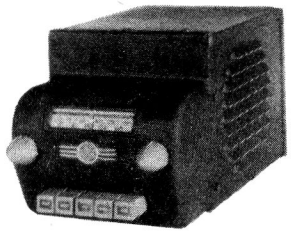
MODEL H-5M

Five-Tube, Single Unit, Superheterodyne Automobile Receiver



Electrical Specifications

TUBES AND FUNCTIONS

6A8 ..... First Detector—Oscillator
6K7 ..... I-F Amplifier
6Q7 ..... Second Det., A-F Amp. and A.V.C.

FREQUENCY RANGE .....550-1,550 kc

POWER OUTPUT

Type ..... Pentode
Undistorted ..... .9 watts
Maximum ..... 3.6 watts

POWER SUPPLY

"A" ..... 6.3 volt Auto Storage Battery
"B" ..... Non-Synchronous Vibrator
Current Drain ..... 6.3 amps.

CHASSIS FEATURES

No. I-F Stages ..... One
Completely Shielded Ant. Filter
Magnetite-core Adjusted Antenna and I-F Transformers
Ignition-Noise-Suppression Filters
Antenna Compensator Trimmer
Illuminated Dial

6K6G ..... Output
0Z4G ..... Rectifier
Dial Lamp ..... 6.3 volts, 0.25 ampere

ALIGNMENT FREQUENCIES

I-F ..... 455 kc
Ant. .....600 and 1,400 kc
Oscl. ..... No Adjustment

LOUDSPEAKER

Type ..... Electrodynamic
Size ..... 5 inches
V. C. Impedance ..... 3.2 ohms at 400 cycles
Field Coil Resistance ..... 5 ohms
App. Field Coil Voltage Drop..... 6 volts

OPERATING FEATURES

Mechanical Key Tuning
Independent Manual Tuning Control
Automatic Volume Control

Mechanical Specifications

OPERATING CONTROLS

1. Left Knob..... On-Off Switch and Volume
2. Five Keys ..... Station Tuning
3. Right Knob..... Manual Tuning, Ratio 2½—1

Net Weight ..... 8½ pounds
Shipping Weight ..... 14 pounds

CONTROL OPERATION

Turn Right..... Power On; Volume Increase
Key ..... Signal Tuned Automatically
Rotate ..... Signal Tuned Manually

General Description

Model H5M is a five-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five keys, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for key tuning are explained on page 5 under the heading "Key Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

Loudspeaker.—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, taking care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid cement after adjustment has been completed.

