohms ½W Insulated
46	7233773	C 331	330 ohms 1W Insulated
47	7238873	A 105	1 megohm ½W Insulated
48	7237994	B 221	220 ohms 1W Insulated
49	1214573	C-272 / B-562	1800 ohms 2W wire wound (Replace with 2700 2W and 5600 1W in parallel
			Tubes
	7237751	5229	6SK7
	7237752	5222	6SA7
	1214293	5232	6SQ7GT
	1213793	5241	6V6GT
	1211924	5003	0Z4

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MODEL 986443, Chevrolet

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			Miscellaneous Electrical Parts
55	7256188	7256188	Control - Volume, Tone & Switch
55A			Volume Control
55B			Tone Control
55C			Switch
56	7242204	7242204	Control - Sensitivity
57	125588	55	Lamp - Dial Light
58	7259381	6111	Speaker - 6x9 Elliptical PM
59	7256009	7256009	Transformer - Output
60	7255881	7255881	Transformer - Power
61	7239124	8542	Vibrator
			MECHANICAL PARTS
			Chassis
65	7256250	1217950	"A" Lead & Fuse Holder
66	7256742	7256742	Connector - Antenna
67	1219619	1219619	Socket - Dial Light
	7236279	7236279	Socket - Octal Tube
	7239125	7239125	Socket - Vibrator
			Tuner
75	7255941	7255941	Backplate - Pointer
	147481	147481	Ball Bearings Pkg.
76	7258491	7258491	Bushing & Drive Shaft Assy.
77	7258525	7258525	Manual Drive Shaft Assy.
78	7258072	7258072	Clutch Disc - Driven
79	7258203	7258203	Connecting Link
80	7258211	7258211	Core Guide Bar - Parallel
81	7256271	7256271	Conn. Link - Pointer
82	7255992	7255992	Spring-Conn. Link - Pointer
83	7258468	7258468	Core Assy. - Powdered Iron
84	7259759	7259759	Escutcheon Assy.
85	7259764	7259764	Dial
86	7255940	7255940	Dial Backplate - Upper
87	7256163	7256163	Dial Backplate - Lower
88	7256102	7256102	Gear & Bushing - Clutch
89	7259755	7259755	Gear & Bracket - Worm
	7237172	7237172	Grommet - Osc. Coil Mtg.
	7244021	7244021	Grommet - Ant. - RF Coil Mtg.
	7251168	7251168	Grommet - "A" Lead
90	7256175	7256175	Pointer Assy.
	1219618	1219618	Pointer Tip Pkg.
91	1217837	1217837	Push Button and Slide Assy.
92	7258756	7258756	Spring - Clutch
93	7257415	7257415	Spring - Core Bar Conn. Link
94	7255984	7255984	Spring - Slide Return
			INSTALLATION PARTS
	7257919	7257919	Condenser - Ammeter
	1911095	6030	Condenser - Generator
	1910147	6030	Condenser - Ignition Coil
	1912900	6030	Condenser - Voltage Regulator
	7256098	7256098	Escutcheon - Control Bushing
	147685	147685	Fuse - 14 amps
	7256148	7256148	Knob - Control
	7255935	7255935	Knob - Dummy
	7255936	7255936	Knob - Wing
	7256466	7256466	Spacer - Radio Mtg. - Lower
	7255934	7255934	Spacer - Radio Mtg. - Upper
	494786	6009	Static Collector
	1887829	6003	Suppressor - Distributor
	1888204	1888204	Rubber Nipple

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MODEL 2233297

GENERAL

MOUNTING—All 1950 GMC Trucks.

TUBES—Five, plus rectifier.

SPEAKER—6" x 9" Elliptical, Permanent Magnet.

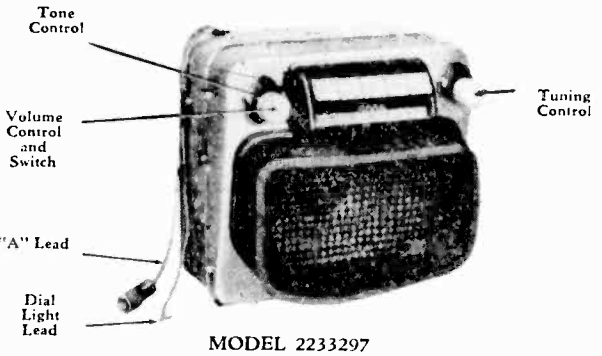
TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000058 - 0.000090 Mfd.

TUNING RANGE—550-1600 KC.

PUSH BUTTON SET-UP PROCEDURE

Pull Push Button left and out. Tune in desired station manually. Push button all the way in.



MODEL 2233297

ALIGNMENT PROCEDURE

Output Meter Connections ..... Across Voice Coil

Generator Return ..... To Receiver Chassis

Dummy Antenna ..... In Series With Generator

Volume Control Position ..... Maximum Volume

Tone Control Position ..... Treble

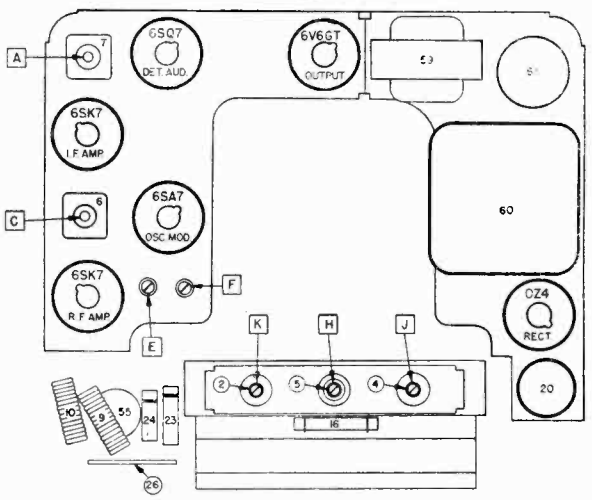
Generator Output ..... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator to	Signal Generator Frequency	Tune Receiver to	Adjust in Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	L**

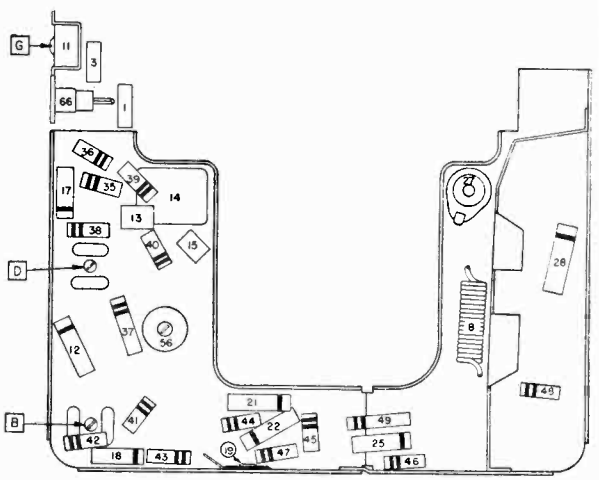
*Before making this adjustment check mechanical setting of oscillator core "H." The rear of the core should be $1\frac{29}{32}$" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) If adjustment is necessary, first dissolve the glyptal seal on the core studs. Core adjustments should be made with an insulated screw driver, and core studs should be cemented in place with glyptal or household cement after alignment.

**L is the pointer adjustment screw which is on the connecting link, between the pointer assembly and core guide bar (See tuner Dwg.) It should be adjusted so that when looking directly at the dial the pointer is at the 1100 KC mark. This setting is to give the correct relationship between the pointer and the dial when the radio is installed in a car.

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case).



