

RCA Victor M-34

Automobile Receiver

Superheterodyne

INSTRUCTIONS

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

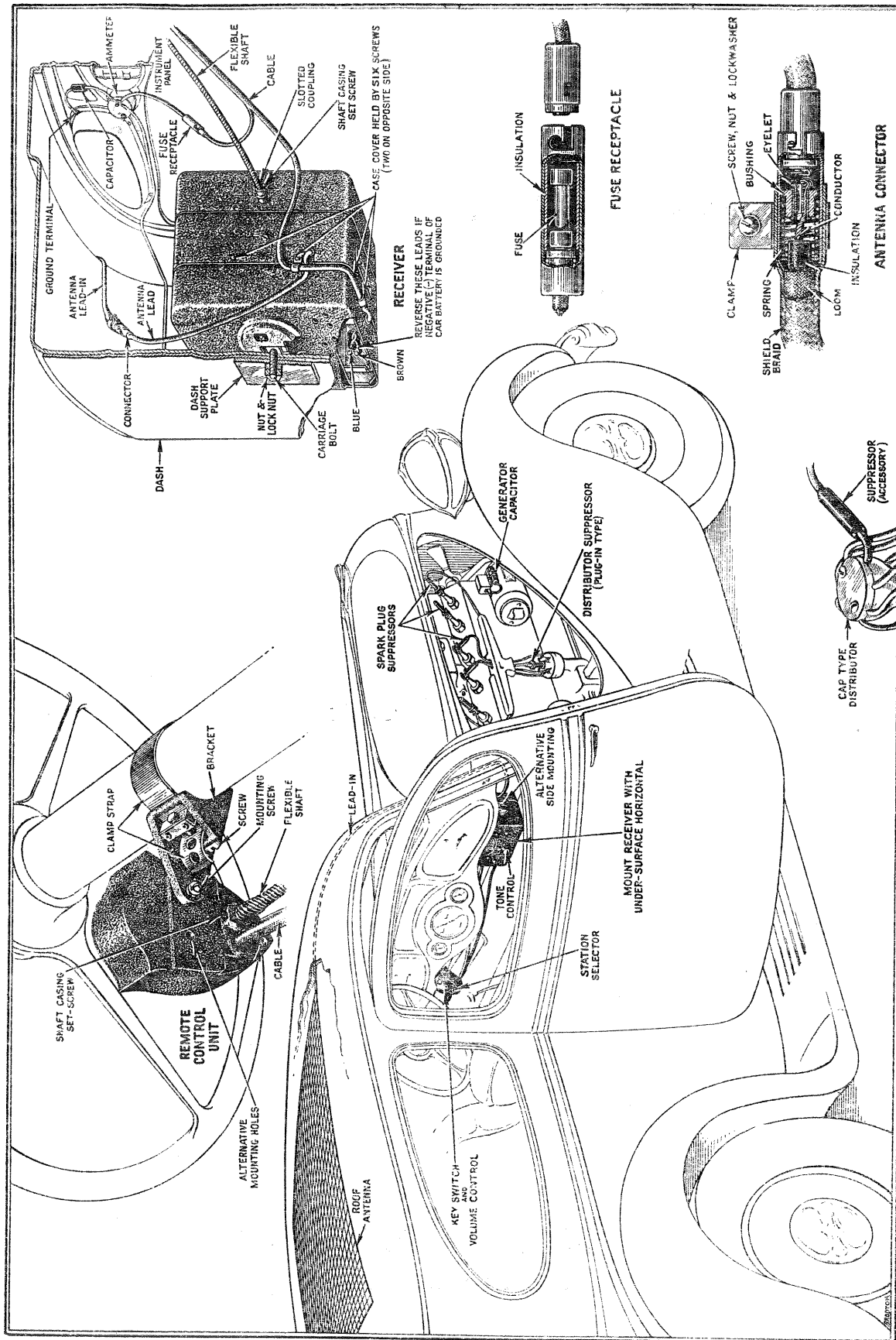


Figure 1

Instructions for
RCA Victor M-34
Automobile Receiver

INTRODUCTION

Mechanical simplicity and high-quality performance are keynotes of this automobile radio receiver. The instrument consists of a superheterodyne chassis, a loudspeaker, and a vibrator-type "B" battery eliminator mounted in a single case. It is operated from the car storage battery.

A remote control unit, mounted on the steering column and connected to the receiver through a flexible shaft and cable, places all controls convenient to the driver. This unit contains the station selector control, a glare-proof illuminated dial (calibrated in station channels) and a combined volume control and "key-lock" power switch.

Equipment for the suppression of ignition interference is provided. The use of a roof (built-in or interior type) antenna is recommended.

PART I—INSTALLATION

Procedure

1. Unpack the set from carton and check equipment. (See "Equipment Furnished"—page 4.)
2. **CHECK POLARITY OF AUTOMOBILE STORAGE BATTERY SUPPLY.** If the negative (—) side is grounded to car frame, remove case cover and make changes to chassis connections shown in Figure 1. *Do not disturb these connections if positive (+) side is grounded.* (See details under "Mounting of Units"—page 5.) Replace case cover.
3. Determine most satisfactory mounting position (see details under "Location of Units"—page 4), spot mounting-bolt location and drill $\frac{1}{2}$ " diameter hole. Insert bolt through dash and assemble support plate and nuts on engine side. Hang receiver over bolt head and tighten nuts. (See Figure 1 and details under "Mounting of Units"—page 5.)
4. Attach remote control unit to steering column by means of mounting bracket and strap. (See Figure 1 and details under "Mounting of Units"—page 5.)
5. Assemble flexible shaft to receiver and remote control unit. (See Figure 1 and details under "Mounting of Units"—page 6.) *Make sure that the set-screws are tightened firmly against both ends of shaft casing.*
6. Connect metal-shielded lead from receiver to antenna by means of coupling connector. (see notes on antennas under "Location of Units"—pages 4 and 5—and details of lead-in under "Connections"—pages 6 and 7.)
7. Connect terminal at end of *black* lead from cable to binding-post of automobile ammeter (see Figure 1 and details under "Connections"—page 7). The ignition by-pass capacitor (equipped with two leads) should be installed at this time. (See Figure 1 and paragraph 4 under "Suppression of Ignition Interference"—page 7.)
8. Install spark-plug and distributor suppressors; also generator by-pass capacitor (see Figure 1 and paragraphs 1, 2 and 3 under "Suppression of Ignition Interference"—page 7).
9. Push knob over shaft protruding through front of remote control unit. Observing the dial scale rotate knob slowly—first to stop position slightly beyond "150" and then reverse to other stop position slightly beyond "55."
10. Insert key in lock on remote control unit and turn to extreme clockwise position. Dial should become illuminated immediately but the tubes will not reach proper operating temperature until after approximately 45 seconds. (See details under "PART II—OPERATION" and "PART III—MAINTENANCE.")