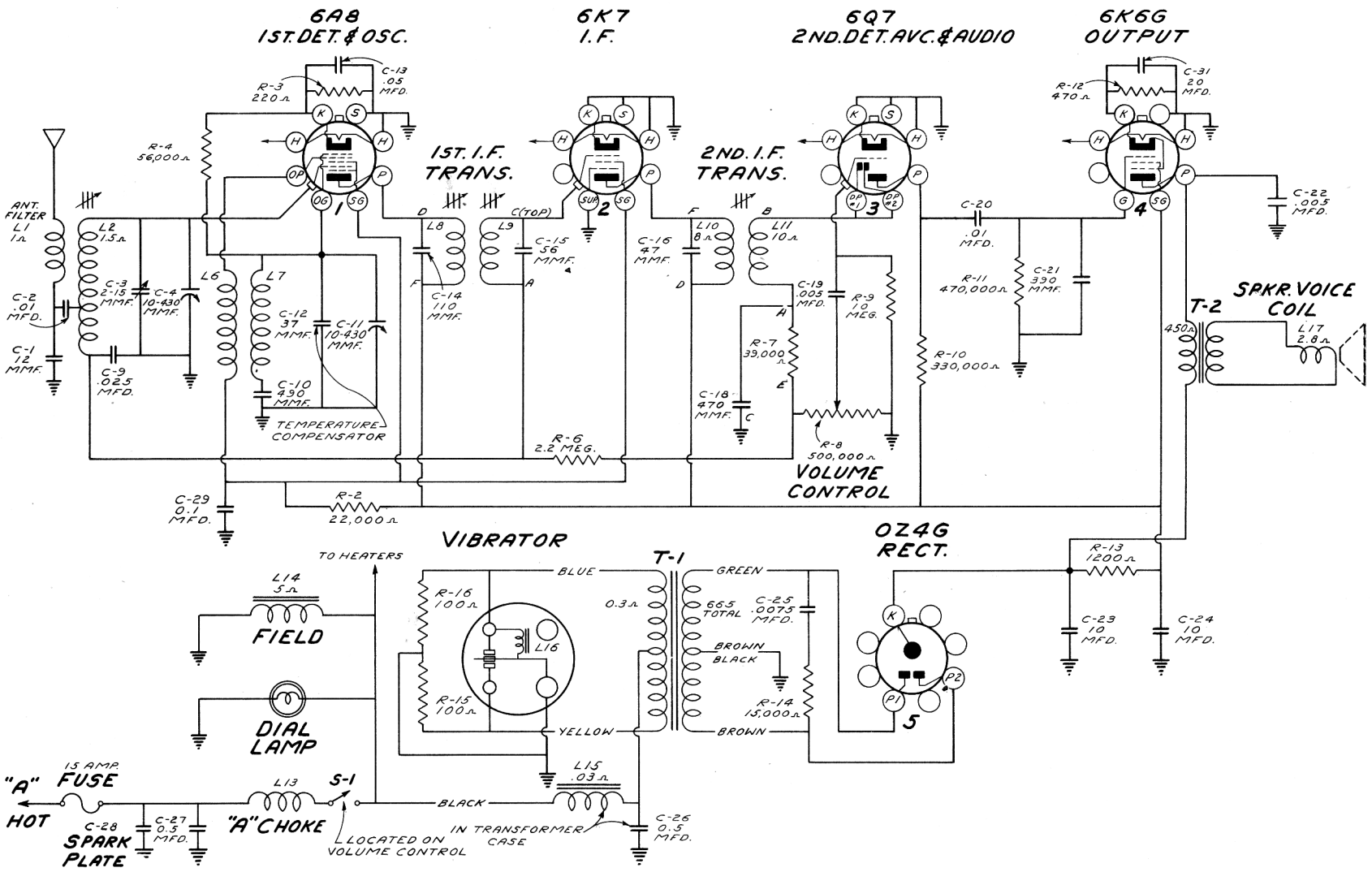


Fig. 1—Schematic Circuit Diagram

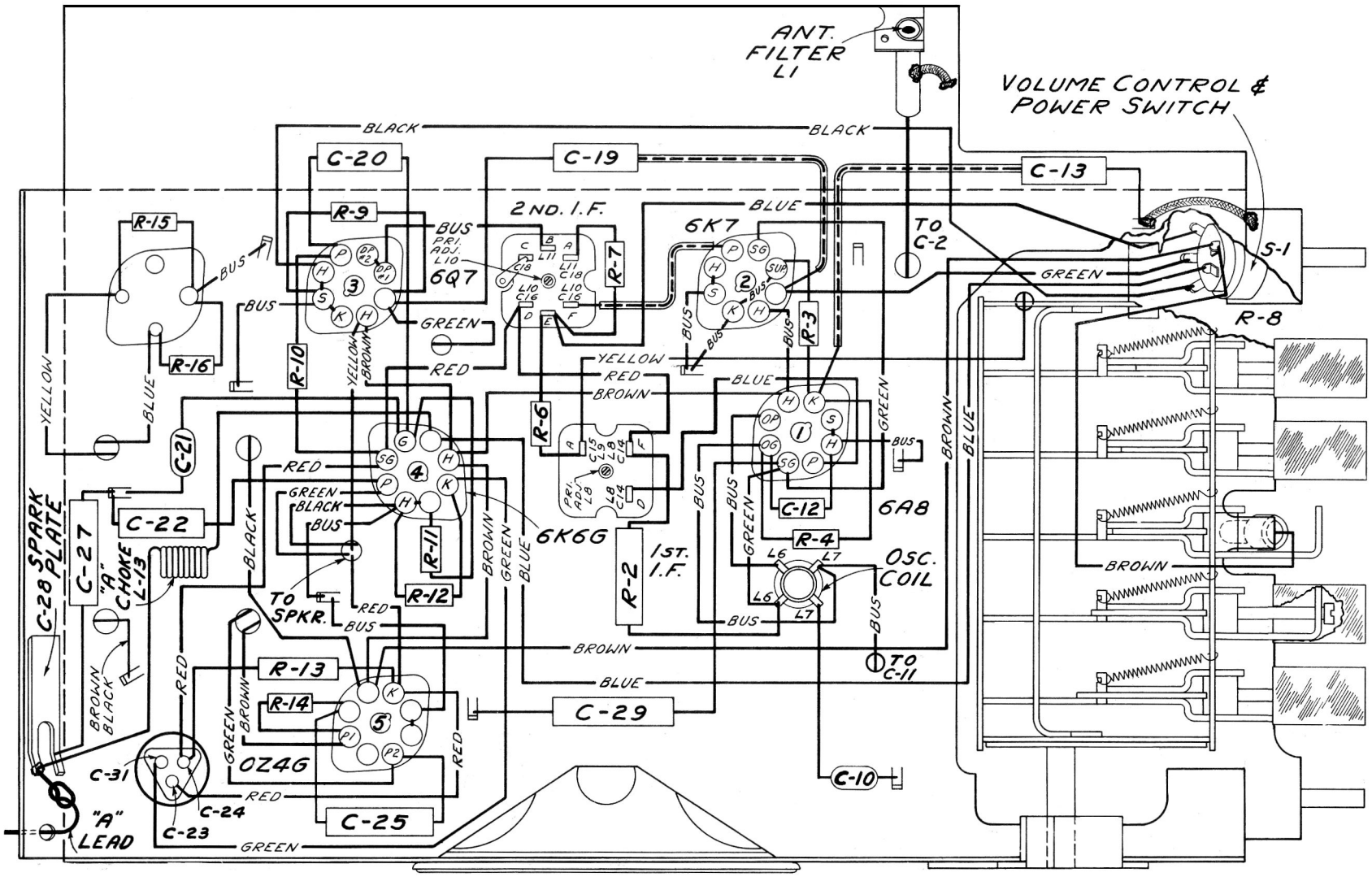


Fig. 2—Chassis Wiring Diagram

Alignment Procedure

PRELIMINARY:

Output meter connections ..... Across speaker voice coil
Output meter readings to indicate 1 watt ..... 1.8 volts
Generator ground lead connections ..... To chassis
Dummy antenna value to be in series with generator output ..... See Chart Below
Connection of generator output lead ..... See Chart Below
Generator modulation ..... 30%, 400 cycles
Position of Volume Control ..... Fully clockwise
Chassis must be in its case with front end removed, when aligning R-F circuit.

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Adjustment Symbol	Circuit Adjusted
No Signal 550-750 kc	455 kc	.001 mfd.	6K7 Grid	L-10	2nd I.F. Trans.
No Signal 550-750 kc	455 kc	.001 mfd.	6A8 Grid	L-8, L-9	1st I.F. Trans.
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3	Ant.
600 kc	600 kc	.0001 mfd. †	Ant. Lead	L-2	Ant.
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3 *	Ant.

NOTE: No oscillator alignment adjustments are required in this receiver.

IMPORTANT ALIGNMENT NOTES.

† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit" in "Service Data."

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

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

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

Oscillator circuit alignment is not required in this receiver at either end of the band; the oscillator coil is pre-adjusted for inductance in the factory.

Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case.

