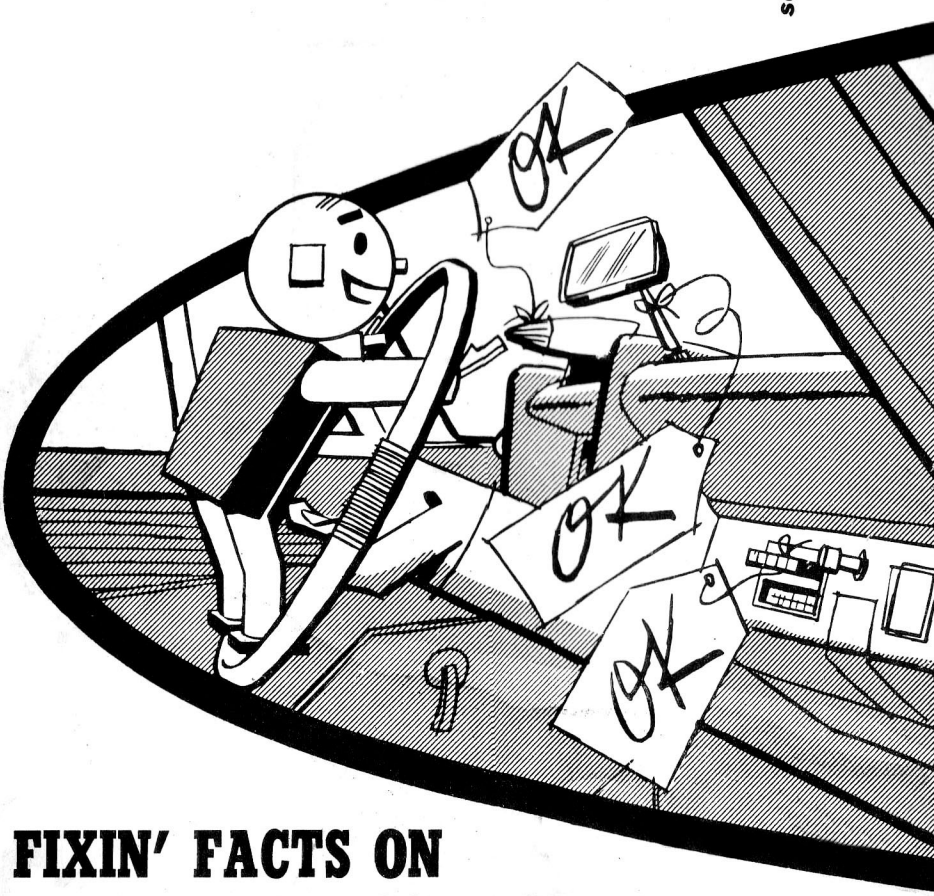
SERVICE REFERENCE BOOK

of the MASTER TECHNICIANS SERVICE CONFERENCE

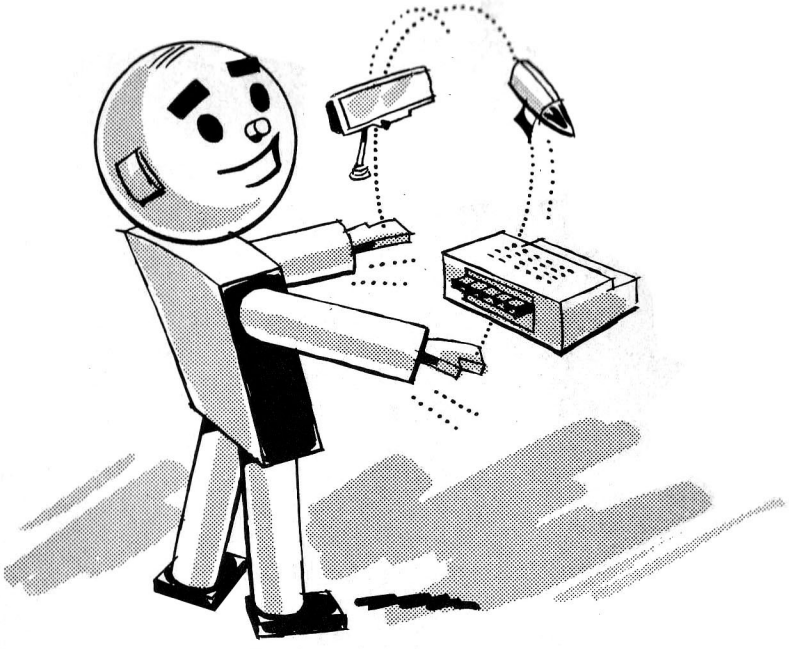
session no. 135



FIXIN' FACTS ON ELECTRICAL ACCESSORIES

PREPARED BY CHRYSLER CORPORATION

Plymouth · Dodge · De Soto · Chrysler · Imperial



Tech sez:

"IT'S SMART TO KNOW ELECTRICAL ACCESSORY SERVICE!"

Three of the most popular accessories on our new cars are the transistor-powered radio, the automatic beam changer, and the new Mirror-Matic mirror. These units are being installed on more of our cars every day.

So, the man who knows his way around *electrically,* has a bright future. Since the number of accessories is growing, there's a greater opportunity to be of service whenever one of these items needs adjustment or repair.