Equipment

A. Equipment Furnished:

1. *Receiver Package*—Includes the receiver and remote control units joined by the wiring cable:

- (a) The receiver contains one each of the following Radiotrons installed in sockets: RCA-78, RCA-6A7, RCA-6B7, RCA-89.
- (b) The remote control unit contains one dial lamp (6-8 volts).
- (c) The wiring cable includes one fuse (20 amperes) installed in attached fuse receptacle.

2. *Outfit Package*—Containing:

- (a) Flexible shaft (33 $\frac{7}{8}$ inches long).
- (b) Receiver unit mounting bolt ($\frac{7}{16}$ inch diameter), dash support plate, and nuts (2).
- (c) Steering column bracket for remote control unit with strap, screws (2) and lockwasher (1).
- (d) Shield clamp for antenna lead-in wire with screw (1), lockwasher (1) and nut (1).
- (e) Key (1) and knob (1) for remote control unit and eyelets (2) for antenna connector packed in small envelope.
- (f) Ignition Interference Suppression Equipment:
 - 6 Spark plug type suppressors (additional obtainable from your dealer).
 - 1 Distributor type suppressor.
 - 2 Capacitors.
- (g) Instruction Book.

B. Additional Equipment Required:

1. *Antenna*—One of the following types:
 - (a) Roof (built-in) type—recommended.
 - (b) Roof (interior) type for attachment to head-lining inside car—also recommended. A special antenna of this type complete with pin-hooks and lead-in wire may be purchased from your dealer.
 - (c) Plate (sub-mounted) type for attachment to channel members of car chassis—alternative. An efficient plate antenna completely equipped for mounting and a specially-designed shielded lead-in wire also are obtainable from the dealer.

Location of Units

Receiver and Remote Control Units—The arrangement of units shown in Figure 1 is recommended and will be found applicable to the majority of automobiles. Consideration should be given to the possibility of interference of the receiver with other equipment beneath the instrument panel or of the mounting bolt with apparatus on the engine side of the dash. By placing the receiver unit toward the right-hand side of the dash, the flexible shaft will be of correct length as furnished in practically all cases. This position, however, may be considered impractical because of its universal preference for heating devices, necessitating installation of the receiver unit either near the center or at the extreme left-hand side of the dash and the use of a shorter flexible shaft. In such cases, the shaft may be either short-

ened (as described under "Mounting of Units") or exchanged for one of proper length by the dealer.

NOTE—Two support brackets are attached to the receiver case, one on the rear surface and the other on the right-hand side viewing the loud-speaker opening. The side bracket must be used when the unit is mounted at the extreme left-hand end of the dash in order to avoid sharp bends in the flexible shaft and resultant unsatisfactory operation.

As furnished, the remote control unit is equipped for attachment to the steering column of the car. Its clamp bracket is so designed that the driver may select from a wide variety of possible mounting positions for maximum accessibility. The associated bracket strap will be found to accommodate practically any diameter steering column. If considered desirable, however, the remote control unit may be supported upon the instrument panel by means of an accessory bracket procurable from the dealer.

Antenna:

(a) *Roof (Built-in) Type*—Best results will be obtained by use of a built-in roof antenna. The majority of modern automobiles (closed body types only) are already equipped with such an antenna installed at the factory, the lead-in wire from which will usually be found coiled up beneath the instru-

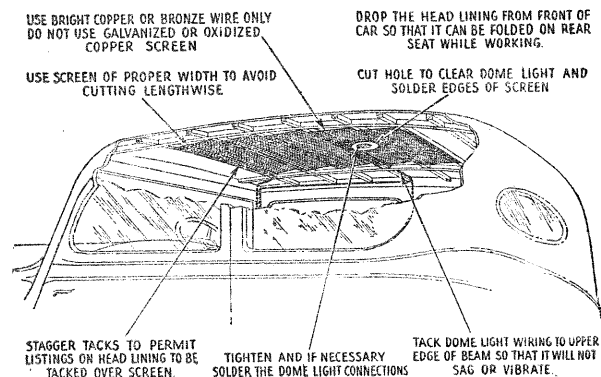


Figure 2

ment panel. Many other earlier cars employ a piece of metallic screen—for top material support—which, if ungrounded (not in electrical contact with the metallic frame), may be readily utilized as an antenna.

NOTE—The presence of a top support screen and of grounds in that screen may be determined without removing any portion of the inside fabric (head-lining). First procure any sharp-pointed metallic tool, push the point through the fabric (at several points if necessary) and feel around in an attempt to scrape the screen surface—being careful not to punctuate the weather-proof top. If a screen is found, connect an ordinary dash or head-lamp between either terminal of the automobile ammeter and the tool, re-insert the tool through the head-lining and make contact with the screen. If the lamp lights, however dimly, it shall be assumed that the screen is grounded.

Mounting of Units

In order to use an ungrounded support screen, first release the head-lining at the front corner nearest the receiver. Then connect a flexible rubber-insulated lead to the corner of the screen and solder the joint. Feed the free end of the lead down the adjacent pillar-post of the car into the driving compartment and replace the head-lining.

If the top support screen is grounded, or if no screen is present, it will be necessary to drop the entire head-lining (see Figure 2). In the former case, the screen may be insulated by removal of a strip several inches from all edges and from the dome light fixture. The possibility of subsequent shifting may be eliminated by tacking the screen to one or more of the ribs and by lacing the sides with cord. Where no support screen is used, a copper screen having a total area of at least ten square feet should be inserted. It should be located as far to the rear as possible and insulated from all metallic parts grounded to the frame of the car. The antenna finally should be tested for grounds (see the foregoing "NOTE" for test procedure). If satisfactory, attach the lead-in wire and replace the head-lining of the car.

NOTE—Since a degree of skill—only acquired by experience—is necessary in removing and replacing the top fabric material, such work should be allotted to a competent "trim" man.

(b) *Roof (Interior) Type*—The accessory interior-type roof antenna also will provide very satisfactory performance and, in addition, is extremely simple to install. It may be quickly attached to the head-lining inside the car (preferably as far to the rear as possible) by means of pin-hooks, thereby precluding removal of the fabric. An antenna of this type, however, should not be used in any automobile having a grounded top material support screen since the proximity of that screen would seriously reduce its efficiency. Before purchase, therefore, it will be advisable to check this possibility, following the test procedure described under "Roof (Built-in) Type."

As furnished, the interior-type antenna is equipped with a sufficient length of lead-in wire ready-attached. The effective antenna wire is enclosed by long-wearing paper procurable either in "gray" or "tan" finish as desired to harmonize with the car upholstery.