PARTS LAYOUT—TUBE VIEW



PARTS LAYOUT—CHASSIS VIEW

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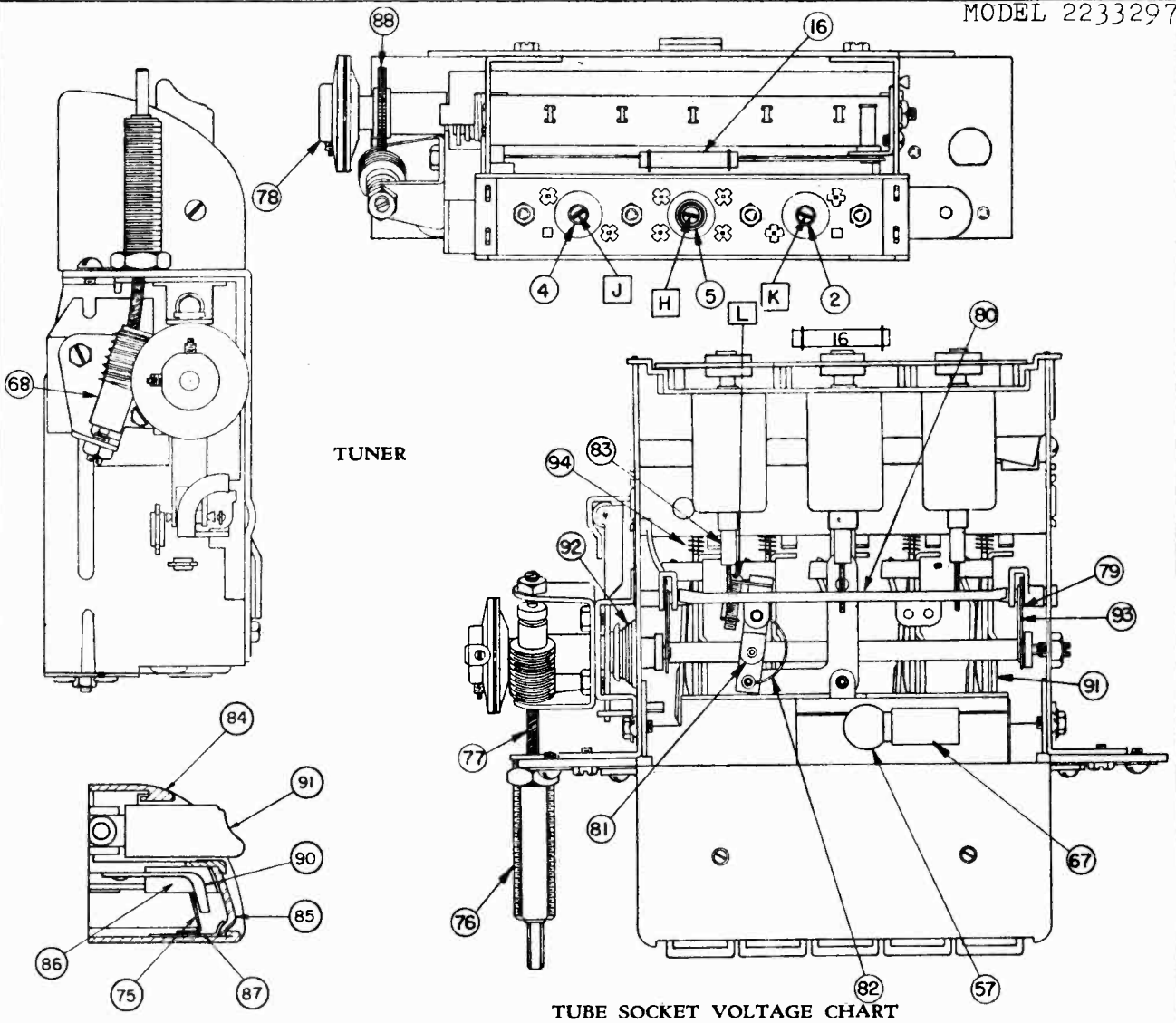
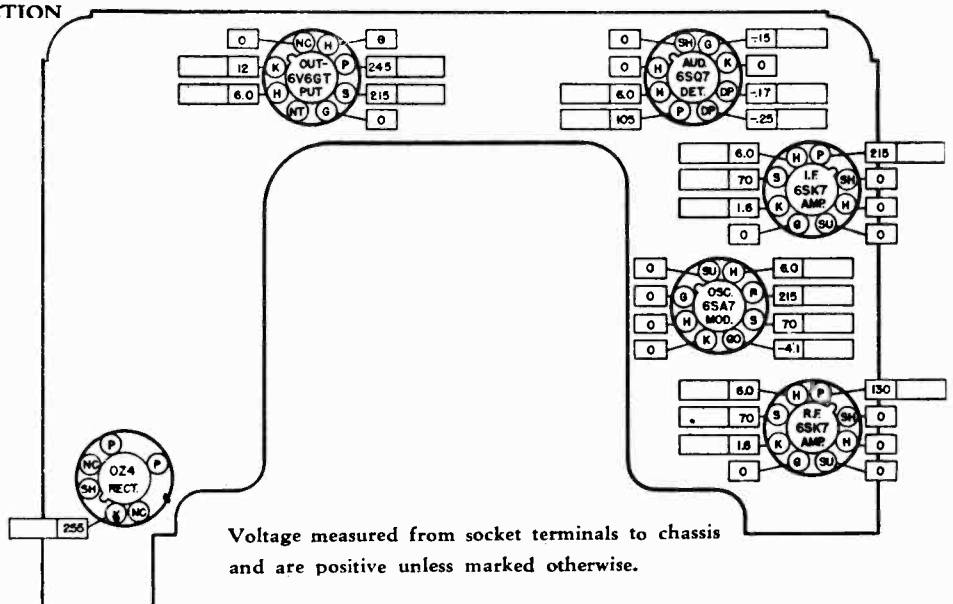
MODEL 2233297



ESCUTCHEON CROSS SECTION

TUBE SOCKET VOLTAGE CHART



Voltage measured from socket terminals to chassis and are positive unless marked otherwise.

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram on page are shown above. The blank spaces are provided so the service man may fill in the actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

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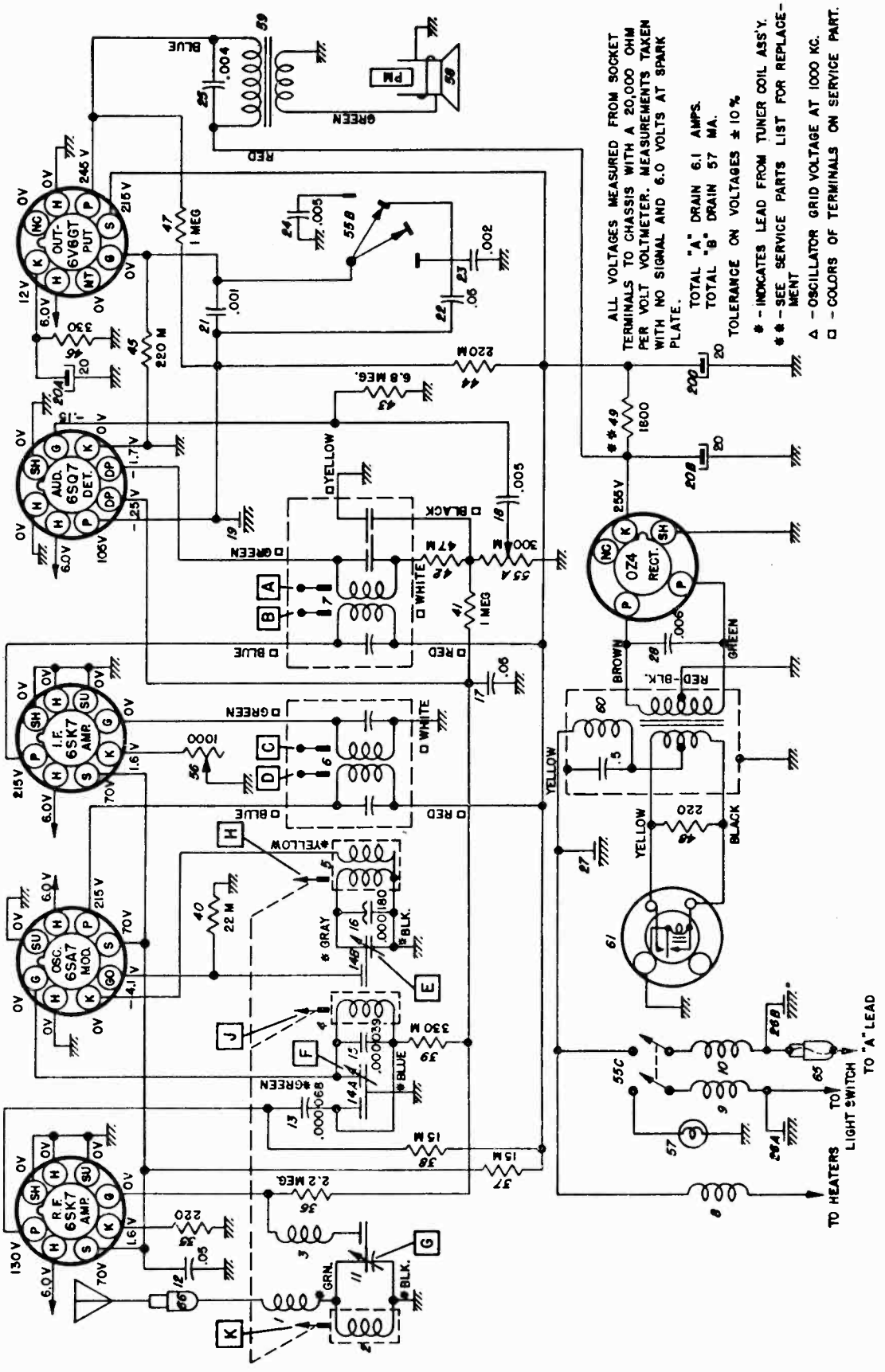
MODEL 2233297



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SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7255738	7255738	Antenna Series Choke
2	7258914	7258914	Antenna
3	7240251	7240251	Antenna Spark Choke
4	7258914	7258914	R.F.
5	7258911	7258911	Oscillator
6	7258188	1218725	1st I.F.
7	7258198	1218726	2nd I.F.
8	7255912	7241708	Hash Choke
9	7258554	1217846	"A" Spark Choke
10	7258554	1217846	"A" Spark Choke
			Condensers
11	7257959	7257959	Antenna Trimmer & Brkt.
12	7236841	E-503	.05 mfd. 400V Tubular
13	1219550	G 680	.000068 mfd. Mica
14	7242454	7242454	Dual Trimmer
14A			R.F. Section
14B			Oscillator Section
15	7258221	G 390	.000039 mfd. Mica
16	7257424	7257424	.000180 mfd. Compensating
17	7236842	E 503	.05 mfd. 200V Tubular
18	7230767	E 502	.005 mfd. 600V Tubular
19	1217848	1217848	Chassis Plate Cond.
20	7240724	M 908	Electrolytic
20A			20 mfd. 25V
20B			20 mfd. 400V
20C			20 mfd. 400V
21	7239188	E 102	.001 mfd. 600V Tubular
22	7230892	E 503	.05 mfd. 400V Tubular
23	1219632	E 202	.002 mfd. 600V Tubular
24	7232956	E 502	.005 mfd. 600V Tubular
25	7233243	H 402	.004 mfd. 800V Tubular
26	7258332	1219369	Spark Plate Cond.
26A			Pilot Light Section
26B			"A" Lead Section
27	1217848	1217848	Chassis Plate Cond.
28	7240906	H 602	.006 mfd. 1600V Tubular
			Resistors
35	7237835	A 221	220 ohms ½W Insulated
36	1211147	A 225	2.2 megohms ½W Insulated
37	7233653	C 153	15,000 ohms 2W Insulated
38	7237595	B 153	15,000 ohms 1W Insulated
39	7240732	A 334	330,000 ohms ½W Insulated
40	1214550	A 223	22,000 ohms ½W Insulated
41	7238873	A 105	1 megohm ½W Insulated
42	1214553	A 473	47,000 ohms ½W Insulated
43	7241937	A 685	6.8 megohms ½W Insulated
44	1213479	A 224	220,000 ohms ½W Insulated
45	1213479	A 224	220,000 ohms ½W Insulated
46	7233773	B 331	330 ohms 1W Insulated
47	7238873	A 105	1 megohm ½W Insulated
48	7237994	B 221	220 ohms 1W Insulated
49	1214573	C-272 and B-562	1800 ohms (Replace with 2700 2W and 5600 1W in parallel)
			Tubes
	7237751	5229	6SK7
	7237752	5222	6SA7
	1214293	5232	6SQ7GT
	1213793	5241	6V6GT
	1211924	5003	0Z4