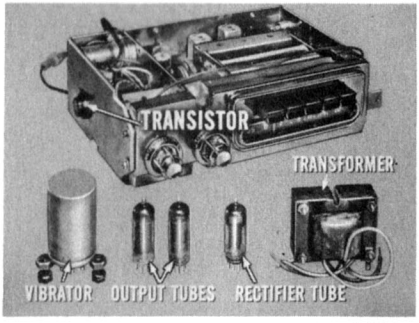
Most of this work, by the way, can be done by *any* service technician. It doesn't have to be referred to a specialist. All it takes is familiarity with the suggestions outlined in this reference book. And here's a handy guide to where this information can be found:

THE TRANSISTOR-POWERED RADIO

Description

When the transistor was developed, it was quickly adapted for use in car radios. This, naturally, brought about many changes, most of which have a direct bearing on service adjustments.

For one thing, using a transistor enabled designers to engineer a smaller set. Large components like the vibrator, the output tubes, the rectifier tube, and the power supply transformer were eliminated.



Only 12 volts are needed to operate tubes, resistors, and condensers of a transistor-powered radio. Operating at so low a voltage results in longer parts life. The transistor itself has an almost infinite service life. And, the transistor-powered radio requires less warm-up time.

In comparison, the circuit of a vibrator tube set needs 200 volts. Operating at a voltage so high means that the tubes and other components involved have a shorter service life.

But, the low voltage of a transistor-powered radio means that antenna trimmer and push-button adjustments must be made more

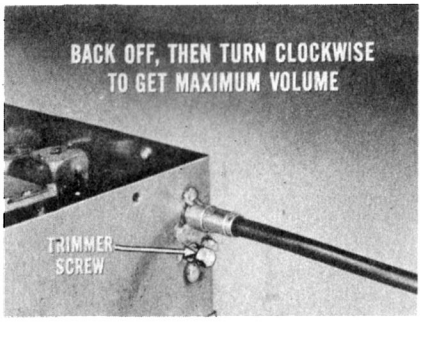
accurately than those of a vibrator-type radio. This is clear when you compare voltage drop in the vibrator set with that in the transistor-powered set.

In the 200-volt circuit of a vibrator set, a one-volt drop is only ½%. On the other hand, a voltage drop of only one volt in the 12-volt transistor circuit is almost 10%.

The antenna trimmer adjustment must be made prior to delivery of a new car, after any radio or antenna repair, and whenever an owner reports unsatisfactory radio reception. Pay special attention to this adjustment in the case of *dual antenna* installations, because it is especially critical.

Antenna Trimmer Adjustment. First, park the car in a location fairly free from outside radio interference. Next, raise the antenna to its maximum height. Warm up the set for at least 15 minutes. Then, tune in to a weak station above 1000 kilocycles—one that you can hardly hear even when the volume's turned on full blast. Or, tune in to a point *off-station* where you can hear only noise.

Back off the antenna trimmer adjusting screw which is usually found near the antenna receptacle. Then, turn it *clockwise* to get maximum volume from either the weak station, or the noisy point off-station. Making the final turn clockwise tightens the screw and helps prevent its working out of adjustment due to normal car vibration.



Again . . . be sure to make this adjustment on dual antenna installations. This is also important on touch-tuner radios where signal strength has a significant effect on over-all efficiency of the receiver.

Push-Button Adjustment. After adjusting the trimmer, adjust the push buttons for the best reception from local stations where the owner does most of his driving. The radio should be warm enough from the previous operation.

Pull the first button all the way out, about ½". Manually, turn the knob to tune in the desired station. When you find the best reception, push the button all the way in to lock it into place. Stations may be set up in any order, but it's best to go from low to high frequencies, left to right.

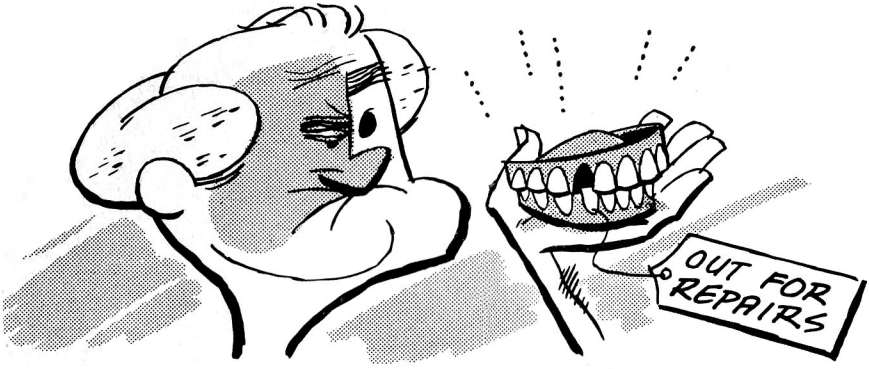
Once all buttons are adjusted, check them by manually tuning away from stations selected. Push each button in and see if you've secured the finest reception.

Fader Control Operation. On cars equipped with two speakers—front and rear—be sure to check fader control operation, particularly when getting a new car ready for delivery. When the fader knob is turned fully counterclockwise, the front speaker plays; fully clockwise —the rear speaker plays. Between these two extremes, both speakers should play; volume should be equal with the knob in mid-position.