(c) *Plate Type*—For those cases where the installation of a built-in roof antenna is considered too costly and the interior roof antenna impractical, good reception from local or semi-distant powerful stations may be procured with the special plate-type antenna also obtainable as an accessory. This unit should be clamped to the frame of the chassis as far to the rear as possible. It is adjustable in length and may be mounted either lengthwise or crosswise of the chassis, which position should be selected with due regard to the prevention of overcrowding. The plate must be placed as close to the ground as possible, but not below the lowest portion of the chassis at the desired location, as sufficient road clearance must be retained. It is also important to avoid any position in which the plate will impede free motion of chassis parts such as springs, drive shaft, or axles in order to prevent damage to the antenna.

Details of mounting the various units are shown in Figure 1. The following procedures are recommended:

Receiver Unit—It is necessary first to determine the electrical polarity of the storage battery supply. This may be done most conveniently by making an examination of the battery connections and ascertaining which terminal is grounded (that is, connected to the frame of the car). The positive terminal is usually marked (+) and tends to form corrosion far more rapidly than the negative (—). If the positive terminal is grounded, no change in the electrical connections of the receiver unit will be required. However, if the opposite is true, the cover of the receiver unit case (held in place by six screws) must be removed and the two leads (equipped with spade terminals) located beneath the radio chassis as shown in Figure 1 must be reversed.

Now replace the case cover and support the assembled unit against the dash in the chosen location. Allowing a clearance of at least two inches above the top surface, where possible, to permit subsequent removal of the case from the mounting bolt head, mark with a pencil or crayon on the dash four points corresponding to the corners of the adjacent case surface. Then determine the exact center of the area bounded by those four points (by drawing diagonal lines between opposite corners) and mark that position with a center-punch. Next drill a $\frac{1}{2}$ inch hole at the center-punch mark and insert the mounting bolt. The support plate and the two nuts then should be assembled upon the bolt from the engine side of the dash as shown but should not be tightened. Finally hang the receiver over the bolt head, align sides vertically and tighten the nuts in place.

Remote Control Unit—In attaching the remote control unit to the steering column of the car, it will be advisable first to examine the detailed view (in Figure 1) showing the assembly of its mounting bracket. Four small holes are contained in the associated flexible strap at distances proper for use with steering columns of the most common diameters ($1\frac{1}{2}$, $1\frac{5}{8}$, $1\frac{3}{4}$, $1\frac{7}{8}$ inches), but the strap length will be found sufficient to permit the insertion of an additional hole if necessary to accommodate a 2 inch column. The proper hole may be determined by wrapping the clamp strap tightly around the column, inserting the machine screw furnished through that hole found to be nearest in alignment with the tapped hole in the clamp bracket. Three tapped holes are provided in the back of the remote control unit, permitting support of that unit either at the right- or left-hand side or above the steering column.

Flexible Shaft—Insert that end of the flexible shaft to which is attached the slotted coupling through the bushed opening in the left side of the receiver unit. Then rotate the shaft from the free end until the coupling slot is felt to engage over the pin contained in the tuning mechanism and slide the shaft forward to the full depth of the slot. With the shaft held in this position, insert the opposite end of the shaft through the bushing at the rear of the remote control unit and push forward until the flattened portion of the shaft protrudes through the front cover. Then proceed to tighten the external set-screw (located at the bottom of the case—see Figure 3) adjusting the shaft position as necessary until the screw is felt to engage in the groove. Tighten the screw fully to the bottom of the slot and then loosen it approximately one-quarter of a turn. Finally, secure the flexible casing in place by tightening the set-screws at each end *firmly*, so as to pro-

shielded and cut to eliminate excessive slack when attached to the receiver antenna connector. Before connecting the antenna to the receiver, the following comments applying to the particular type of antenna adopted should be observed:

- (a) *Roof Antenna (Built-in Type)*—The lead-in wire from a factory-installed built-in roof antenna usually is unshielded and often is of insufficient length to reach the receiver. If necessary, an extra length of insulated lead-in may be spliced to the existing lead-in, in which case the joint must be soldered and wrapped with tape. In general, it will be advisable to shield the exposed length of lead-in wire, procuring for this purpose from your dealer a length of shield braid and an equivalent length of insulating loom (or rubber tubing) sufficient to extend between the end of

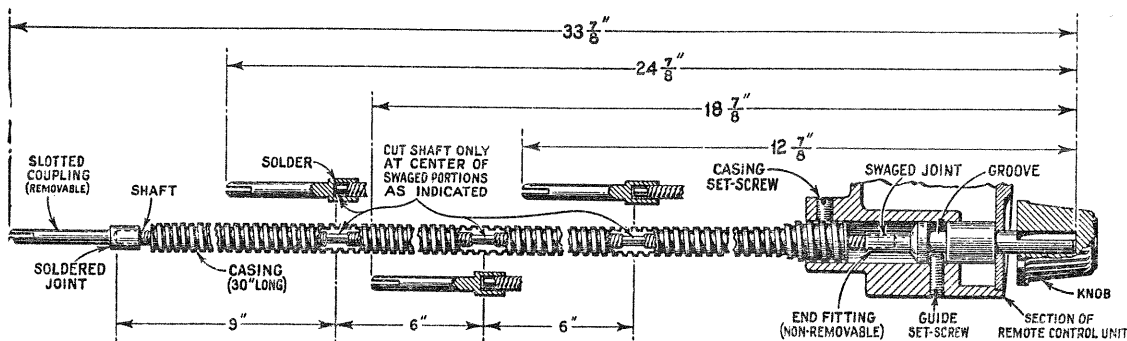


Figure 3

vide good electrical contact as well as solid mechanical support.

NOTE—In many installations it will be found necessary or desirable to use a flexible shaft of shorter length than 33 $\frac{7}{8}$ inches. While it is simplest to procure a shaft of proper length from the dealer as mentioned heretofore, very little difficulty should be experienced in shortening the original part if deemed expedient. To shorten the shaft, refer to Figure 3 and proceed as follows:

1. Determine the minimum shaft length permissible for the installation.
2. Remove the slotted coupling (using a soldering iron) and withdraw the shaft from its casing.
3. Cut the shaft only at the center of a swaged joint, selecting that joint which allows at least the required length.
4. Cut from the shaft casing a length equal to the amount of shaft removed. (This operation may be simplified by placing the casing between wooden blocks in a vise so that the block ends will serve to guide the hack saw blade.)
5. Replace the shaft in its casing and solder the slotted coupling to the end of the shaft.

Connections

Refer to Figure 1 and make connections as follows:

Antenna to Receiver—For least ignition interference, any portion of the antenna lead-in wire which extends behind the instrument panel or into the engine compartment of the car should be fully

the lead-in wire and its point of entrance from the body pillar post. Slip the loom over the lead-in wire and the shield braid over the loom.