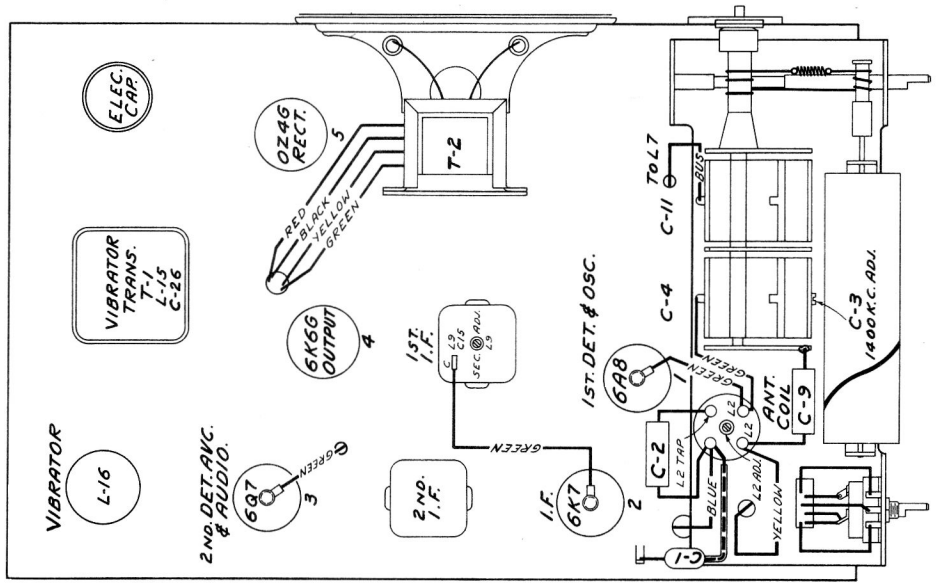


Fig. 3—Location of Parts and Alignment Adjustments

Service Data

Antenna Circuit.—The antenna circuit is designed to work with a low capacity antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If larger antennas, such as screened top or a double under the running-board having a total capacity of 200 to 550 mmf. is to be used, it will be necessary to reduce the value of the antenna coupling capacitor C-2 from .01 to approximately 200 mmf. (.0002). For even larger antennas such as insulated steel tops, a correspondingly smaller value of C-2 (approximately 125 to 150 mmf.) should be used keeping in mind to use the largest value possible with which the antenna circuit can be aligned.

After installation, and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer (C-3) for maximum signal output. This trimmer is accessible by prying off the nameplate between the control knobs.

Antenna Filter.—A filter is included in the antenna circuit. Being completely shielded, it prevents radiating ignition interference within the set. It also reduces the possibility of picking up vibrator interference. As shown in Figure 4, the filter unit is mounted inside a steel shell which in turn is welded to the chassis. The shielded antenna lead-in makes contact with the filter unit within the steel shell and is held in place by a bayonet type connector.

Key Tuning Mechanism.—The key tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the key actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft. The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

The cams which determine the stop points for each key are mounted on the push arms and are locked in place by the locking screws and lock-shoes, which press firmly against the cams when the locking screws are tightened. **Care should be used when locking screws are tightened not to use excessive force as the threads may become damaged or stripped.**

Adjustments for Key Tuning are very easily made. To adjust a key for any station proceed as follows:

(1) Pull the key off the push arm.

(2) Loosen the cam locking screw one-half turn.

(3) Using the Manual Tuning Control tune in the station.

(4) Press the push arm in as far as it will go and accurately retune station.

(5) With the push arm still held down, tighten cam locking screw.

(6) Replace the key.

With the locking screw tight, the cam is locked in position and when the key is pushed in, the cam pressure causes the rocker plate to assume the position that tunes in the desired station.

Manual Tuning Dial.—A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a pulley on the condenser shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. Figure 6 shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.