Foot Switch Operation. The foot switch and search-tuning bars (LOC and DIST) actuate the touch-tuner mechanism the same way —with one exception. Search sensitivity of the touch-tuner depends upon which of the search-tuning bars was depressed last. The foot switch, then, will operate the search-tuner at a sensitivity determined by which of the two bars was depressed last. So, during predelivery inspection, always check performance of the foot switch.

Diagnosis

Nobody likes to drive around with a gaping hole in the instrument panel. So anything you can do to spare an owner that experience will be appreciated by him. Actually, it's easy for the average



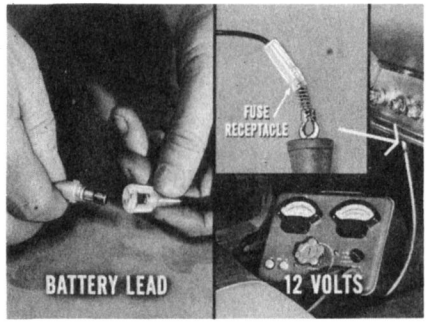
technician to track down and correct most of the causes of poor reception. You'll need a few parts, and a voltmeter.

Here's a suggested list of the parts you need, so they can be substituted for corresponding parts in the set to be tested:

—spare fuse (7.5 amps.)
—antenna assembly
—radio tubes (one each)
—speaker
—condensers, or suppressors (three)
—voltmeter

NOTE: Test the parts to be sure they are serviceable, and then tape these parts so they are easily identified as test parts. Then you won't be apt to leave them in an owner's set.

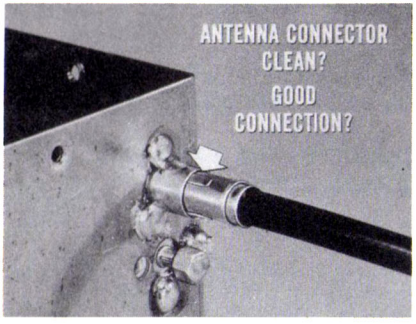
Radio Inoperative. If the radio doesn't play at all, turn it on and off a few times. If you don't hear a "pop" in the speaker, disconnect the battery lead and install a new fuse. If switching the set on and off still won't produce sound in the speaker, use the voltmeter to see if 12 volts are



available at the fuse receptacle. Remember that the pilot light is not always a good clue to fuse and lead condition because, on some models, the pilot light is fed by a separate wire.

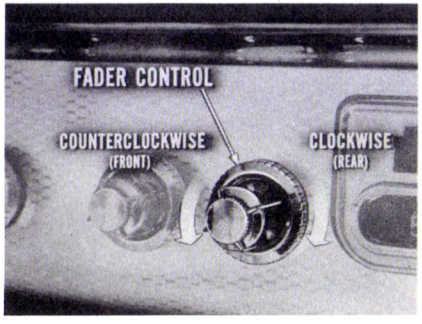
Now, if you find ample voltage at the fuse receptacle and the new fuse blows, you'll know the set needs major repair—and that's a job for a radio specialist.

But if you get sound through the speaker, and the set still won't play, connect the test antenna. Hold it away from the car.

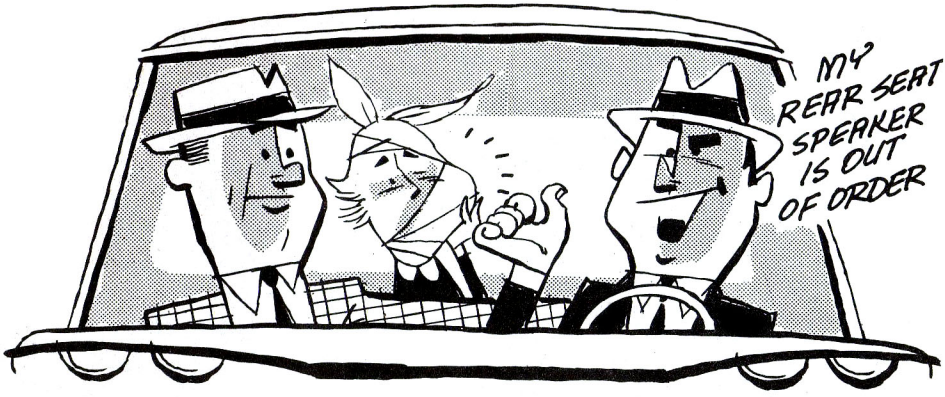


If the radio works, you'll know the difficulty was with the original antenna. However, make sure you don't throw away a good antenna assembly. See that the antenna connector is clean and makes a good connection. Corrosion there will make any antenna look bad.

On power antennas especially, try repair operations before replacing the assembly, since parts are available. Quite often, a simple cleaning, or straightening of a bent mast is all that's required. Look under the heading "Power Antenna Service" for diagnosis procedures applicable to power antennas.



If you find the original antenna okay, suspect the speaker next. Radios with rear-seat speakers are easy to check. Just turn the fader control *clockwise* to check the rear speaker – *counterclockwise* to test the front speaker. If one works and the other doesn't, the set's okay, but one speaker is dead, so replace it.



On cars *without* a rear speaker, connect the spare speaker and turn on the radio. If the radio plays, replace the old speaker. But if the spare speaker still doesn't play, one of the radio tubes might be defective. In this case, remove the set and begin substituting tubes.