- (b) *Roof Antenna (Interior Type)*—If an interior type antenna is used, the lead-in wire should be brought down the outside of that front pillar post nearest the receiver.
- (c) *Plate Type Antenna*—With the plate type antenna, the full-shielded end of the special cable should be brought into the automobile driving compartment through a $\frac{1}{2}$ inch hole drilled in the toe-board (if no other opening is available). This end is to be connected to the receiver unit antenna lead (as explained in following paragraphs) and the opposite (unshielded) end then cut off as required to eliminate excessive slack upon connection to the plate. The pigtail extension from the end of the shield must be soldered or bonded to the frame of the car.

Refer to the detailed view of the antenna connector shown in Figure 1 and proceed to attach the lead-in wire (if shielded) as follows: First, cut the end of the lead-in so that the internal insulated wire and loom (if present) are flush with the end of the shield covering and push back the shield approximately $1\frac{1}{2}$ inches. Cut the loom to the end of the

shield and then remove sufficient insulation to expose one inch of clean bare-conductor. Now disconnect the female portion of the connector attached to the receiver antenna lead and remove the small internal bushing and spring.

To assemble, slip the bared conductor through the female portion of the connector and then through the spring and bushing, making certain that the insulation enters the end of the connector. Bend over and spread the strands of the conductor against the forward end of the bushing and then force one of the eyelets (packed in small envelope in outfit package) into the bushing to hold the conductor in position. Cut off the ends of the conductor strands approximately $\frac{1}{8}$ inch beyond the edge of the eyelet and bend the strands over toward the center of the eyelet. The assembly may be now attached to the receiver portion of the connector and the shield covering on the lead-in wire pushed forward to cover the adjacent end of the female portion. Finally, bond the shield to the connector by means of the small clamp furnished. **No soldering operations are required.**

NOTE—An unshielded lead-in wire (as in the case of the interior-type antenna) may be attached to the antenna connector as described above except that all references to the shield braid and loom may be neglected.

Power Supply to Receiver—The power input lead (*black* wire with fuse receptacle and terminal, extending from the receiver cable) must be connected electrically to the ungrounded side of the car storage battery. This connection preferably may be made at the battery terminal of the ammeter (usually the terminal with only one lead attached—consult wiring diagram in instruction book for automobile) and any slack length remaining should be taped securely behind the instrument panel.

PART II—OPERATION

The instrument should be operated as follows:

1. Insert the key in the lock on the remote control unit and turn it clockwise to the extremity of its rotation.

NOTE—This key serves to operate both the power switch and the volume control. A slight rotation clockwise will turn the power "on" and the remainder of the range permits adjustment of volume. The dial scale should become illuminated when the power is "on."

2. Rotate the Station Selector knob in either direction until a desirable station program is heard.

NOTE—The dial scale is calibrated in channels to aid in station identification. Add one cipher to the scale marking to obtain the actual frequency in kilocycles.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now, readjust the Station Selector to the position midway between the points where

Suppression of Ignition Interference

1. Disconnect all wires from the spark plugs. Fasten one spark plug suppressor to the top of each plug and re-attach the wires to the free ends of the suppressors. These suppressors may be mounted either in line with or at right angles to the plugs (as shown in Figure 1) in order to avoid interference with metallic parts grounded to the engine or frame.

2. If the distributor is of the plug-in type, disconnect the center wire from the head. Plug the distributor suppressor into the distributor head and insert the wire in the free end of the suppressor.

NOTE—For cap-type distributors, exchange the distributor suppressor at your dealer's for one of a special type. Cut the wire leading from the distributor to the coil and screw the suppressor into the end attached to the distributor. Screw the other end of the wire (leading to the coil) into the opposite end of the suppressor.

3. Clamp the generator by-pass capacitor against the generator frame. The screw holding the cut-out ordinarily may be utilized for securing this unit. Connect the capacitor lead to the terminal on the generator side of the cut-out switch. (In some cases, interference will be reduced by connecting the capacitor lead to the opposite side of the cut-out. The most suitable position for this lead must be determined by trial.)

4. The other by-pass capacitor must be connected between the battery terminal of the ammeter and any convenient screw on the instrument panel. In certain cases, interference will be reduced still further by connecting an additional capacitor (obtainable from your dealer) between the battery side of the ignition coil and the car frame.

the quality becomes poor or the signal disappears. This operation insures the best quality of reproduction.

4. Finally, advance the Volume Control (clockwise) until the desired level is obtained. Except on weak signals, the automatic volume control will maintain the volume substantially at the latter level, thereby precluding further manual adjustments. (Fading of the signal may be experienced in extreme cases, as when passing under bridges or other metallic structures, since such structures almost completely shield the antenna.)

5. Set the Tone Range Switch (located on the front of the receiver unit) for the preferred tone quality. This switch has two positions. In the counter-clockwise position, high-frequency (treble) response and static interference (when present) are decreased.

6. When through operating, turn the key to the "off" position, counter-clockwise. The instrument is then locked by removing the key.

PART III—MAINTENANCE

Noisy or weak reception, or failure to operate, may be due to one of the following causes:

Radiotrons—If the set fails to operate (particularly when first installed), remove the case cover and make certain that all Radiotrons are in the proper sockets and that the control grid clips are pressed down firmly over the respective dome terminals as shown by the diagram printed on the label affixed to the inside of the cover.

The Radiotrons should be tested periodically and replaced if necessary in order to maintain best performance. The efficiency of each Radiotron may be checked by comparison with a new one of the same type in its place. Spare Radiotrons of each type should be kept on hand.

Fuses—This installation is protected by one fuse (rated 20 amperes) which is mounted in the fuse receptacle contained in the power input lead. If the set fails to operate and the dial lamp does not light, this fuse should be removed for examination. If found to be burned out, the wiring should be inspected for short-circuits or grounds and all tubes tested prior to insertion of a new fuse. **The replacement fuse must be of the same ampere rating.**

"B" Battery Eliminator—With the key switch turned to the "on" position, a slight buzz should be noticed to emanate from the receiver. This buzz should be taken as indicative of proper operation of the "B" Battery Eliminator vibrator. Failure to observe this buzz, accompanied by repeated necessary replacement of the fuse, will denote a faulty condition, and, in such cases, the complete receiver should be taken to the dealer for inspection. **Do not attempt to adjust the vibrator yourself!**

Antenna—A properly installed roof antenna of the built-in or interior-type should require no attention. When the plate antenna is employed, the insulator bushings should be cleaned occasionally to prevent grounding.

Ignition System—The ignition system of the car must be kept in good condition. Fouled plugs or plugs with improperly adjusted gaps will affect the operation of the receiver as well as of the automobile. Burned or improperly adjusted breaker points will also impair the performance. It will be advisable to advance the generator charging rate in order to compensate for the additional drain on the car storage battery imposed by this instrument.