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MODEL 2233297

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			Miscellaneous Electrical Parts
55	7256188	7256188	Control - Volume, Tone & Switch
55A			Volume Control
55B			Tone Control
55C			Switch
56	7242204	7242204	Control - Sensitivity
57	125588	55	Lamp - Dial Light
58	7259381	7259381	Speaker - 6x9 Elliptical PM
59	7256009	7256009	Transformer - Output
60	7255881	7255881	Transformer - Power
61	7239124	8542	Vibrator
			MECHANICAL PARTS
			Chassis
65	7256250	1217950	"A" Lead & Fuse Holder
66	7256742	7256742	Connector - Antenna
67	1219619	1219619	Socket - Dial Light
	7236279	7236279	Socket - Octal Tube
	7239125	7239125	Socket - Vibrator
			Tuner
75	7255941	7255941	Backplate - Pointer
	147481	147481	Ball Bearings Pkg.
76	7258491	7258491	Bushing & Drive Shaft Assy.
77	7258525	7258525	Manual Drive Shaft Assy.
78	7258072	7258072	Clutch Disc - Driven
79	7258203	7258203	Connecting Link
80	7258211	7258211	Core Guide Bar - Parallel
81	7256271	7256271	Conn. Link - Pointer
82	7255992	7255992	Spring-Conn. Link - Pointer
83	7258468	7258468	Core Assy. - Powdered Iron
84	7259798	7259798	Escutcheon Assy.
85	7259799	7259799	Dial
86	7255940	7255940	Dial Backplate - Upper
87	7256163	7256163	Dial Backplate - Lower
88	7256102	7256102	Gear & Bushing - Clutch
89	7259755	7259755	Gear & Bracket - Worm
	7237172	7237172	Grommet - Osc. Coil Mtg.
	7244021	7244021	Grommet - Ant. - RF Coil Mtg.
	7251168	7251168	Grommet - "A" Lead
90	7256175	7256175	Pointer Assy.
	1219618	1219618	Pointer Tip Pkg.
91	1217837	1217837	Push Button and Slide Assy.
92	7258756	7258756	Spring - Clutch
93	7257415	7257415	Spring - Core Bar Conn. Link
94	7255984	7255984	Spring - Slide Return
			INSTALLATION PARTS
	7257919	7257919	Condenser - Ammeter
	1911095	6030	Condenser - Generator
	1910147	6030	Condenser - Ignition Coil
	1912900	6030	Condenser - Voltage Regulator
	7256098	7256098	Escutcheon - Control Bushing
	147685	147685	Fuse - 14 amps
	7256148	7256148	Knob - Control
	7255935	7255935	Knob - Dummy
	7255936	7255936	Knob - Wing
	7256466	7256466	Spacer - Radio Mtg. - Lower
	7255934	7255934	Spacer - Radio Mtg. - Upper
	494786	6009	Static Collector
	1887829	6003	Suppressor - Distributor
	1888204	1888204	Rubber Nipple

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MODEL 7258755,
Cadillac

GENERAL

MOUNTING—All 1950 Cadillac Cars.

TUBES—Seven, Plus Rectifier.

SPEAKER — 6" x 9" Elliptical, Permanent Magnet.

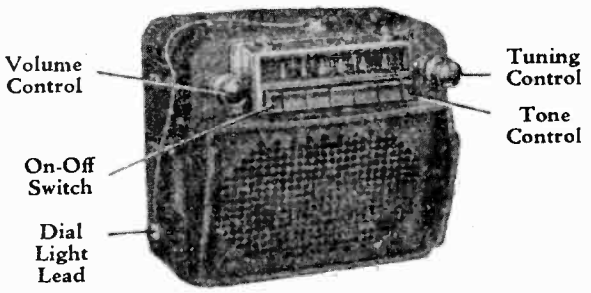
TUNING—Manual and 5 P.B. Mechanical.

ANTENNA TRIMMER COMPENSATION — 0.000060 - 0.000085 Mfd.

TUNING RANGE—550-1600 KC.

PUSHBUTTON SET-UP

Pull pushbutton to the right and out. Tune in desired station manually. Push button all the way in.



MODEL 7258755

ALIGNMENT PROCEDURE:

Output Meter Connection ..... Across Voice Coil

Signal Generator Return ..... To Chassis

Dummy Antenna ..... In Series With Generator

Volume Control ..... Maximum Volume

Tone Control ..... Treble

Generator Output ..... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1430 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Gen. Signal	L**

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

**"L" is the pointer adjustment screw on the pointer connecting link (See tuner drawing). Adjust so pointer reads 1000 KC (on the "10" calibration mark).

With the radio installed and the car antenna plugged in adjust antenna trimmer "G" (See sticker on case) for maximum volume with the radio tuned to a weak station near 1400 KC.

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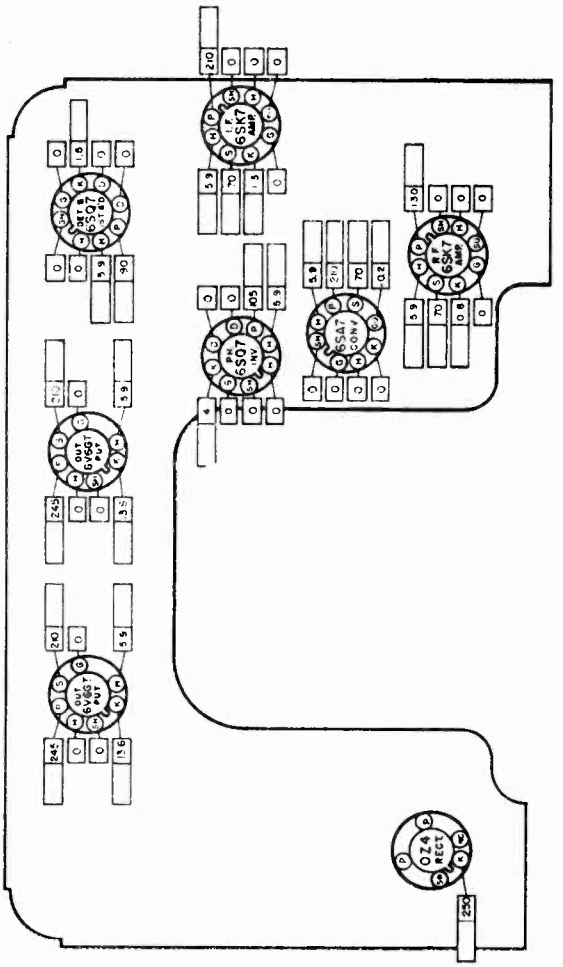
MODEL 7258755,
Cadillac

TUBE SOCKET VOLTAGE CHART

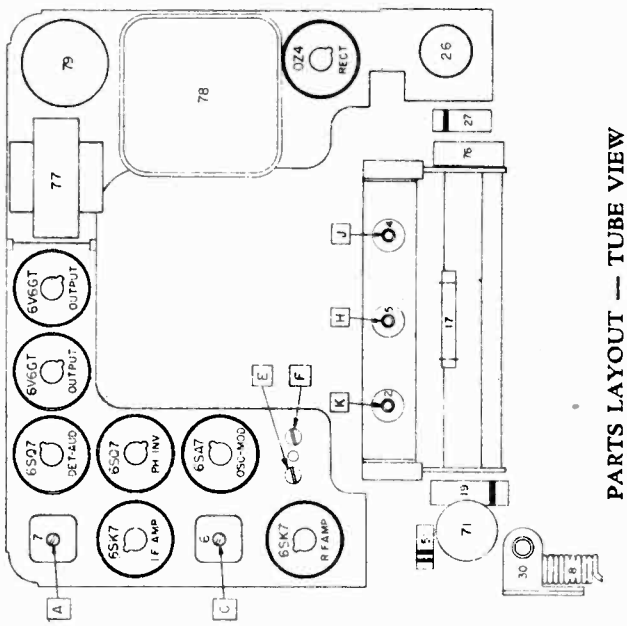


The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

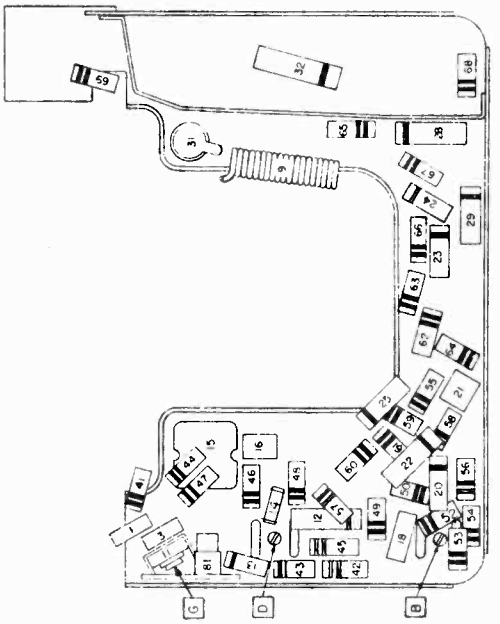
Voltmeter resistance ..... Ohms Per Volt.

Readings taken with ..... Volts at Spark Plate.

All voltages measured from socket terminals to chassis.