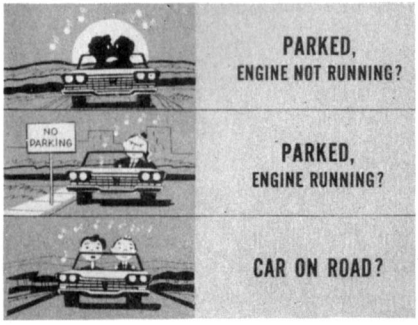
NOTES: Whenever you remove the set for bench testing, be sure to ground the set to the battery *negative* terminal. Also, connect the battery lead to the *positive* post. Unless you ground the receiver this way, you may damage all the components.

Never run the radio without connecting it to a speaker. The speaker is a vital part of the circuit. Bypassing it can cause serious damage.

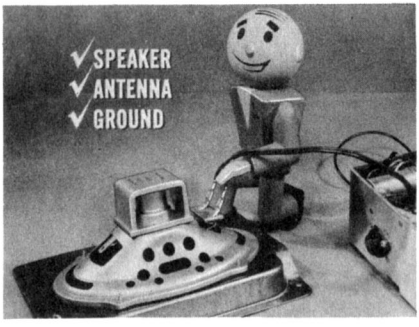
Plug in the taped, pre-tested tubes *one at a time*. Let each tube warm up before you make the next substitution. If the radio still fails to operate after all tubes are checked, a major repair is indicated and a radio specialist should look at the set.

NOTE: Testing a transistor and replacing it is an operation for a radio technician. While you'll rarely have to replace one, if everything checks out but the transistor, refer the set to the radio specialist.

Noisy, Erratic Reception. If an owner reports noisy, erratic reception, first see if antenna trimmer and push-button adjustments will correct the condition. If not, find out when the noise takes place. In other words . . . determine whether the noise takes place when the car's parked and the engine isn't running. Then, see if the noise shows up when the car is parked and the engine is running. If not then, see if it shows up only when the car is out on the road.



Car Parked, Engine Not Running. If the radio's noisy when the car is parked and the engine isn't running, tune in a local station. Then, jar the instrument panel with the heel of your hand. If jarring causes more noise, there's probably a loose connection. To track it down, wiggle the power input plug, the speaker plug, and the antenna connector. Make sure the set doesn't have a loose mounting which would cause a poor ground.

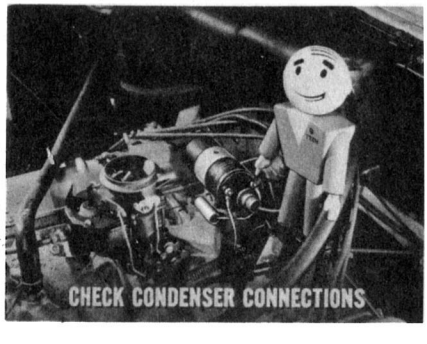


If none of those connections are loose, but you still get noise when you jar the set, remove it and hook it up on the bench. Then, with your finger tip, gently tap the tubes. Now, if you hear noise when any tube is tapped, it means the tube is

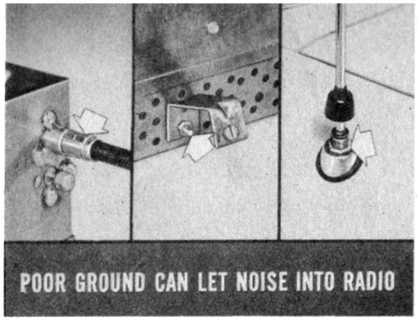
probably defective and should be replaced. If the tubes pass this test, and there is still noisy reception, you'd better get the set over to the radio technician.

Car Parked, Engine Running. If reception is okay when the engine isn't running, but is noisy when the engine does run, suspect the car's electrical system. As a further check on this possibility, latch the hood securely. Start the engine. Turn the radio on and tune it to a *spot between stations*. That will give you pure noise that you can study better. Ignition noise shows up on the set as a "ticking" sound. It will vary in frequency with engine speed.

If you hear ignition noise, check the condenser connections at the ignition coil. They must be clean and tight. If connections are okay, substitute the spare, pre-tested coil condenser to see if the ticking disappears.



If the test condenser doesn't correct ignition noise, a loose high-tension wire is the most common cause. Also, check connections at the distributor cap, coil, and at the spark plug terminals. If these are okay, check the secondary cables for continuity.



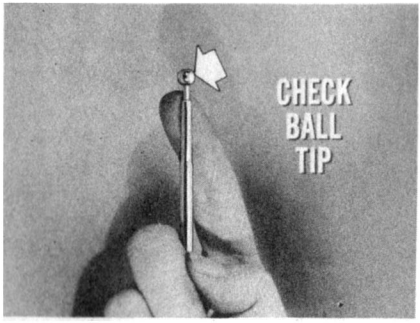
A poor radio ground can also let ignition noise interfere with reception. So check the connection between the antenna lead-in and receiver receptacle. Check the ground between the radio mounting and instrument panel. Also, make sure the anteena mounting nut is tight.