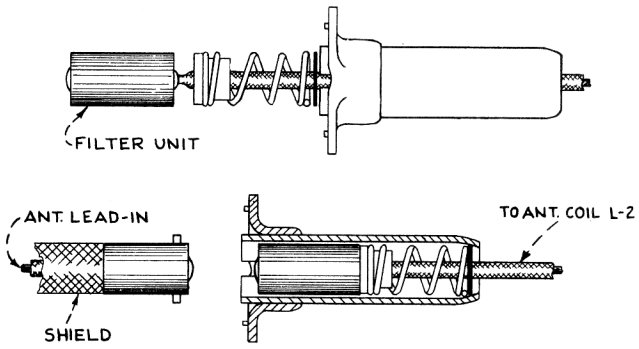


Figure 4—Antenna Filter

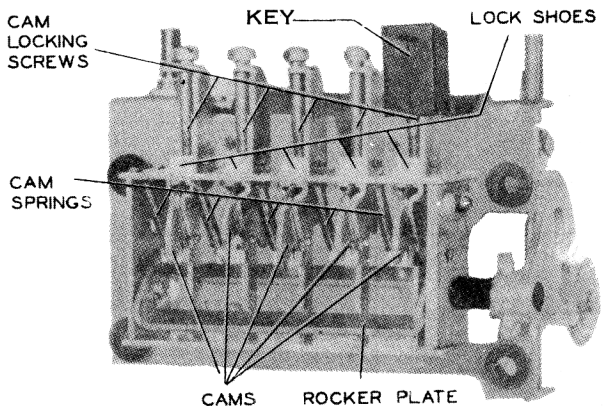


Fig. 5—Bottom View of Key Mechanism

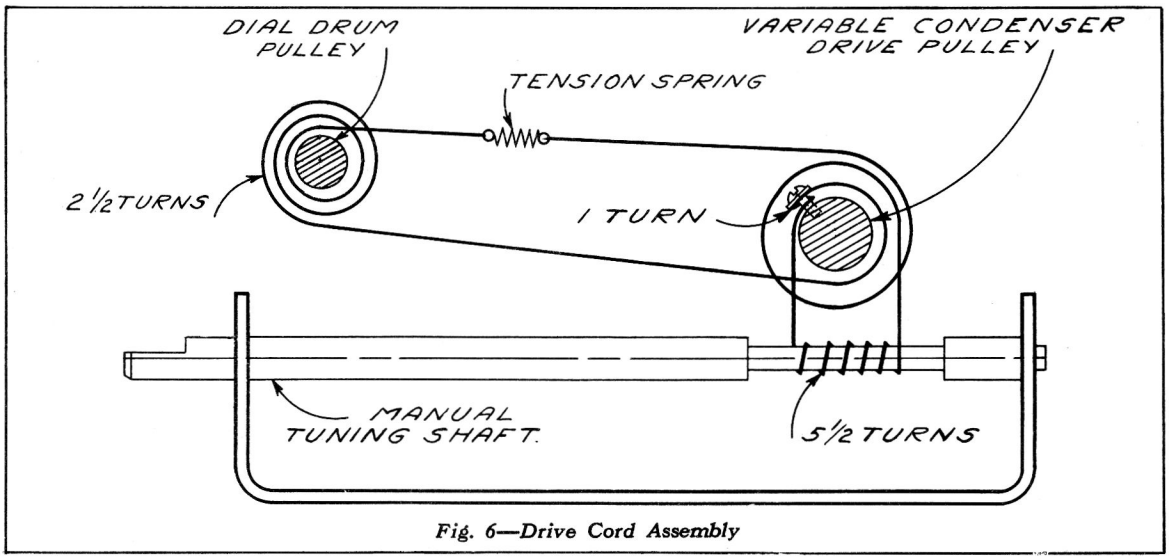


Fig. 6—Drive Cord Assembly

RECEIVER MOUNTING CHART FOR 1939 MODEL CARS.