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

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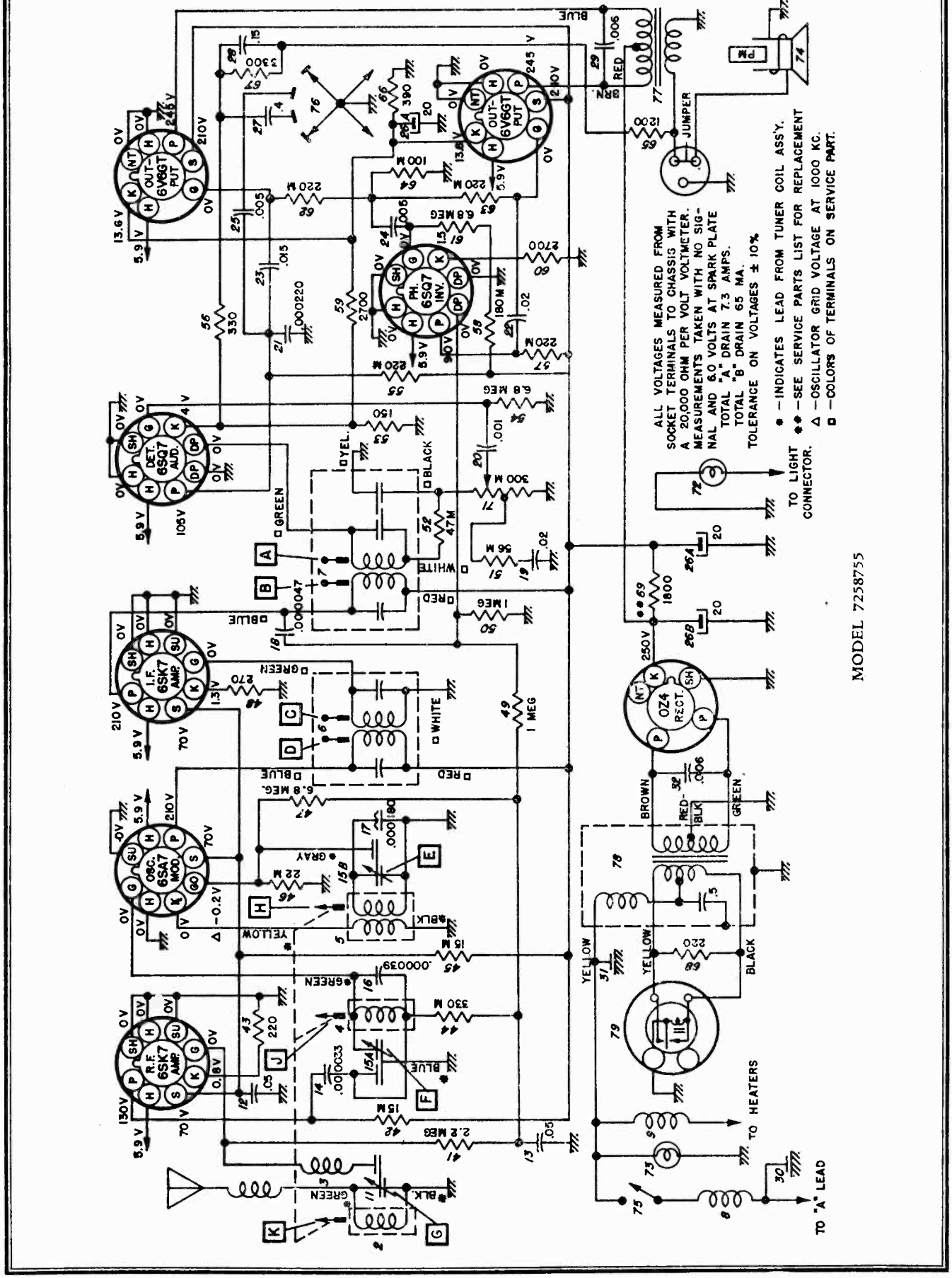
MODEL 7258755,
Cadillac



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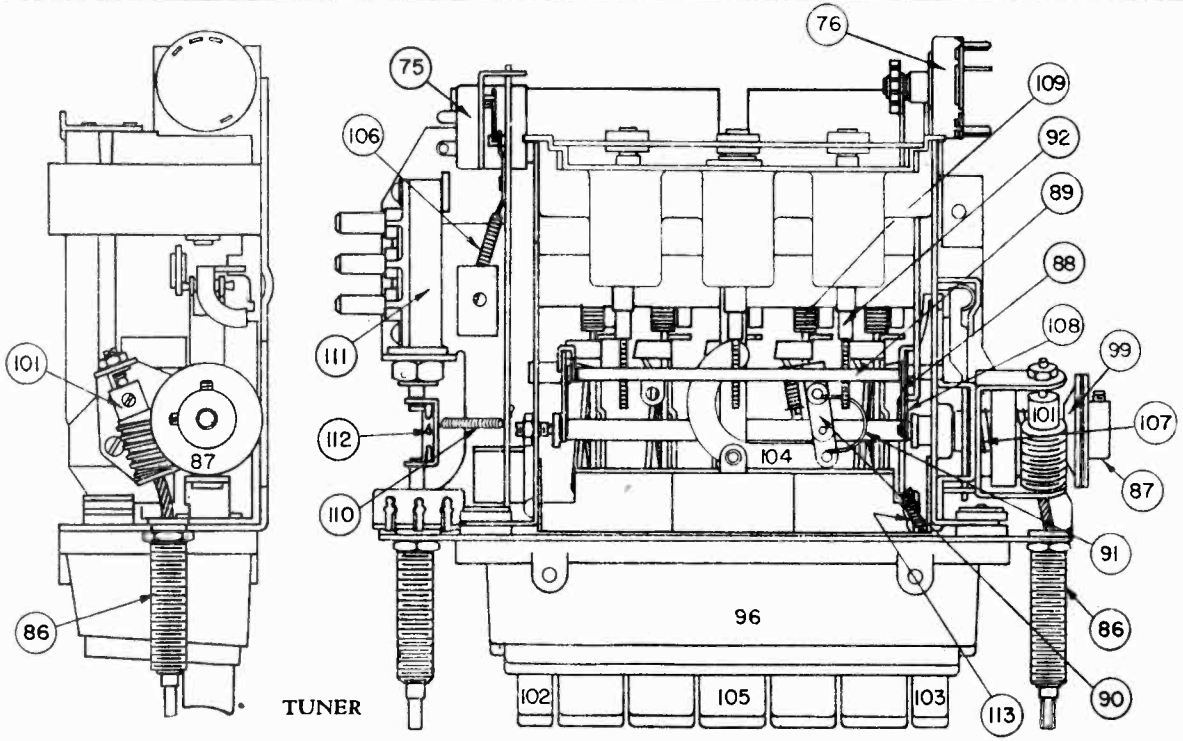
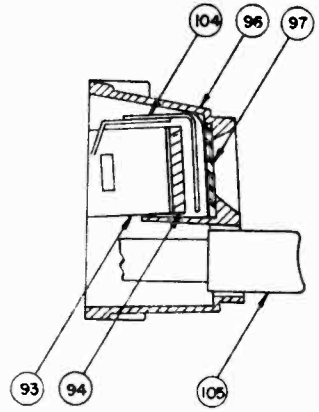


TUNER



ESCUTCHEON CROSS SECTION

SERVICE PARTS LIST

Illus. No	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7255738	7255738	Antenna Series Choke
2	7258914	7258914	Antenna
3	7240251	7240251	Antenna Spark Choke
4	7258914	7258914	R.F.
5	7258911	7258911	Oscillator
6	7258849	1219508	1st I.F.
7	7258850	1219509	2nd I.F.
8	1217846	1217846	"A" Spark Plate
9	1217846	1217846	Hash Choke
			Condensers
11	7258226	7258226	Antenna Trimmer
12	7258125	E 503	.05 Mfd 400 V Tubular
13	1210697	E 503	.05 Mfd 200 V Tubular
14	1218348	G 330	.000033 Mfd Ceramic
15	7242454	7242454	Dual Trimmer
15A			R.F. Section
15B			Oscillator
16	7258221	G 390	.000039 Mfd Ceramic
17	7257424	7257424	.000180 Mfd Compensating
18	1218202	G 470	.000047 Mfd Ceramic
19	7237720	E 203	.02 Mfd 400 V Tubular
20	1218883	E 102	.001 Mfd 600 V Tubular
21	1218886	G 221	.000220 Mfd Ceramic
22	7233770	E 203	.02 Mfd 600 V Tubular
23	7237719	7237719	.015 Mfd 600 V Tubular
24	7232956	E 502	.005 Mfd 600 V Tubular
25	7230767	E 502	.005 Mfd 600 V Tubular
26	7240724	M 908	Electrolytic
26A			20 Mfd 25 V
26B			20 Mfd 400 V
26C			20 Mfd 400 V
27	1218882	1218882	.4 Mfd 100 V Tubular
28	1218880	1218880	.15 Mfd 100 V Tubular
29	7240906	H 602	.006 Mfd 600 V Tubular
30	7240797	7240797	Spark Plate and Choke Assy.
31	1217848	1217848	Chassis Plate Assy.

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SERVICE PARTS LIST

Illus. No	Production Part No.	Service Part No.	Description
			Tubes
	7237751	5229	6SK7
	7237752	5222	6SA7
	7237753	5231	6SQ7
	1213793	5241	6V6GT
	1211924	5003	0Z4
			Miscellaneous Electrical
71	7258954	7258954	Control - Volume
72	125588	55	Lamp - Dial Light
73	187189	187189	Lamp - Pilot Light
74	7258488	7258488	Speaker - 6 x 9 Elliptical P.M.
75	7242411	7242411	Switch - "On - Off"
76	7258273	7258273	Switch - Tone Control
77	7258390	7258390	Transformer - Output
78	7255881	7255881	Transformer - Power
79	7239124	8542	Vibrator - Non-synchronous
			MECHANICAL PARTS
			Chassis
81	7239475	7239475	Socket - Antenna
82	1219106	1219106	Socket - Dial Light
	7236279	7236279	Socket - Octal Tube
	7239125	7239125	Socket - Vibrator
			Tuner
86	7258957	7258957	Bushing and Manual Drive Shaft
87	7258072	7258072	Clutch Disc-Driven
88	7258203	7258203	Connecting Link - Core Bar
89	7258206	7258206	Core Guide Bar - Parallel
90	7256271	7256271	Pointer Connecting Link
91	7255992	7255992	Spring - Pointer Connecting Link
92	7258468	7258468	Core - Powdered Iron
93	1219105	1219105	Dial Backplate Assy.
94	7258254	7258254	Dial - Calibration
95	7258239	7258239	Dial - Retainer Spring
96	7258270	7258270	Escutcheon
97	7258236	7258236	Dial Glass
98	7258232	7258232	Dial Retainer
99	7256760	7256760	Gear and Bushing
101	7256758	7256758	Gear and Bracket - Worm
102	7258757	7258757	Plunger and Button - "On - Off"
103	1219138	1219138	Plunger and Button - Tone Control
104	7258269	7258269	Pointer Assy.
105	1219104	1219104	Push Button and Slide Assy.
106	7257361	7257361	Spring - Toggle Lever
107	7258756	7258756	Spring - Clutch
108	7257415	7257415	Spring - Core Bar Connecting Link
109	7255984	7255984	Spring - Slide Return
113	7258786	7258786	Spring - Tone Control
110	7258731	7258731	Spring - Yoke
111	7258260	7258260	Vacuum Valve
112	7258229	7258229	Vacuum Valve Drive Yoke
			INSTALLATION PARTS
	7258542	7258542	"A" Lead and Fuse Connector
	1911095	6030	Capacitor - Generator
	1910147	6030	Capacitor - Ignition Coil
	147685	147685	Fuse - 14 amps
	7240138	6013	Static Collector
	1456932	1456932	Knob - Dummy
	7259369	7259369	Knob - Control
			Resistors
41	1211147	A 225	2.2 Megohms ½ W Insulated
42	7237595	B 153	15,000 Ohms 1 W Insulated
43	7237835	A 221	220 Ohms ½ W Insulated
44	7240732	A 334	330,000 Ohms ½ W Insulated
45	7233653	C 153	15,000 Ohms 2 W Insulated
46	1211192	A 223	22,000 Ohms ½ W Insulated
47	1215563	A 685	6.8 Megohms ½ W Insulated
48	1214542	A 271	270 Ohms ½ W Insulated
49	7238873	A 105	1 Megohm ½ W Insulated
50	7238873	A 105	1 Megohm ½ W Insulated
51	1213267	A 563	56,000 Ohms ½ W Insulated
52	7240731	A 473	47,000 Ohms ½ W Insulated
53	1213220	A 151	150 Ohms ½ W Insulated
54	7241937	A 685	6.8 Megohms ½ W Insulated
55	1214555	A 224	220,000 Ohms ½ W Insulated
56	1213224	A 331	330 Ohms ½ W Insulated
57	1214555	A 224	220,000 Ohms ½ W Insulated
58	1215560	1215560	180,000 Ohms ½ W Insulated
59	1213240	1213240	2,700 Ohms ½ W Insulated
60	1213240	1213240	2,700 Ohms ½ W Insulated
61	7241937	A 685	6.8 Megohms ½ W Insulated
62	1214555	A 224	220,000 Ohms ½ W Insulated
63	1214555	A-224	220,000 Ohms ½ W Insulated
64	1213270	A 104	100,000 Ohms ½ W Insulated
65	1213236	1213236	1200 Ohms ½ W Insulated
66	1216149	B 391	390 Ohms 1 W Insulated
67	1213481	A 332	3,300 Ohms ½ W Insulated
68	7237994	B 221	220 Ohms 1 W Insulated
69	1214573	{ C 272 / B 562	{ 1800 Ohms 2 W Wire Wound (or Replace with 2700 Ohms 2 W and 5600 Ohms 1 W in Parallel)