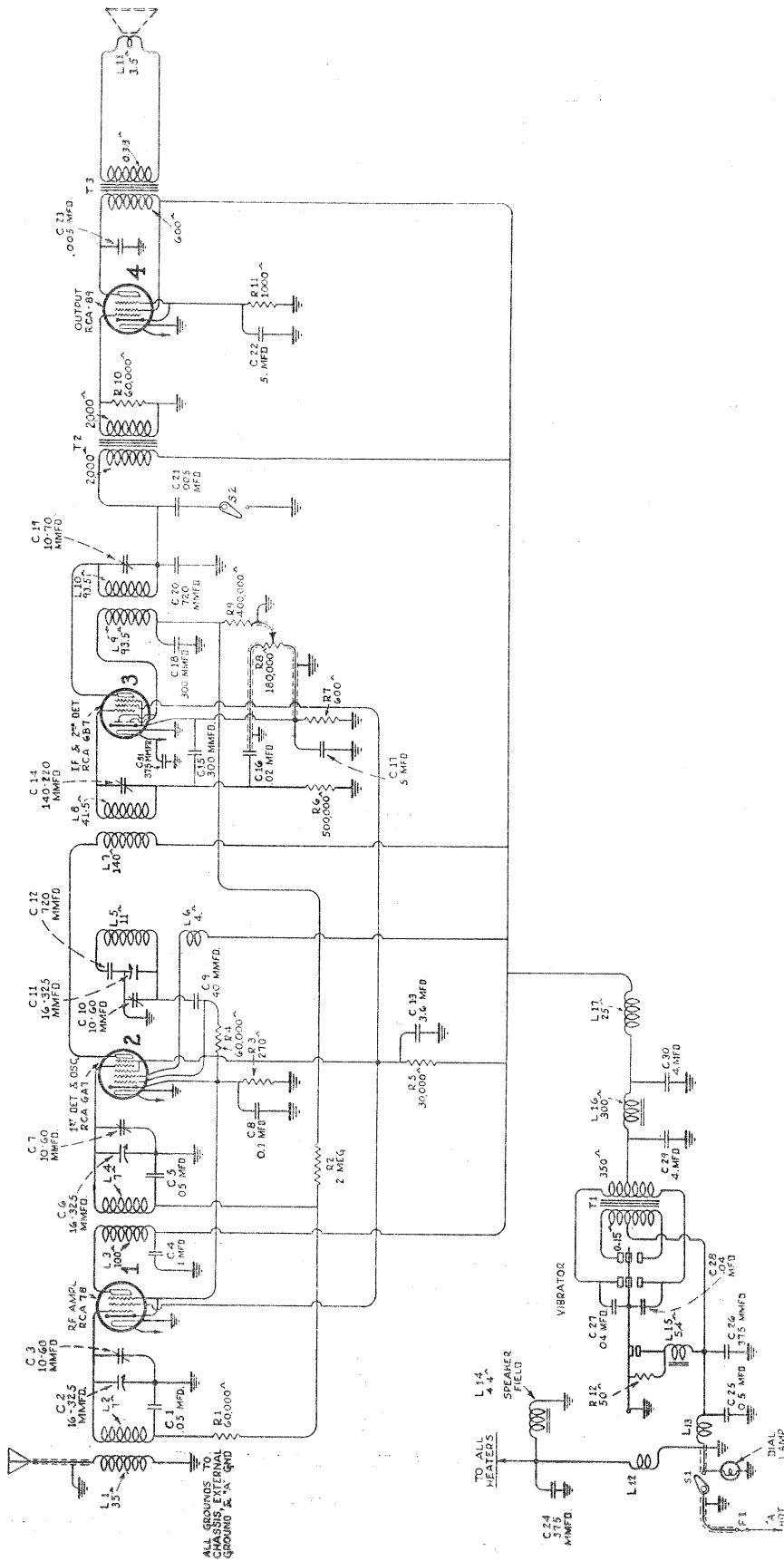


Figure A—Schematic Circuit

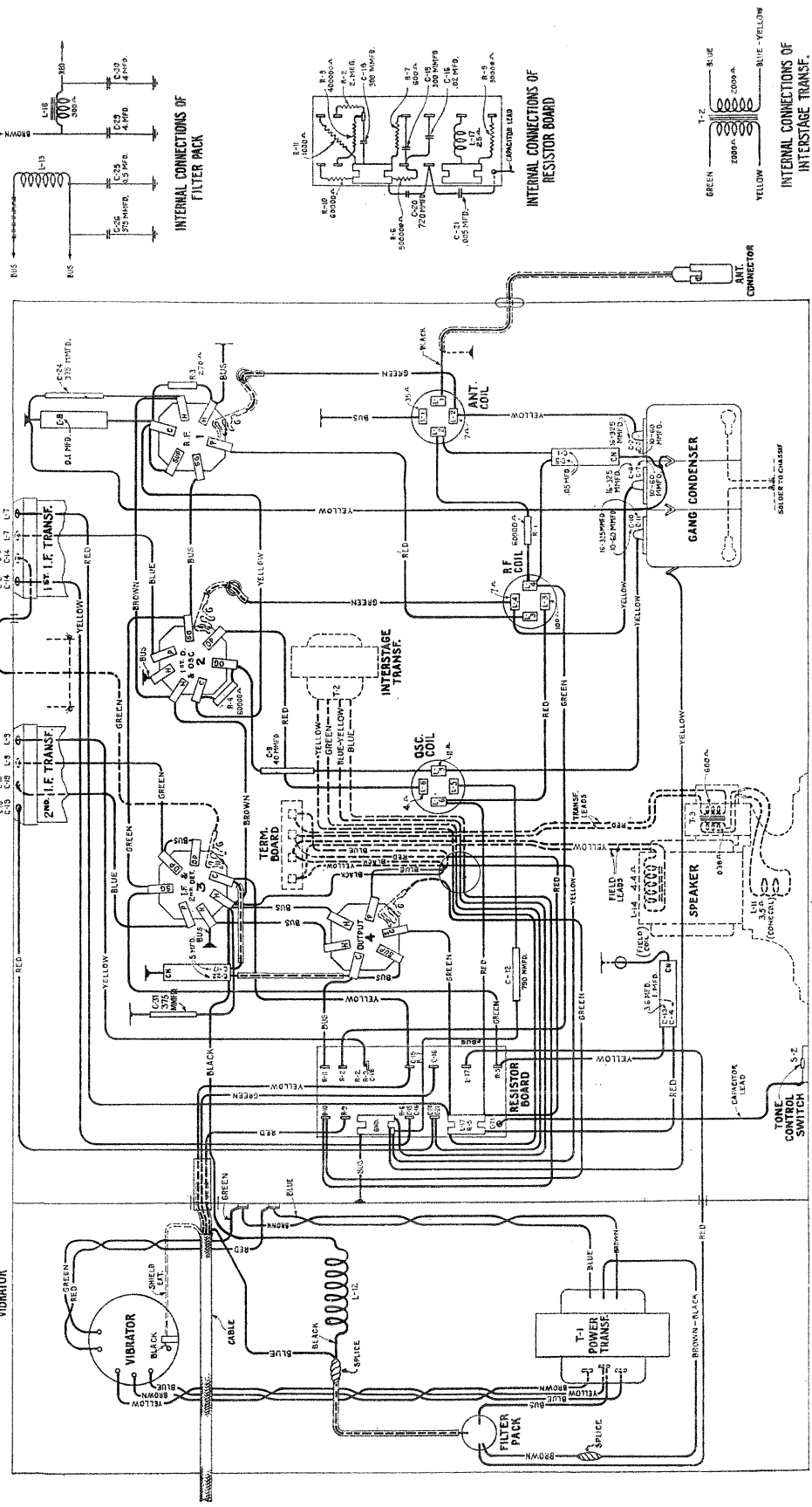
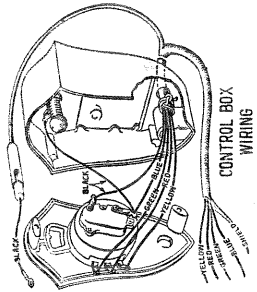
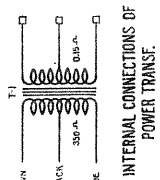
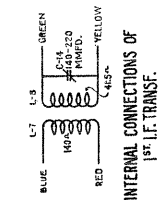
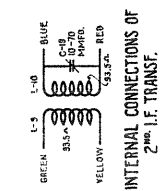
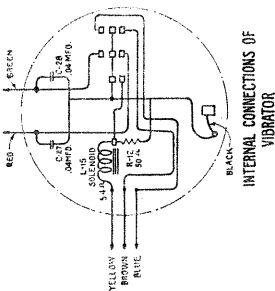