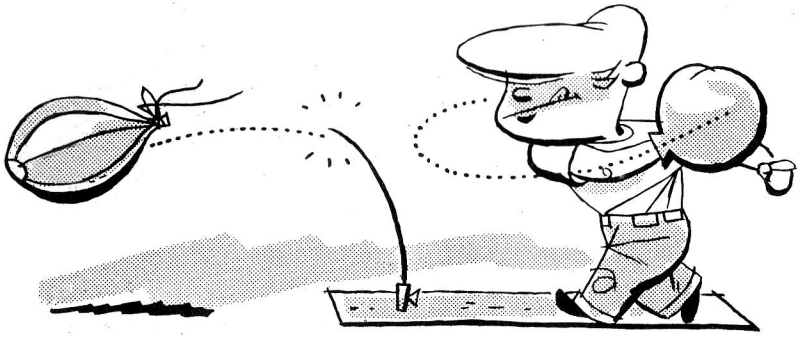
Generator noise begins as a low-pitched whine at low speeds. As speed increases, the noise gradually increases to a high-pitched whine. If replacing the generator condenser doesn't eliminate the whine, inspect the brushes and commutator. If there's abnormal arcing, the brushes may not be seating properly. If brushes are worn, replace them. In extreme cases, you may have to turn down the commutator and undercut the segment insulators. Then, install new brushes and sand them in so that they'll make good contact.

If the generator regulator condensor is bad, or has a poor connection, it may cause a loud "click", or a buzzing sound when the regulator operates. You can check this by substituting the good condenser from your test group.

Car in Motion. Let's assume you have made all the radio checks covered up to this point, and there's still radio noise when the car's in motion.

In a case like this, check the ball tip on the antenna. Like a tiny lightning rod in reverse, it takes static picked up by the ball and lets it leak off into the air. If the ball is missing, static will discharge from the antenna with a snap that sounds like outside interference. So replace the ball if it's been broken off.





Another thing, extend the antenna. Flex it slightly to make it vibrate. If this vibration causes noise, check the lead-in and make sure the antenna ground and mounting are okay. When checking dual rear antennas, see that insulators haven't worked out of position, which could be another cause of noise.

Radio Noisy When Accessories Operate. Loud "clicks", or "pops" when you operate turn signals, hit the brakes, or operate power seats and windows, mean that there are poor ground connections at those accessories. Some noise, of course, is normal.

Radio Reception Garbled. Any time an owner reports garbled, or distorted reception, first try to correct it by antenna trimmer and push-button adjustments. If that doesn't work, connect your substitute speaker to the set. If that corrects sound distortion, then check the mounting of the original speaker. The voice coil can be

misaligned enough to rub on the center pole piece of the speaker magnet, if the speaker frame had been twisted by improper mounting in the speaker grille. Other things that can affect reception are a torn speaker cone, foreign material touching the cone, or a defective tube. If there are foreign particles (dust, metal chips) in the core, remove them with a vacuum cleaner. If none of these causes are found and the spare speaker doesn't improve the sound, substitute tubes.

Radio Touch-Tuner Operation. Before you can check touch-tuner operation, meet these four requirements:

(1) the receiver must be able to tune in *distant* stations manually.
(2) the antenna must be fully extended.
(3) the antenna trimmer must be properly adjusted.
(4) the car must be in a location where normal station signal strength is available (away from steel-reinforced buildings).

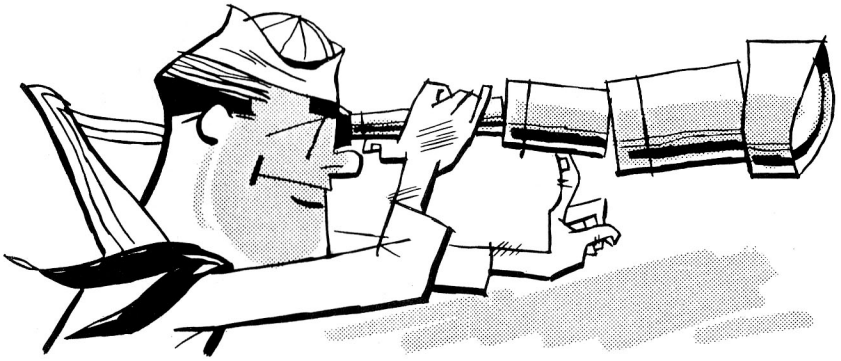
Now, suppose the LOC and DIST buttons *have not been* depressed. If the touch-tuner mechanism starts and runs *continuously,* send the set to a specialist for major repair.

If the mechanism runs continuously after the LOC button is depressed, push in the DIST button momentarily. If the tuner still runs continuously, refer it to a radio specialist.

Power Antenna Service

On 1957, 1958, 1959 Chryslers and Imperials the electric radio antenna is a telescoping type, extended and retracted by a coiled nylon cord powered by a two-way electric motor. Main components are a drive assembly, mast assembly, and support tube. The mast assembly is serviced as a unit. The drive motor is also serviced as a unit. Switches, connectors, insulators, and gaskets are available.

Maintenance. Frequent cleaning of the mast telescoping sections will prevent many problems. Do this when you lubricate or wash the car. Just use a clean soft cloth to wipe off all the rods.



Unsatisfactory operation is either (a) weak, fading or no reception; or (b) antenna will not raise or lower.

(a) Weak, fading, or no reception is usually caused by a broken lead-in wire, poor connection, faulty insulation of the mast or lead-in, or moisture in the antenna body tube.