MAKE OF CAR	RECEIVER POSITION	HEATER POSITION	REMARKS
BUICK	In centre, under instrument Panel.	Right side.	May be installed to left of steering column. Space down to clear map light switch handle.
CHEVROLET or PONTIAC	To right of steering column under instrument panel.	Right Side.	---
CHRYSLER DESOTO DODGE PLYMOUTH	To right of cowl ventilator handle, under instrument panel.	Right side.	---
FORD (Deluxe)	To left of centre, between cowl ventilator handle and panel light rheostat.	Right of centre.	---
FORD (Mercury)	To left of centre, clear of shift lever when in reverse.	Right of centre.	---
FORD (Standard)	To left of centre, under instrument panel between steering column and cowl ventilator handle.	Centre of firewall.	Space down to clear panel light switch handle.
HUDSON 6,8 & 112	In centre, under instrument panel.	Right side.	---
NASH	Right side, under glove box.	In centre.	May be installed to left of steering column. Space down to clear switch handle.
OLDSMOBILE	On right side, under glove compartment.	In centre.	May be installed in centre to right of ventilator handle when heater is not used.
PACKARD	Right of ventilator handle under instrument panel.	In centre or on right side.	On cars not equipped with over-drive, mount receiver between steering column and ventilator handle.
STUDEBAKER	Left of steering column, under instrument panel.	In centre.	Receiver may be mounted in centre of panel, when heater is not used.

Radiotron Socket Voltages

Type	Plate	Screen Grid	Cathode		Heater
6A8 Det.	220V	85V	1.4V		6.3V
6A8 Osc.	85V	—	—		—
6K7	220V	85V	0		6.3V
6Q7	70V	—	0		6.3V
6K6G	250V	220V	12V		6.3V
0Z4G	Output voltage 225V measured from cathode to gnd.				—

Note:—The above readings were taken with volume control set at maximum, receiver tuned to a quiet point with no signal received. To duplicate the above readings use a standard 0-1 milliameter with 10-50—150—250—500 volt ranges. All readings should hold within ± 20% of values given.

REPRODUCER ASSEMBLIES (CRL 503-2)

S-2415 Coil—Field Coil (L14) .....
S-2375 Cone—Reproducer Cone and Voice Coil (L17)
S-2416 Reproducer Complete .....
S-2417 Output Transformer (T2) .....

REPLACEMENT PARTS MODEL H5M

STOCK NO.	DESCRIPTION	
	RECEIVER ASSEMBLIES	
S-2301	Cap-Grid connector cap (Pkg.of 5)..	
13002	Capacitor-12 mmfd. (C1).....	
31728	Capacitor-37 mmfd. (C12).....	
12405	Capacitor-47 mmfd. (C16).....	
13307	Capacitor-56 mmfd. (C15).....	
14262	Capacitor-110 mmfd.(C14).....	
13894	Capacitor-390 mmfd.(C21).....	
30673	Capacitor-470 mmfd.(C18).....	
32363	Capacitor-490 mmfd.(C10).....	
4838	Capacitor-.005 mfd.(C19,C22).....	
30626	Capacitor-.0075 mfd.(C25).....	
14393	Capacitor-.01 mfd. (C2,C20).....	
4870	Capacitor-.025 mfd.(C9).....	
30882	Capacitor-.05 mfd.(C13).....	
11414	Capacitor-0.1 mfd.(C29).....	
12741	Capacitor-0.5 mfd.(C27).....	
S-2356	Capacitor-Electrolytic capacitor consisting of two 10 mfd.sections & one 20 mfd. section (C23,C24,C31).	
31596	Clip-Spring clip to hold oscillator coil (Pkg.of 5).....	
S-2336	Coil-Antenna coil and core, less shield (L2).....	
31977	Coil-Antenna filter (L1).....	
S-2337	Coil-Oscillator coil (L6,L7).....	
11765	Lamp-Dial Lamp.....	
30641	Lead-Ammeter lead (chassis end) complete with male section of fuse holder.....	
30540	Resistor-100 ohms-$\frac{1}{2}$ watt (R15,R16).	
14561	Resistor-220 ohms-$\frac{1}{4}$ watt (R3).....	
30499	Resistor-470 ohms-$\frac{1}{2}$ watt (R12).....	
6134	Resistor-1200 ohms-1 watt(R13).....	
12695	Resistor-15,000 ohms-$\frac{1}{4}$ watt (R14)..	
13669	Resistor-22,000 ohms-2 watt (R2)...	
12266	Resistor-39,000 ohms-$\frac{1}{4}$ watt (R7)...	
12286	Resistor-56,000 ohms-$\frac{1}{4}$ watt (R4)...	
12452	Resistor-330,000 ohms-$\frac{1}{2}$ watt(R10)..	
12285	Resistor-470,000 ohms-$\frac{1}{4}$ watt(R11)..	
12679	Resistor-2.2 meg. - $\frac{1}{4}$ watt (R6)....	
13601	Resistor-10 megs. - $\frac{1}{4}$ watt (R9)....	
13471	Ring-Retaining ring for antenna coil (Pkg.of 5).....	
S-2338	Socket-Dial lamp socket.....	
31319	Socket-Radiotron socket.....	
13686	Socket-Vibrator socket.....	
14261	Transformer-First I.F.Transformer (L8,L9,C14,C15).....	
30672	Transformer-Second I.F.Transformer (L10,L11,C16).....	
31597	Transformer-Vibrator power transformer (T1,L15,C26).....	
13688	Vibrator-Plug-in vibrator complete (L16).....	
31637	Volume Control and power switch (R8,S1).....	