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MODEL 7258865,
Cadillac

GENERAL

MOUNTING—All 1950 Cadillac Cars.

TUBES—Eight, Plus Rectifier.

SPEAKER — 6" x 9" Elliptical, Permanent Magnet.

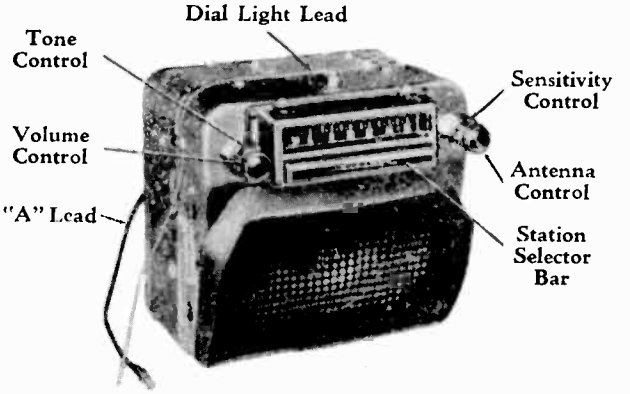
TUNING—Electronic.

ANTENNA TRIMMER COMPENSATION — 0.000060 - 0.000085 Mfd.

TUNING RANGE—540 - 1600 KC.

PUSHBUTTON SET-UP

No pushbutton set-up is necessary. However, the number of stations on which the tuner will stop can be controlled by the use of the Sensitivity Control.



MODEL 7258865

SIGNAL SEEKING TUNER ALIGNMENT PROCEDURE:

NOTE: When aligning the signal seeker tuner type radio, be sure to use a vacuum tube voltmeter as indicated and be sure to follow the alignment sequence given—(Notice that the primary of the 2nd I.F. is aligned first.)

Output Meter Connection ..... VTVM From [2] To Chassis (see parts layout page 2)
Generator Return ..... Receiver Chassis
Dummy Antenna ..... In Series With Generator
Volume Control ..... Maximum Volume
Sensitivity Control ..... Maximum Sensitivity
Tone Control ..... Treble
Generator Output ..... Not To Exceed 2 Volts at VTVM

Step	Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence for Max. Output
1	0.1 mfd	6SA7 Grid (Pin 8)	260 KC	*High Frequency Stop	A, B, C, D
2	0.000068 mfd	Antenna Connector	1615 KC	High Frequency Stop	**E, F, G
3	0.000068 mfd	Antenna Connector	600 KC	Signal Gen. Signal	J, K
4	0.000068 mfd	Antenna Connector	1615 KC	Signal Gen. Signal	F, G
5	0.000068 mfd	Antenna Connector	1000 KC	Signal Gen. Signal	***L

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

**Before making this adjustment, check the setting of oscillator core "H." The rear of the core should be $1\frac{33}{32}$" from the mounting end of the coil form. This measurement is readily made by inserting a suitable plug in the mounting end of the coil form. The core adjustment is made from the mounting end of the coil form with an insulated screwdriver. (It will be necessary to steady the core guide bar by applying a downward pressure at the antenna core end of the bar while making these adjustments.) If this adjustment is necessary, first dissolve the glyptal seal on the core stud and be sure to re-seal after making the adjustment.

***"L" is the pointer adjustment screw on the end of the core guide bar—adjust so pointer reads 1000 KC.

With the radio installed and the antenna plugged in, adjust antenna trimmer "G" (See sticker on case) for maximum volume with the radio tuned to a weak station near 1400 KC.

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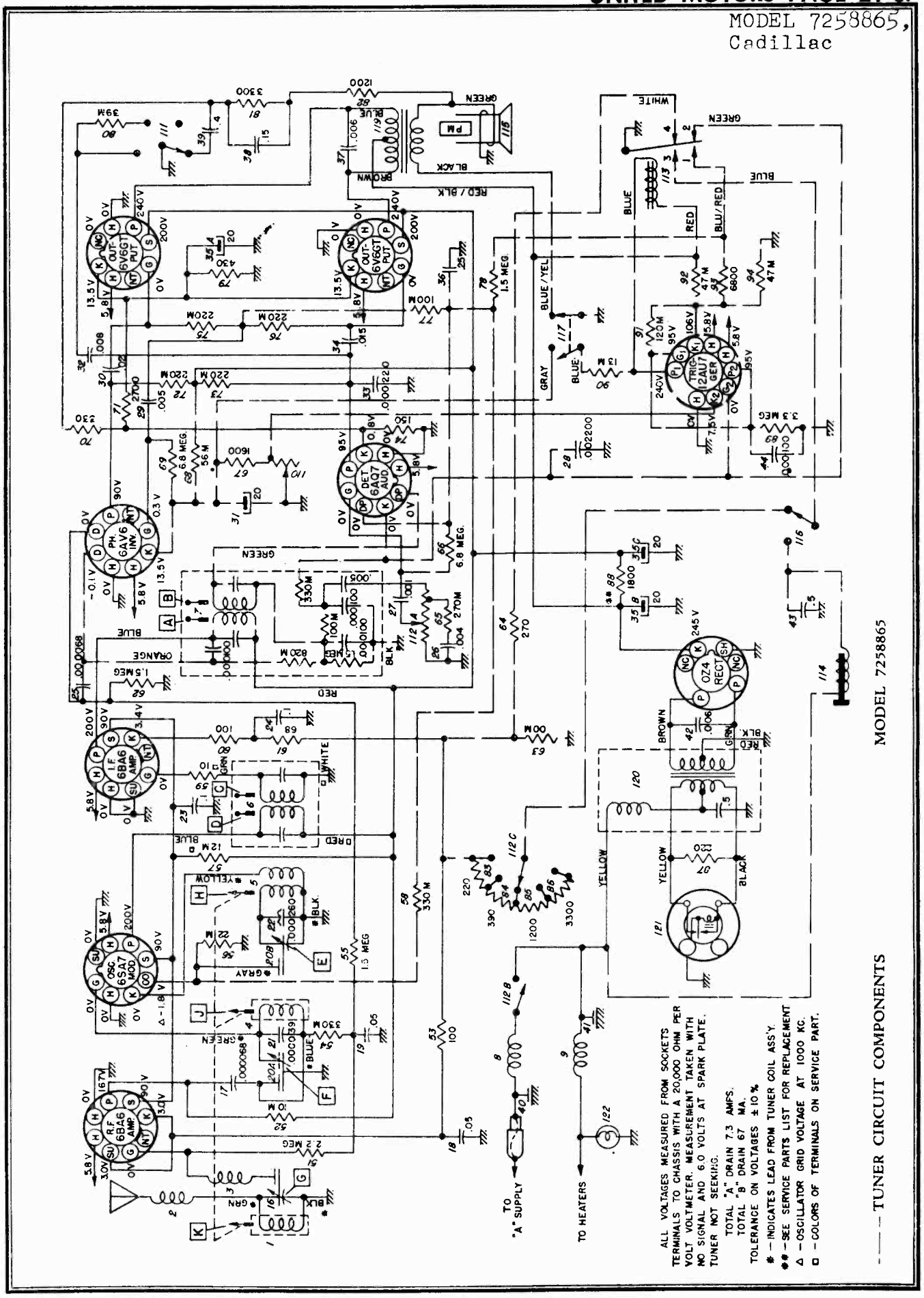
MODEL 7258865,
Cadillac



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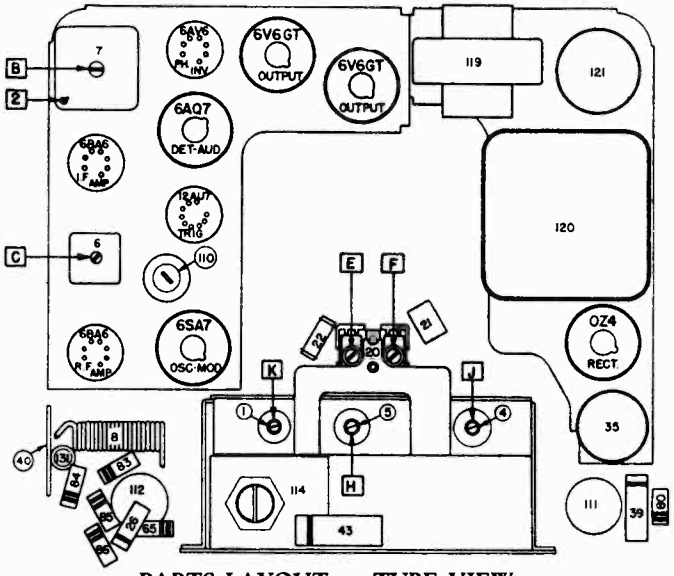
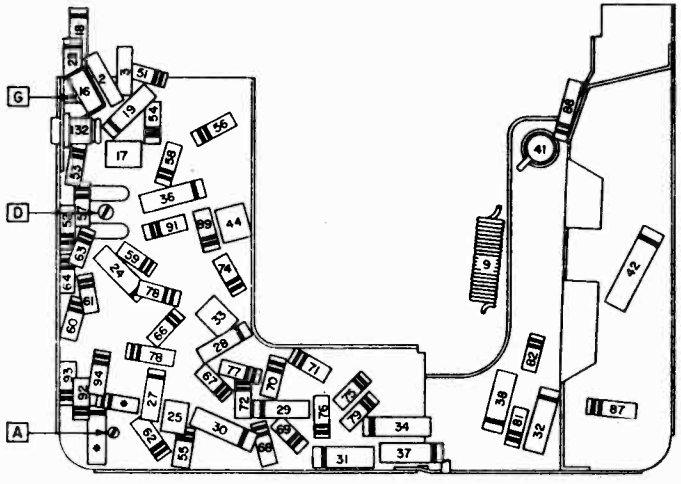