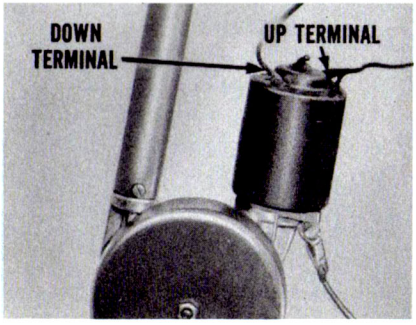
(b) Failure to raise or lower can generally be traced to a blown fuse, faulty connections at the switch or switch lead terminals, bent antenna mast rods, or a faulty drive motor.

Always test an antenna for performance before you remove it. See if the condition is one of reception, or failure to raise or lower.

Removal. Fully lower the antenna. Disconnect motor leads at the connectors, and the antenna lead-in wire at the receiver. Remove the antenna mounting escutcheon nut and the nut that holds the drive housing to the antenna lower mounting bracket. Finally, remove the assembly carefully so you won't bend the mast rod.

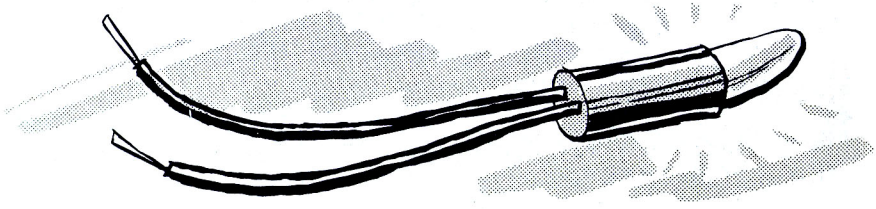
Bench Tests. Clean the antenna and drive assembly first. Then, with a battery source of 12-volt power, test operation of the drive mechanism.

Ground the negative lead to the drive housing. With the positive lead, contact the "up" terminal to extend the antenna, and contact the "down" lead to retract the mast. If the motor doesn't work, remove it for repair or replacement. If the motor runs freely, but the antenna doesn't work, remove it for repair or replacement. If the motor runs freely, but the antenna doesn't extend or retract, replace the mast assembly. If the motor labors and the antenna moves very slowly, look for excessive dirt or bent mast rods. Clean and straighten rods that you find in this condition.



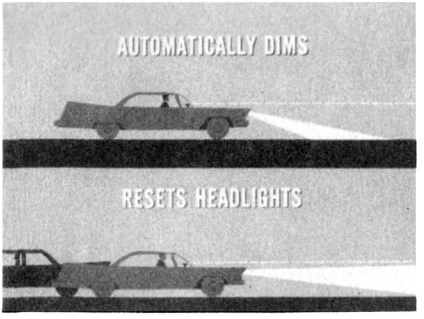
Next, use a 12-volt test lamp to test antenna mast rods and lead-in wire for grounds and continuity. With the test lamp in the circuit, attach one test lead to the lead-in plug terminal. Touch the housing or body with the other test lamp lead. The test lamp should not light. If it does, there's a ground between the lead-in or mast and the antenna body tube. Find the ground and tape up the insulation as required.

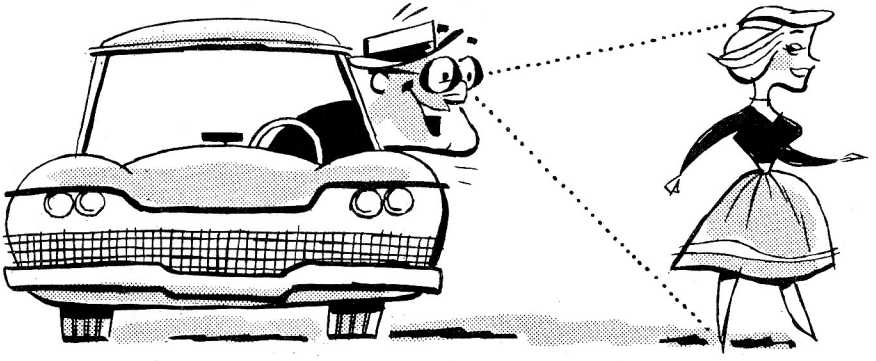
Now touch one test lamp lead to the antenna lead-in terminal. Touch the mast rod with the other lead. The test lamp should light. If it doesn't, there's a broken lead-in wire, or a faulty connection at the mast-wire-to-lead-in terminal lug. If the lamp lights very dimly, look for high resistance at the mast wire and lead-in wire connections.



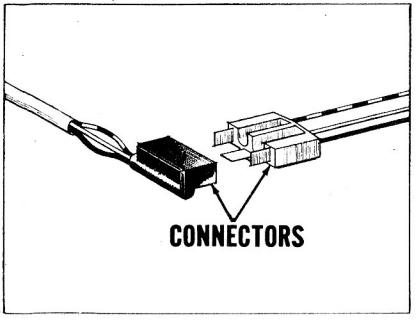
AUTOMATIC BEAM CHANGER

The automatic beam changer dims headlights automatically when it "sees" an oncoming car at a distance of about 1200 feet. It will automatically reset headlights on their bright beam as soon as the approaching car has passed. If the headlights are bright, and the driver wishes to dim them, he can step on the floorboard dimmer switch to change the beam manually at any time.