Figure B—Wiring Diagram

PART IV—SERVICE DATA

Type and Number of Radiotrons Used.....	1 RCA-89, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current.....	5.5 Amperes
Undistorted Output.....	2.0 Watts
Loudspeaker Field Current.....	1.35 Amperes
Maximum Output D. C. Voltage from Rectifier....	250 Volts
Total Plate Current.....	53 M. A.

This four tube Superheterodyne Automobile Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, plate supply unit and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

Plate Supply Unit

This receiver uses a vibrator type Inverter and rectifier that provides a source of direct current voltage for use as plate and grid supply for all Radiotrons. *This unit is accurately adjusted at the factory and service adjustments should not be attempted.* Any difficulties with this unit should be referred to the nearest Distributor handling these instruments who has instructions for servicing this item.

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for either adjustments:

R. F. Adjustment

The three R. F. line-up capacitors are adjusted at 1400 K. C. Proceed as follows:

(a) A fairly accurate adjustment can be made by using the ear for an indicating device, thus eliminating the need of an output meter and the necessity of removing the rear cover to connect it.

(b) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(d) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(e) Then adjust the three line-up capacitors until maximum sound in the speaker is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

For a more accurate adjustment, the use of an output meter is recommended. However, this will require the removal of the rear cover in order to connect the output meter across the cone coil. Also the bottom and Radiotron side of the chassis must be shielded together with the transformer so that vibrator noise will not be obtained, due to the removal of the case shielding.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10", to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 3 3/8" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery

Radiotron No.	Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Plate Current M. A.	Heater Volts
RCA-78 R. F.	3.7	92	253	7.0	6.06
RCA-6A7	First Detector	92	253	12.0	6.06
	Oscillator	—	253	Total	
RCA-6B7 Second Detector	3.2	92	236	6.0	6.06
RCA-89 Power	26.5	230	217	27.5	6.06

SERVICE DATA FOR VIBRATOR UNIT

The vibrator unit used in this receiver is of excellent design and sturdy construction. It functions as a combined A. C. generator and mechanical rectifier. Referring to Figure C, it will be noted that the primary and secondary of the transformer are center tapped. By connecting the outside of each winding to the contacts of the vibrator and using the arms and center taps of the windings as sources of input and output voltage, a combined generating and rectifying action is obtained.

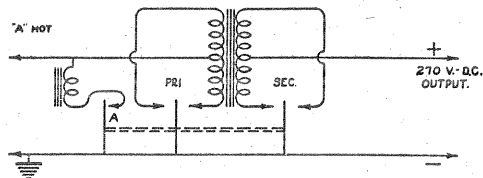


Figure C—Schematic of Vibrator Unit

When the switch is turned "on" the vibrator makes and breaks contact at point "A." This constitutes the driving action of the unit, and is in no way connected with the other circuits. The primary vibrator functions to connect the input low voltage current first across one-half and then across the other half of the primary of the transformer. This results in a pulsating direct current applied to the primary in an alternating direction. The result is an A. C. voltage emanating from the secondary of the transformer. Due to the transformer having a step-up ratio the A. C. secondary voltage is considerably greater than the primary. The secondary vibrator functions in a similar manner as that on the primary side, so that by reversing the alternations applied to the load, a pulsating D. C. is obtained. After filtering, this is used as plate and grid supply to all Radiotrons.

(1) Spring and Contact Adjustment Limits

Proper adjustments of the various contacts are made in the following order and manner:

1. With 8 and 10, Figure D, firmly held against their respective stops and with 3 and 5 in contact with 8 and 10 respectively, the air gap between 1, 6 and 2, 7 shall be 0.015" plus or minus 0.005". On no particular unit, however, shall the differences between the two air gaps exceed 0.005".

2. Adjust the buzzer screw, 11, Figure D, so that when the position of the armature is such that 1 and 2 are just making contact with 6 and 7 respectively, the contact between 4 and 9 shall just be breaking.

(2) Adjustment for the Reduction of Sparking

If any pair of contacts show excessive sparking, the following procedure will in general reduce the sparking to a minimum.

For example, consider the case where excessive sparking is occurring between 6 and 1. Sparking will be reduced to a minimum by bending the armature spring on that side

(secondary side) away from 6 and toward 8. (See Figure D.) If the bend is too small, only a small change will be noted. However, if an excessive bend is made, the sparking will be transferred from 6, 1 to 8, 3.

The same method may be applied to any pair of contacts. Usually only a slight bend will be necessary. Although after bending, no change in the position of the armature contacts may be noted, a sufficient change in the initial force requirements will have been made to reduce sparking.

(3) Output Voltage

When connected to a 6 volt primary source, the output voltage across a 5,000 ohm resistor (connected in place of the receiver load at the output of the filter), must be 240 volts or greater. The output voltage on receivers should be at least 225 volts.

(4) Failure to Start

Failure of the vibrator to start may be due to any of the following:

1. Low battery voltage. This may be due to either a low voltage battery or high resistance connections. The connection should be made to the battery side of the ammeter, otherwise the resistance of the ammeter may be sufficient to reduce the voltage at the vibrator to a degree that it will fail to start. If any doubt exists, measure the voltage between the "A" hot connection of the ammeter and ground with the set turned "on."