PARTS LAYOUT — TUBE VIEW

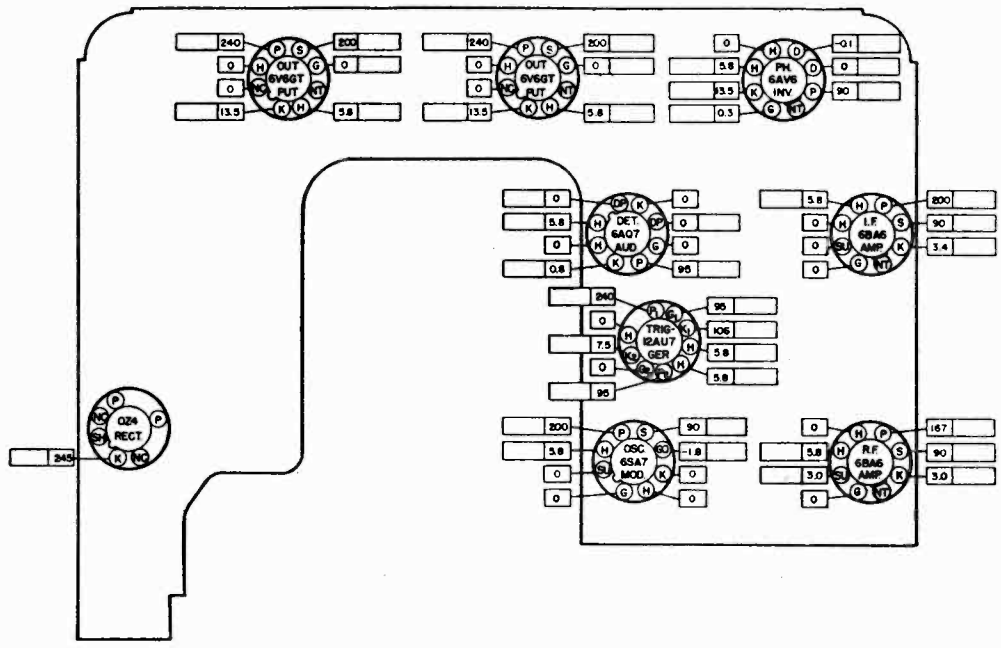


PARTS LAYOUT — CHASSIS VIEW

*Condenser and resistor are included in the 2nd I.F. Coil Assembly.

**Connect a VTVM from this point to ground for output indications during alignment.

TUBE SOCKET VOLTAGE CHART



The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

Voltmeter resistance ..... Ohms Per Volt.

Readings taken with ..... Volts At Spark Plate.

All voltages measured from socket terminals to chassis.

TUNER ADJUSTMENT PROCEDURE:

CATHODE DELAY ADJUSTOR (Illustration #110) (This adjustment should be necessary only if the delay adjustor has been replaced or the adjustment has definitely been proven to be faulty).

With exactly 6.0 volts on the spark plate, set the delay adjustor (Illus. 110) so that the voltage at K_2 of the 12AU7 trigger tube (Pin #8) is exactly 7.5 volts.

NOTE: For all other tuner adjustments, see Bulletin 6D-620.

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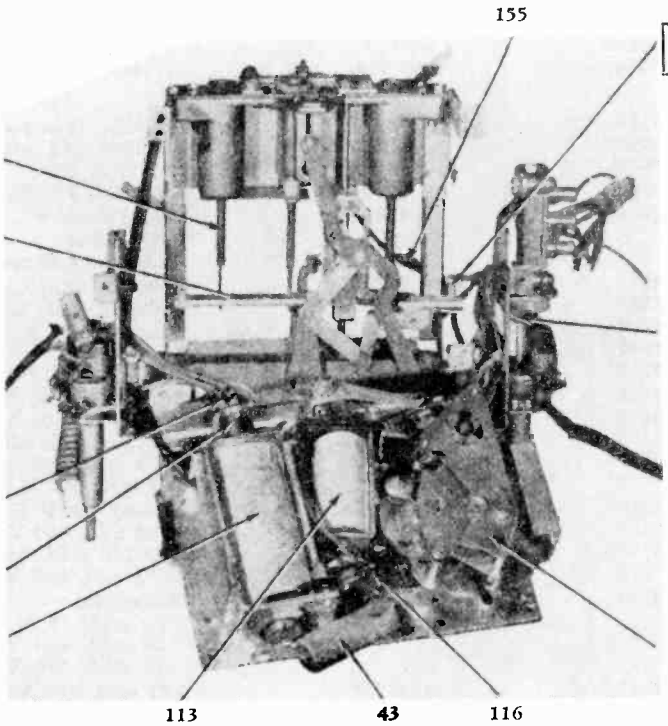
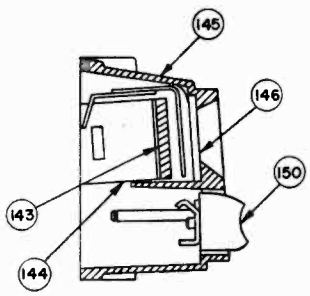
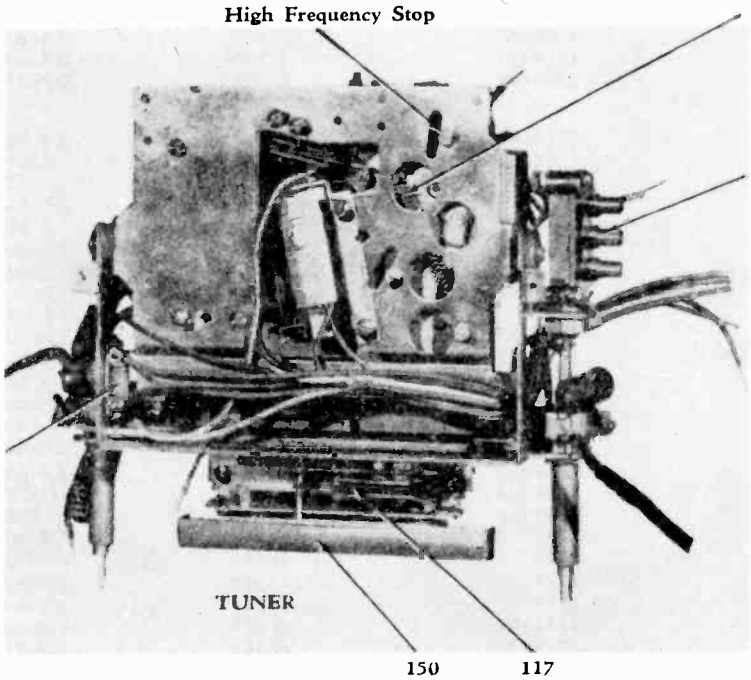
MODEL 7258865, Cadillac



TUNER — OPEN



ESCUTCHEON
CROSS-SECTION



SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7257979	7257979	Antenna
2	7258502	7258502	Antenna Series Choke
3	7240251	7240251	Antenna Spark Choke
4	7257979	7257979	R.F.
5	7259184	7259184	Oscillator
6	7258849	1219508	1st I.F. Assy.
7	7259290	1219602	2nd I.F. Assy.
8	1217846	1217846	"A" Spark Choke
9	1217846	1217846	Hash Choke