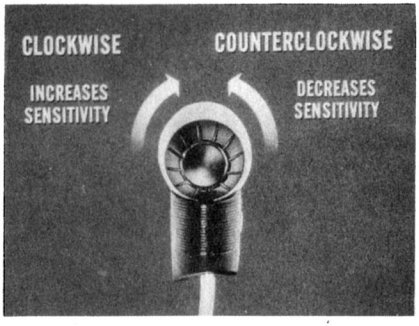
NOTE: The dimmer foot switch on current models is mounted on top of the floor panel. Wires to the switch and from the beam changer are under the floor mat. Shifting the floor mat excessively may cause the connections between the beam changer and the headlights to work loose. If that happens,



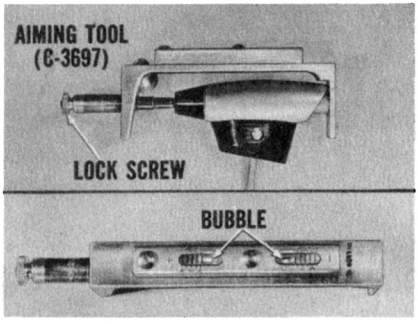
stepping on the foot switch will not change the headlight beam. Be sure to check these connections to see that they are tight. Tape the wires to the connectors, if necessary. You can use a trim panel retainer to keep the two connectors from working loose.

Maintenance

Adjust Sensitivity. If headlights do not dim as promptly as they should, or dim when the approaching car is too far away, sensitivity is improperly adjusted. A knob at the rear of the scanner unit mounted on the instrument panel lets you adjust sensitivity. Turning the knob *clockwise* increases sensitivity – *counterclockwise* decreases sensitivity.



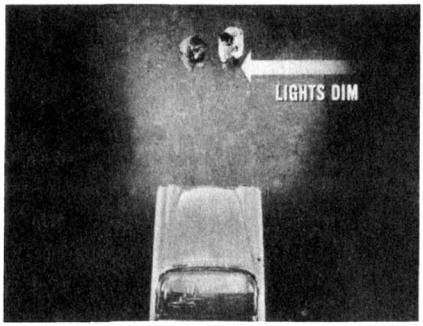
Adjust Scanner Alignment. Ability of the scanner to see straight ahead is mighty important. It should not look up or down too much. To check this alignment, be sure the car is on a level floor–like in the headlight aiming bay. Tires must be inflated properly, front suspension height must be right, and someone should be seated behind the steering wheel.



Mount this special aiming tool (C-3697) on the scanner. Loosen the base lock screw just enough to allow free movement. Adjust the scanner until the leading edge of each bubble is at zero. Then, tighten the lock screw to secure the adjustment.

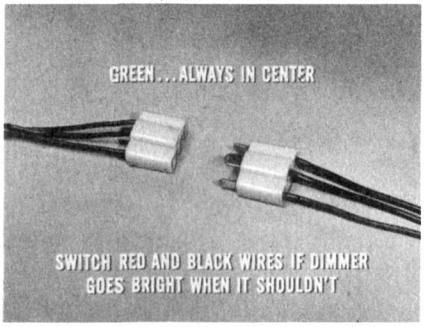
Side-to-side adjustment is also important. Some dimming from reflected light is normal, especially on curves when headlights reflect from a bright surface close to the road. Too much sensitivity to reflected side light, though, can be annoying. You can check side-to-side alignment by putting the headlights on the high beam. If reflected light causes them to dim, decrease scanner sensitivity.

Stand about ten feet ahead of the car—off to one side. Aim a flashlight at the scanner unit, at scanner level. Walk across to the other side as you watch the headlights. The instant they dim, stop and mark that point on the floor. Repeat that operation from the opposite side of the car.



Mid-point between the two marks should be directly ahead of the scanner. If it isn't, ream the holes in the instrument panel with a $^{5}/_{32}$" drill so the scanner unit can be relocated.

If the dimmer goes bright when it should go dim, and vice versa, check wiring at the connectors. The green wire must always be in the center. Switch the red and black wires that connect to the amplifier if the dimmer operates in reverse.

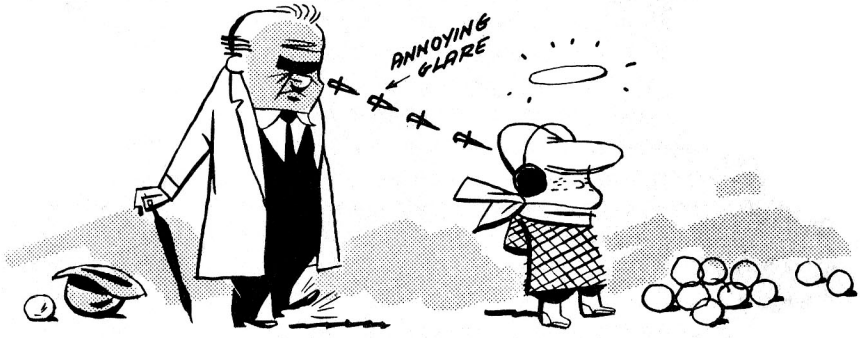


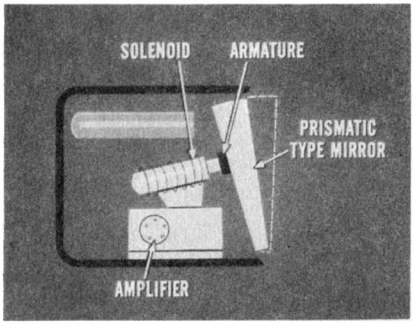
NOTE: The scanner and control units are serviced as complete assemblies. Do not try to make internal repairs on either unit.