2. Improper adjustment of the buzzer screw. Unless the buzzer screw is adjusted so that the center contact breaks just as the outer contacts make when being pushed toward the coil, failure to start or sticking may occur. See (1) par. 2.

3. Improper tension of center contact spring. If there is any indication of improper tension of the center contact spring, such as small or irregular amplitude of armature vibration, it should be removed and flattened so that it is entirely straight before being replaced. If the vibrator initially operated properly and then failed, a slight bow should be placed in the center contact spring in the direction of the contact.

(5) Vibrator R. F. Interference

Two bronze contacts are provided between the case and chassis for proper grounding of the chassis, thereby preventing R. F. interference from the vibrator. One of these contacts is fastened to one of the screws holding the I. F. transformer and the other is held between the edge of the chassis and the case near the vibrator. Whenever the chassis is removed, these contacts should be checked to be sure they are in position and that proper tension exists to maintain a good contact.

Make sure that all grounds and connections in the receiver and filter pack are O. K. before adjusting the vibrator for R. F. interference. Unless it is due to excessive sparking, an adjustment will reduce the interference only for a short time.

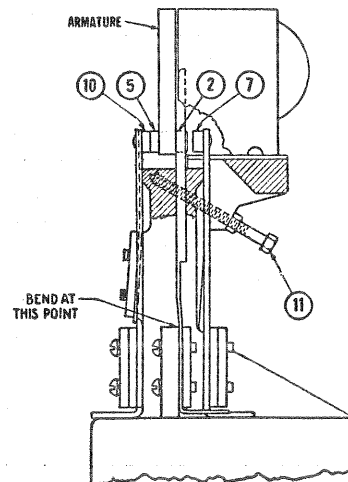
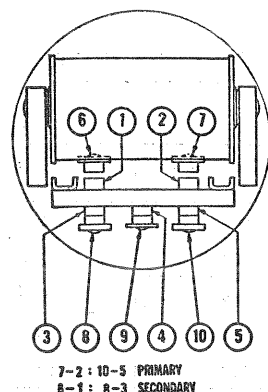