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MODEL 7258865

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		Condensers	
16	7258226	7258226	Antenna Trimmer
17	1219550	G 680	0.000068 mfd. molded
18	1210697	E 503	0.05 mfd. 200 V Tubular
19	1210697	E 503	0.05 mfd. 200 V Tubular
20	7242454	7242454	Dual Trimmer
20A			RF Section
20B			Oscillator Section
21	7258221	G 390	0.000039 mfd. Ceramic
22	7257567	7257567	0.000260 mfd. Compensating
23	7238788	E 104	0.1 mfd. 400 V Tubular
24	7238789	E 104	0.1 mfd. 200 V Tubular
25	1219550	G 680	0.000068 mfd. Molded
26	1218969	E 402	0.004 mfd. 600 V Tubular
27	1218883	E 102	0.001 mfd. 600 V Tubular
28	1219553	1219553	0.002200 mfd. 600 V Tubular
29	7230767	E 502	0.005 mfd. 600 V Tubular
30	7233770	E 203	0.02 mfd. 600 V Tubular
31	1219660	1219660	20 mfd. 50 V Electrolytic
32	1219463	1219463	0.008 mfd. 600 V Tubular
33	7238792	G 221	0.000220 mfd. Molded
34	7237719	7237719	0.015 mfd. 600 V Tubular
35	7240724	M 908	Electrolytic
35A			20 mfd. 25 V
35B			20 mfd. 400 V
35C			20 mfd. 400 V
36	1209817	E 254	0.25 mfd. 200 V Tubular
37	1219084	H 602	0.006 mfd. 800 V Tubular
38	1218880	1218880	0.15 mfd. 100 V Tubular
39	1218882	1218882	0.4 mfd. 100 V Tubular
40	7259710	7259710	Spark Plate and "A" Connector
41	1217848	1217848	Chassis Plate Condenser
42	7240906	H 602	0.006 mfd. 1600 V Tubular
43	1219511	E 504	0.5 mfd. 100 V Tubular
44	1219499	G 101	0.000100 mfd. Molded
		Resistors	
51	1211147	A 225	2.2 Megohms ½ W Insulated
52	1211085	B 103	10,000 Ohms 1 W Insulated
53	1213217	A 101	100 Ohms ½ W Insulated
54	7240732	A 334	330,000 Ohms ½ W Insulated
55	1213283	A 155	1.5 Megohms ½ W Insulated
56	1211192	A 223	22,000 Ohms ½ W Insulated
57	1212491	1212491	12,000 Ohms 2 W Insulated
58	1214557	A 334	330,000 Ohms ½ W Insulated
59	1215107	A 100	10 Ohms ½ W Insulated
60	1213217	A 101	100 Ohms ½ W Insulated
61	1215558	1215558	68 Ohms ½ W Insulated
62	1213283	A 155	1.5 Megohms ½ W Insulated
63	1213270	A-104	100,000 Ohms ½ W Insulated
64	1214542	A 271	270 Ohms ½ W Insulated
65	1214556	A 274	270,000 Ohms ½ W Insulated
66	7241937	A 685	6.8 Megohms ½ W Insulated
67	1219504	1219504	1600 Ohms ½ W Insulated
68	1213509	1213509	56,000 Ohms 1 W Insulated
69	7241937	A 685	6.8 Megohms ½ W Insulated
70	1213224	A 331	330 Ohms ½ W Insulated
71	1213240	1213240	2700 Ohms ½ W Insulated
72	1214555	A 224	220,000 Ohms ½ W Insulated
73	1214555	A 224	220,000 Ohms ½ W Insulated
74	1213220	A 151	150 Ohms ½ W Insulated
75	1214555	A 224	220,000 Ohms ½ W Insulated
76	1214555	A 224	220,000 Ohms ½ W Insulated
77	1213270	A 104	100,000 Ohms ½ W Insulated
*78	*1213283	*A 155	1.5 Megohms ½ W Insulated
79	7239745	7239745	430 Ohms 1 W Wire Wound Insulated
80	1213480	A 393	39,000 Ohms ½ W Insulated
81	1213481	A 332	3300 Ohms ½ W Insulated
82	1213236	1213236	1200 Ohms ½ W Insulated
83	7237835	A 221	220 Ohms ½ W Insulated
84	1213482	A 391	390 Ohms ½ W Insulated
85	1213236	1213236	1200 Ohms ½ W Insulated
86	1213481	A 332	3300 Ohms ½ W Insulated
87	7237994	B 221	220 Ohms 1 W Insulated
88	1214573	C 272 / B 562	1800 Ohms Wire Wound (Replace with 2700 ohms 2 W and 5600 Ohms I W in parallel)
89	1214564	A 335	3.3 Megohms ½ W Insulated

*This resistor was 2.2 Megohms until Serial #62397—Use above Value in Service.

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SERVICE PARTS LIST

MODEL 7258865, Cadillac

Illus. No.	Production Part No.	Service Part No.	Description
		Resistors (Continued)	
*90	*7231539	*7231539	13,000 Ohms 1 W Insulated
91	1213271	1213271	120,000 Ohms ½ W Insulated
92	1216157	B 473	47,000 Ohms 1 W Insulated
93	1216154	1216154	6800 Ohms 1 W Insulated
94	1216157	B 473	47,000 Ohms 1 W Insulated
		Tubes	
	1217690	5252	6BA6
	7237752	5222	6SA7
	1218506	5262	6AV6
	1219484	5278	6AQ7GT
	1213793	5241	6V6GT
	1217924	5003	0Z4 Rectifier
	1219485	5328	12AU7
		Miscellaneous Electrical Parts	
110	7259408	7259408	Adjuster Cathode Relay
111	7259239	7259239*	Control - Tone
112	7259240	7259240	Control - Volume, Sensitivity Switch
112A			Volume Control
112B			Switch
112C			Sensitivity Control
113	7259009	7259009	Relay
114	1219661	1219661	Solenoid
115	7258488	7258488	Speaker 6 x 9 Elliptical PM
116	7259011	7259011	Switch - Tuner Return
117	7259012	7259012	Switch - Station Selector
119	7259336	7259336	Transformer - Output
120	7259375	7255881	Transformer - Power
121	7239124	8542	Vibrator - Non-Synchronous
122	125588	55	Lamp - Dial Light
		MECHANICAL PARTS	
		Chassis	
131	7259710	7259710	"A" Connector and Spark Plate
132	7258520	7258520	Antenna Connector
	7236279	7236279	Socket - Octal Tube
	7259307	7259307	Socket - 9 Pin Miniature Tube
	7258073	7258073	Socket - 7 Pin Miniature Tube
	7239125	7239125	Socket - Vibrator
133	1219603	1219603	Socket - Dial Light
		Tuner	
141	7259201	7259201	Core - Iron Tuning
142	7259178	7259178	Core - Guide Bar
143	7259319	7259319	Dial - Calibrated
144	7259531	7259531	Dial Backplate Assembly
	187189	44	Pilot Light
145	7258270	7258270	Escutcheon Assy.
146	7258236	7258236	Dial Glass
	7258232	7258232	Dial Glass Retainer (2)
148	1219610	1219610	Motor Gear Train
149	7259164	7259164	Plunger - Solenoid
150	1219604	1219604	Station Selector Bar Pkg.
			Station Selector Bar
	7259125	7259125	Switch Operating Collar
			Toggle Plate
	7259111	7259111	Spring (2)
	1216508	1216508	"C" Washer
151	7259100	7259100	Spring Clip
152	7257361	7257361	Spring - Vacuum Valve Anti-Rattle
	7258239	7258239	Spring - Calibrated Dial Retainer
154	7258260	7258260	Vacuum Valve
	7259264	7259264	Vacuum Valve Shaft
155	7259055	7259055	Spring - Motor Power
		INSTALLATION PARTS	
	7258542	7258542	"A" Lead Assy.
	7240138	6013	Static Collector
	1911095	6030	Condenser - Generator
	1910147	6030	Condenser - Ignition Coil
	7259510	7259510	Escutcheon - Sensitivity Control
	7259509	7259509	Escutcheon - Tone Control
	147685	147685	Fuse - 14 Amperes
	7242024	7242024	Fuse Holder Complete
	7259369	7259369	Knob - Control
	7259508	7259508	Knob - Sensitivity Control
	7259507	7259507	Knob - Tone Control
	7259514	7259514	Spring - Tone Control Retainer

*This resistor was 15,000 Ohms until Serial #62300—Use above Value in Service.

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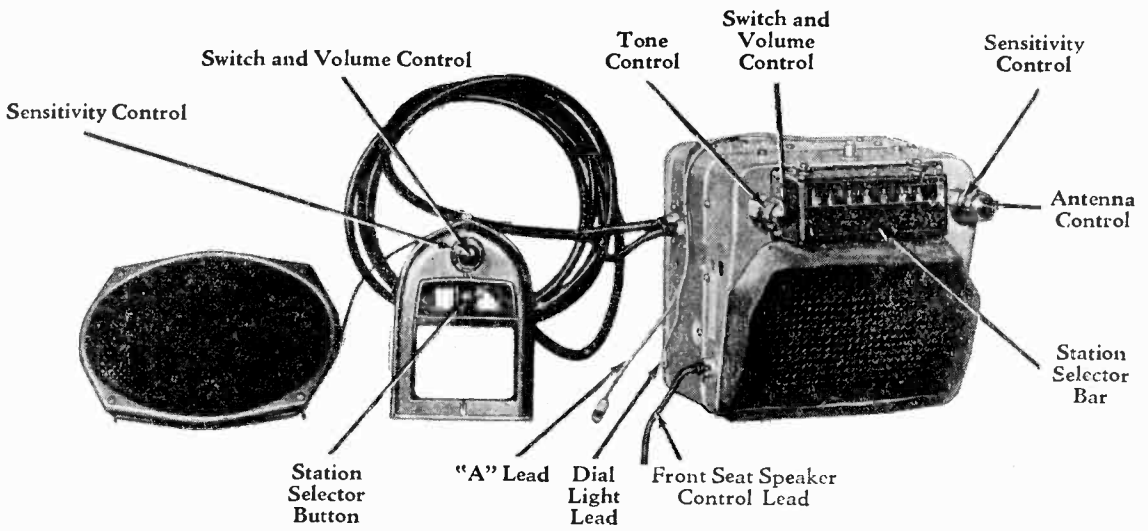
MODEL 7259825,
Cadillac

This Model Same as Model 7258865, Except as Indicated by This Bulletin



MODEL 7259825

GENERAL

MOUNTING—1950 Cadillac 75 Series Cars.

TUBES—Seven, Plus Rectifier and Trigger.

SPEAKER—6" x 9" Elliptical, Permanent Magnet, Front — 6" x 9" Elliptical, Permanent Magnet, Rear.

TUNING—Electronic.

ANTENNA TRIMMER COMPENSATION—0.000060 - 0.000085 Mfd.

TUNING RANGE—540 - 1600 KC.

PUSHBUTTON SET-UP—No pushbutton set-up is necessary. However, the number of stations on which the tuner will stop can be controlled by the use of the Sensitivity Controls.

ALIGNMENT PROCEDURE—Alignment procedure same as that of Model 7258865, Bulletin 6D-1060.

FUNCTIONAL OPERATION

The Cadillac remote control signal seeker type radio has all the controls of the Cadillac Syncro-Matic Model 7258865 Radio for front seat operation and in addition has a control head mounted in the left rear seat arm rest for rear seat operation. This remote control head has a switch, volume control, and station selector button.

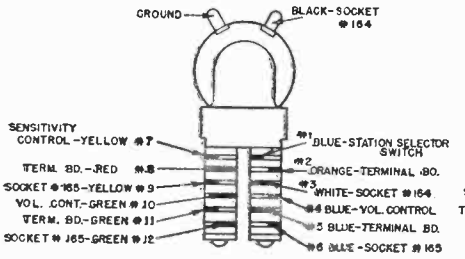
After the rear seat control switch is turned on, only the rear controls operate the radio. The radio can not be operated from the front seat again until the rear control switch is turned off. Two controls that are always operated at the receiver are the tone control and the antenna control.

This radio operates from the front instrument panel in exactly the same manner as the 7258865 Model except for a front speaker switch mounted on the lower edge of the instrument panel to the left of the steering wheel. This switch can only be used when the rear control is in operation, and it gives the front seat occupants the choice of listening at a reduced volume from normal output to the stations selected by the person operating the rear selector button or completely disconnecting the front speaker.