STOCK NO.	DESCRIPTION	
	TUNING UNIT ASSEMBLIES	
S-2339	Condenser-2 gang variable condenser (C3,C4,C11).....	
32634	Cord-Variable condenser drive cord	
32290	Gear-Variable condenser drive gear sector-fastens on cam shaft	
S-2345	Indicator-Station selector indicator and drum assembly.....	
S-2341	Pulley-Indicator drum pulley.....	
S-2352	Pulley-Variable condenser drive cord pulley.....	
S-2354	Push Arm-Station selector push arm assembly consisting of push arm,cam,lock plate and screw....	
2917	Retainer-Station selector knob shaft retainer (Pkg.of 5).....	
S-2342	Screw-No.6-32x9/64 set screw for pulley Stock #S-2341 (Pkg.of 5).	
31482	Screw-No.8-32x$\frac{3}{8}$ in.set screw for gear Stock #32290 (Pkg.of 5)....	
32510	Screw-Push arm adjustment screw..	
S-2343	Shaft-Station selector shaft.....	
S-2344	Spring-Variable condenser drive cord tension spring (Pkg.of 5)..	
30585	Spring-Push arm tension spring (Pkg.of 10).....	
	SPEAKER ASSEMBLIES 84391-501	
30782	Cone-Speaker cone and voice coil (L17).....	
30781	Speaker-Speaker complete.....	
30783	Transformer-Output transformer(T2)	
	MISCELLANEOUS ASSEMBLIES	
5025	Capacitor-Generator capacitor....	
S-2358	Dial-Station selector dial scale.	
5023	Fuse-15 Ampere fuse (Pkg.of 5)...	
4290	Insulator-Insulating sleeve for fuse holder (Pkg.of 10).....	
S-2347	Key-Station selector key.....	
S-2348	Knob-Station selector or volume control knob.....	
7766	Lead-Ammeter lead complete with clip and fuse holder.....	
S-2149	Marker-Station call letter markers (1 set).....	
31652	Mounting-Receiver mounting assembly consisting of brackets, straps,washers,screws and nuts..	
S-2350	Plate-Receiver name plate.....	
11349	Spring-Retaining spring for knob Stock #S-2348(Pkg.of 5).....	
S-2351	Spring-Retaining spring for key Stock #S-2347 (Pkg.of 5).....	
S-1182	Suppressor-Distributor suppressor	