Figure D—Vibrator Contacts

Check All Adjustments on Vibrators Requiring Adjustments of Any Kind

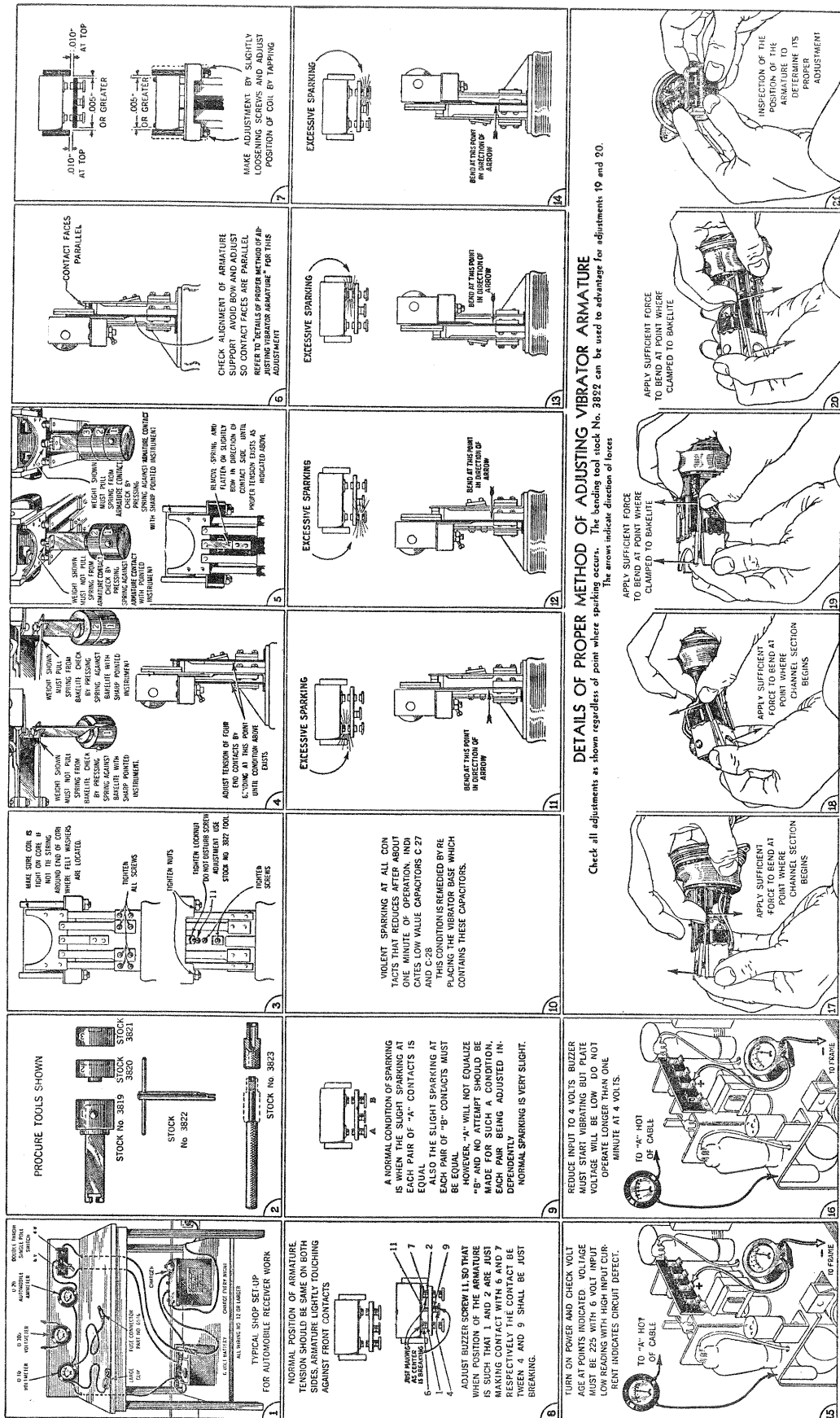


Figure E—Vibrator Adjustments

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
RECEIVER ASSEMBLIES					
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5).....	\$0.22	3758	Connector—For control box end of flexible drive shaft— Package of 5.....	\$0.68
3218	Resistor—600 ohms—Carbon type— $\frac{1}{4}$ watt (R7)—Pack- age of 5.....	1.00	6161	Knob—Station selector knob—Package of 5.....	.90
3572	Socket—Radiotron 7-contact socket.....	.38	6496	Shaft—Flexible drive shaft complete with connectors— Approximately 24 $\frac{1}{2}$ " long.....	1.60
3602	Resistor—60,000 ohms—Carbon type— $\frac{1}{4}$ watt (R1, R4, R10)—Package of 5.....	1.00	6497	Shaft—Flexible drive shaft complete with connectors— Standard length—Approximately 33 $\frac{1}{2}$ " long.....	1.75
3616	Capacitor—300 mmfd. (C15, C18).....	.34	6499	Volume control—Combination volume control and switch (R8).....	1.36
3617	Capacitor—0.005 mfd. (C21).....	.38	6500	Nut—Volume control and switch lock nut.....	.24
3618	Capacitor—0.02 mfd. (C16).....	.38	6501	Scale—Dial scale.....	.40
3619	Resistor—400,000 ohms—Carbon type— $\frac{1}{4}$ watt (R9)— Package of 5.....	1.00	6531	Shaft—Flexible drive shaft complete with connectors— Approximately 12 $\frac{1}{2}$ " long.....	.85
3621	Coil—Choke coil—Located on resistor board (L17).....	.35	6532	Shaft—Flexible drive shaft—Complete with connectors— Approximately 18 $\frac{1}{2}$ " long.....	1.24
3636	Transformer—First intermediate frequency transformer (L7, L8, C14).....	1.74	7602	Box—Control box complete.....	3.00
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19).....	1.65	7603	Cover—Control box cover.....	.44
3641	Capacitor—0.1 mfd. (C8).....	.35	MISCELLANEOUS PARTS		
3644	Bracket—Condenser drive bracket and roller.....	.40	3466	Connector—Antenna lead-in connector.....	.60
3645	Knob—Tone control knob—Package of 5.....	.90	3646	Fuse—20 amperes—Package of 5.....	.40
3695	Capacitor—375 mmfd. (C24, C31).....	.22	3647	Nut—Cap nut and lock washer—Package of 10.....	.35
3696	Capacitor—40 mmfd. (C9).....	.22	3648	Screw—No. 10-32- $\frac{1}{8}$ " cap screw and lockwasher—Pack- age of 10.....	.32
3738	Resistor—1,000 ohms—Carbon type—1 watt (R11)— Package of 5.....	1.10	3689	Bracket—Receiver mounting bracket, bolt and nut as- sembly—One set.....	.30
3745	Capacitor—745 mmfd.....	.34	3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case.....	.30
3746	Capacitor—800 mmfd.....	.34	3827	Cable—From fuse connector to ammeter.....	.10
3769	Resistor—750 ohms—Carbon type— $\frac{1}{4}$ watt (R14)—Pack- age of 5.....	1.00	3843	Cement—4-oz. bottle—For fastening stock No. 3801.....	.25
3790	Mounting screws, washer, and bushing assembly—For 3- gang variable tuning condenser—Comprising three spacers, three screws, three washers, and three lockwashers.....	.18	3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10.....	.30
3851	Capacitor—790 mmfd. (C12).....	.34	3884	Clamp—Cable clamp—Package of 10.....	.20
6135	Resistor—270 ohms—Carbon type— $\frac{1}{4}$ watt (R3)—Pack- age of 5.....	1.00	6151	Suppressor—Spark plug suppressor.....	.56
6186	Resistor—500,000 ohms—Carbon type— $\frac{1}{4}$ watt (R6)— Package of 5.....	1.00	6152	Suppressor—Distributor suppressor.....	.56
6192	Spring—Tuning condenser drive cord tension spring— Package of 10.....	.30	6175	Suppressor—Distributor splice-in suppressor.....	.56
6242	Resistor—2 megohms—Carbon type— $\frac{1}{4}$ watt (R2)— Package of 5.....	1.00	6494	Capacitor—Ammeter capacitor—0.5 mfd.....	.46
6298	Cord—Tuning condenser drive cord—Package of 5.....	.60	6495	Capacitor—Generator capacitor—0.5 mfd.....	.72
6471	Coil—Oscillator coil assembly (L5, L6).....	.74	6617	Lacquer—Touch-up lacquer (one pint of lacquer and one pint of thinner).....	2.25
6488	Transformer—Interstage audio transformer (T2).....	1.30	6670	Suppressor—Spark plug suppressor—"Elbow type".....	.56
6489	Coil—Antenna coil (L1, L2).....	.86	7621	Antenna—Roof antenna—Paper type (Brown).....	1.50
6490	Tone control switch.....	.35	7622	Antenna—Roof antenna—Paper type (Gray).....	1.50
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitors (C4, C13).....	1.08	7645	Housing—Rear section of housing complete with mounting screws.....	1.66
6493	Drum—Tuning condenser drive drum.....	.40	7646	Housing—Front section of housing complete with mounting screws.....	2.30
6513	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22).....	1.00	VIBRATOR ASSEMBLIES		
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5).....	.28	3611	Spring—Buzzer spring and contact point—Package of 5.....	.60
6515	Cable—Shielded cable with antenna connector.....	.32	3612	Screw—Buzzer adjustment screw and nut—Package of 10.....	.48
6516	Connector—Fuse connector.....	.16	3613	Spring—Main contact spring and contact point—Package of 4.....	.62
6517	Cable—Main cable complete with fuse connector.....	1.40	3614	Resistor—50 ohms—Carbon type— $\frac{1}{4}$ watt (R12)—Pack- age of 5.....	1.00
6540	Coil—R. F. coil assembly (L3, L4).....	.94	3801	Cushion—Rubber damper cushion for vibrator base— Package of 2.....	.25
7485	Socket—Radiotron 6-contact socket.....	.40	6478	Armature assembly—Comprising armature, contacts and springs—Assembled.....	.86
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30).....	4.06	6479	Coil—Vibrator coil assembly (L15).....	1.20
7601	Condenser—3-gang variable tuning condenser.....	2.84	6481	Shield—Outer shield for vibrator assembly.....	.32
9430	Transformer—Power transformer (T1).....	3.60	6482	Shield—Inner shield for vibrator assembly.....	.40
CONTROL BOX ASSEMBLIES					
3649	Key—Volume control and switch key.....	.18	6577	Capacitor and base assembly—Comprising vibrator base and two 0.04 mfd. capacitors (C27, C28).....	.78
3650	Screw—Self locking No. 10-32- $\frac{1}{8}$ " full dog point set screw —Package of 10.....	.32	6765	Support—Bakelite support.....	.70
3651	Screw—Self locking No. 10-32- $\frac{1}{8}$ " cupped point set screw —Package of 10.....	.32	7604	Vibrator—Vibrator assembly complete.....	5.64
3652	Screw—Self locking No. 10-32- $\frac{1}{4}$ " cupped point set screw —For flexible drive shaft—Package of 10.....	.32	REPRODUCER ASSEMBLIES		
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap.....	.40	3688	Transformer—Output transformer (T3).....	1.50
3718	Bracket—Control box dash mounting bracket.....	.25	7607	Screen—Metal screen.....	.44
3757	Coupling—Slotted coupling for end of flexible drive shaft— Package of 5.....	.40	7608	Coil assembly—Comprising field coil, magnet and cone support (L14).....	2.40
			9023	Cone—Reproducer cone complete (L11)—Package of 5.....	5.00