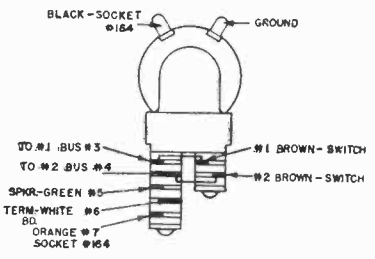
THEORY OF OPERATION

The energizing of relays, illustration numbers 125 and 126, is accomplished by turning the rear control switch (123C) to to the "on" position. When this switch is turned on, the "A" voltage is applied across the relays, energizing the relays and closing the contacts to the rear controls. With the relays 125 and 126 energized, the rear seat controls are operative and not the front seat controls.

Once these relays are energized, the "A" supply is connected to the power transformer center-tap through contacts 1-2 and 3-4 of relay 126, regardless of the position of the front switch (112B); therefore the radio can not be turned off until the relays are de-energized by turning off the rear switch (123C). With the relays in the de-energized position, all controls are operative at the receiver, while all remote controls in the left rear arm rest are inoperative.



RELAY 125



RELAY 126

Relay leads' destinations and colors are to the respective contacts as numbered on the schematic.

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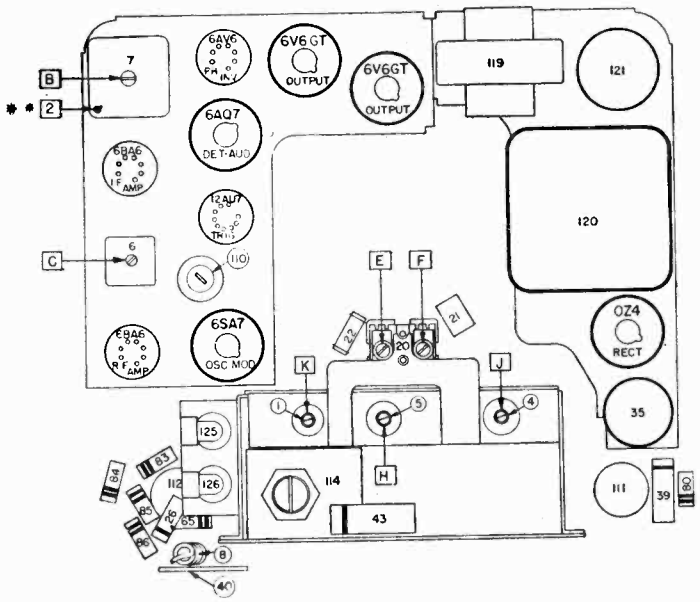
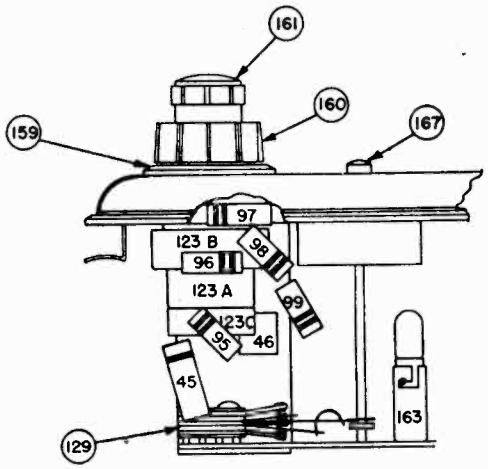
MODEL 7259825,
Cadillac



PARTS LAYOUT — TUBE VIEW

**Connect a VTVM from this point to ground for output indications during alignment.



PARTS LAYOUT — REAR CONTROL

SCHEMATIC DATA

All voltages measured from sockets terminals to chassis with a 20,000 Ohm per volt voltmeter. Measurements taken with no signal and 6.0 volts at spark plate. Oscillator grid voltage taken with the set tuned to 1000 KC. Tuner not seeking.

Total "A" Drain 7.3 Amps.

Total "B" Drain 67MA.

Tolerance on voltages ± 10%.

*—Indicates lead from tuner coil assy.

**—See Service Parts List for replacement.

□—Colors of terminals on service part.

Note the red and black circuits are exactly the same as those of Model 7258865. The blue circuit has been added so that the tuner can be controlled from the rear seat location. This circuit is switched in or out of control by the relays which are energized from the rear seat.

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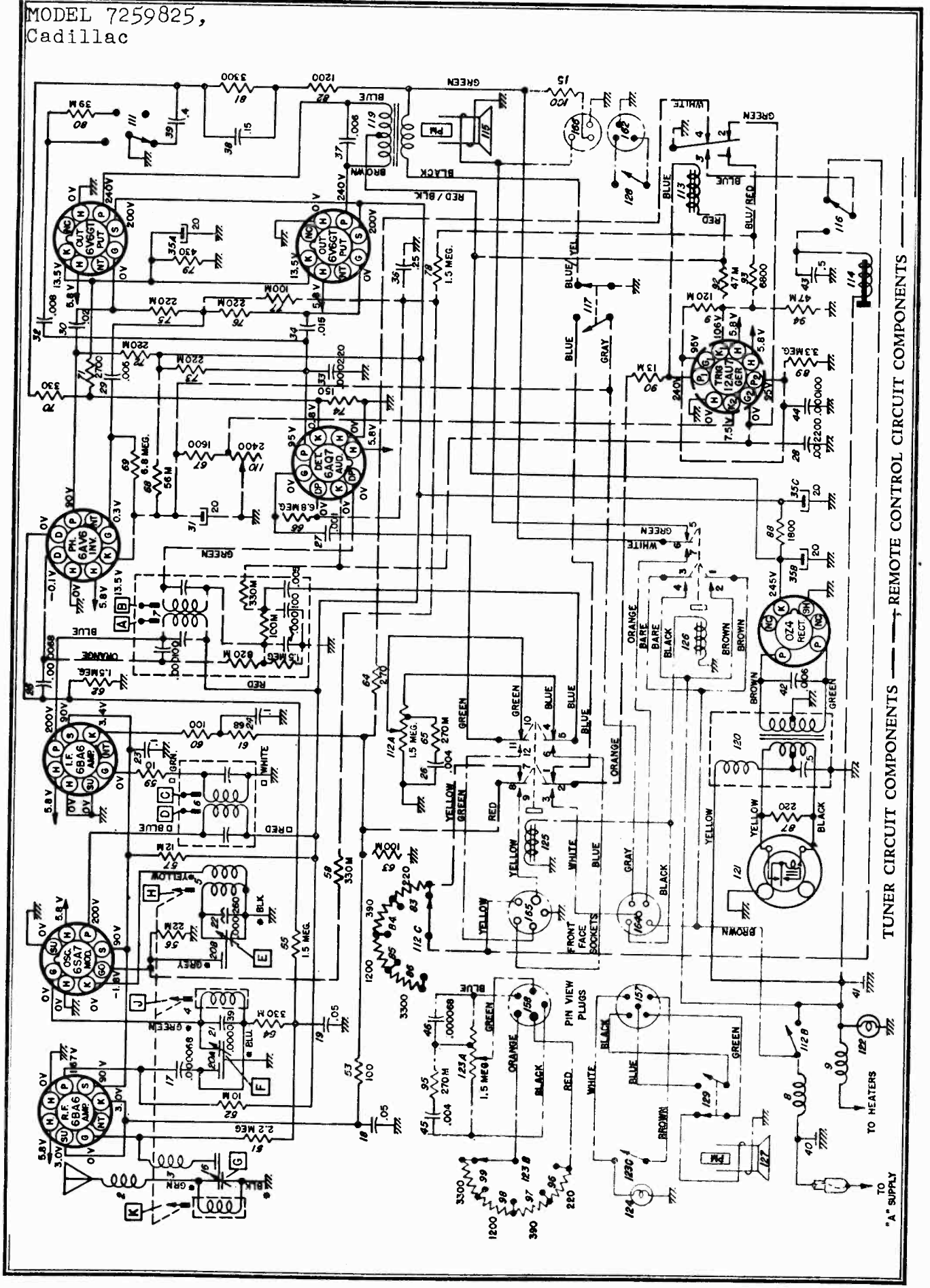

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MODEL 7259825,
Cadillac

CADILLAC REMOTE CONTROL SYNCROMATIC MODEL SERVICE PARTS LIST

The Service Parts List of the Cadillac Remote Control Syncromatic Radio is identical to the Cadillac Syncromatic Radio, Model 7258865, except for the illustration numbers and parts listed below: Those parts marked with an asterisk (*) are changed from Model 7258865—the others are added parts.

ELECTRICAL PARTS

Illus. No.	Production Part No.	Service Part No.	Description
		Condensers	
* 40	7241259	7241259	Spark Plate
45	1218969	E 402	.004 Mfd 600V Tubular
46	1219550	G 680	.000068 Mfd Molded
		Resistors	
95	1214556	A 274	270,000 Ohms ½W Insulated
96	7237835	A 221	220 Ohms ½W Insulated
97	1213482	A 391	390 Ohms ½W Insulated
98	1213236	1213236	1200 Ohms ½W Insulated
99	1213481	A 332	3300 Ohms ½W Insulated
**100	1219672	1219672	15 Ohms 2W Insulated
		Miscellaneous	
123	7259947	7259947	Control - Volume, Sensitivity and Switch - Rear
123A			Volume
123B			Sensitivity
123C			Switch
124	187189	44	Lamp - Dial Light
125	7259951	7259951	Relay - 4 Section
126	7259952	7259952	Relay - 3 Section
127	1457062	1457062	Speaker - 6x9 Elliptical PM, Rear
128	7259950	7259950	Switch - Front Speaker
129	7259012	7259012	Switch - Station Selector, Rear

MECHANICAL PARTS

		Chassis	
*131	7257891	7257891	A-Lead Assembly
		Remote Control	
	7259946	7259946	Cable - Rear Seat
157	1219682	1219682	Plug and Shell Pkg.
158	1219679	1219679	Plug and Shell Pkg.
	4589122	4589122	Escutcheon - Arm Rest
159	7259510	7259510	Escutcheon - Sensitivity Control
160	7259508	7259508	Knob - Sensitivity Control
161	7259369	7259369	Knob Control
162	1219688	1219688	Plug - Front Speaker Switch
163	1219686	1219686	Socket Pkg. - Dial Light
164	7259944	7259944	Socket - Cable Plug
165	7259943	7259943	Socket - Cable Plug
166	7258498	7258498	Socket - Front Speaker Plug
167	1219687	1219687	Station Selector Button Pkg.
			Push Button Assy.
	7259125	7259125	Retaining Ring
			Washer
			Felt Washer
	7256121	7256121	"C" Washer

INSTALLATION PARTS

*	7259970	7259970	"A" Lead Assembly

** Located on the top of the hash cover.

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