MIRROR-MATIC MIRROR

Description

The heart of the Mirror-Matic mirror is a tiny photoelectric cell. It "sees" through a small opening in the mirror. When annoying glare from behind strikes the photocell, it changes current flow in the circuit. That, in turn, causes a tiny amplifier to activate a solenoid.





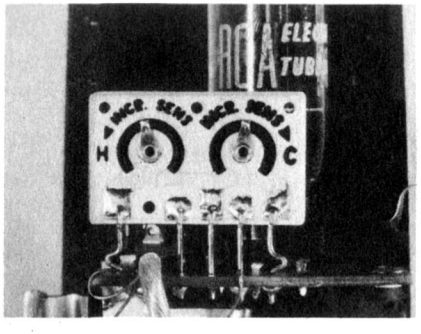
The solenoid attracts an armature attached to the prismatic-type mirror, tipping it forward at the top. Glare is then directed overhead, leaving a dim, no-glare reflection for the driver. When glare behind the driver goes away, the mirror automatically repositions.

Incidentally, the mirror lead wire must be connected to the "H" terminal of the light switch so it will operate only when the headlights are turned on.

A three-way switch incorporated in the mirror lets the driver control sensitivity. "CITY" position gives *reduced* sensitivity so reaction to streetlighting is minimized. "HI-WAY" position provides *increased*

sensitivity to glare when it's needed the most. "OFF" locks the mirror in daylight position.

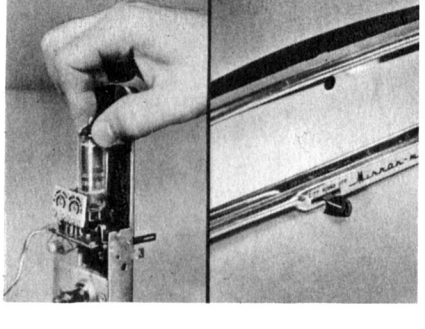
Sensitivity can also be adjusted internally. Take the mirror assembly out of its case, turn it over. You'll see two small potentiometers —one is marked "H" for "HI-WAY"; the other is marked "C" for "CITY". With a toothpick, turn the tiny arm as indicated by the arrows to change sensitivity. Never use a lead pencil to make this adjustment, as the carbon from the lead can upset the resistance calibration of the potentiometers.



Diagnosis

Mirror Doesn't Operate. If an owner reports that the Mirror-Matic mirror doesn't operate, first check the fuse. If it's blown, check for a short in the wire leading to the mirror. Check the wire at the panel grommet next. One of the prongs might have poked through the insulation. You can bend those prongs to prevent a short at that point. Tape any breaks you find in the insulation, and replace the fuse. Put the headlight switch *on* and touch the lead to the power source. If the fuse blows, replace the mirror assembly.

If the fuse doesn't blow, and the mirror still doesn't work, replace the tube with a new 12K5 tube. Move the mirror switch to "HI-WAY", and let the unit warm up for about 30 seconds. If it still doesn't work, replace the mirror assembly.

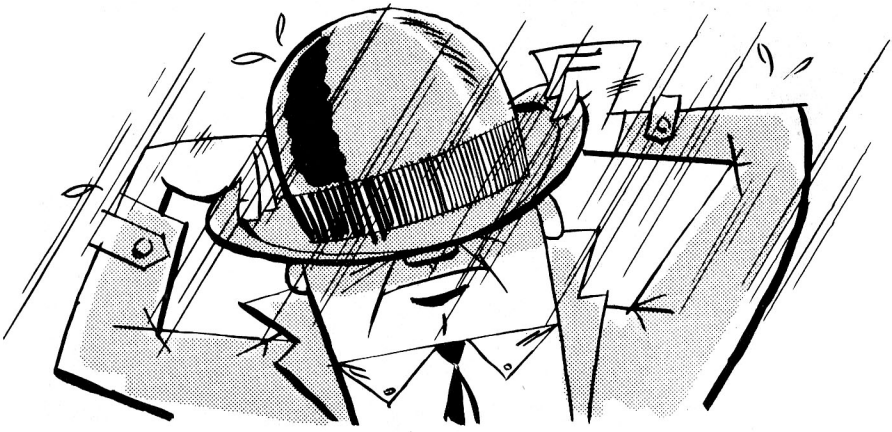


Delayed, Erratic Action. Binding, or interference with mirror or armature movement can delay action, or cause erratic operation. Before you remove the cover, make these checks. Turn headlights on, switch the mirror to "HI-WAY" and wait one minute for the amplifier to warm up.

Switch to "OFF". The mirror should move quickly to *bright* position. Switch to "HI-WAY". The mirror should move quickly to *dim* position as it reacts to daylight or good artificial light inside the car.

If the mirror doesn't operate freely and promptly, check for interference between the mirror and bezel. If you find no point of contact, remove the bezel and check for case interference. If you get good operation with the bezel removed, reposition the bezel to eliminate interference.

If the case and not the bezel interferes, look for the letter "N" stamped near the mirror support hole. Cases without this letter had a slight tendency to shrink under certain climatic conditions. Cases marked "N" are made of a nylon-type plastic that resists shrinkage (Part No. 1902068). Replace the case if it doesn't have the "N" stamping.



While the mirror assembly is uncovered, check for binding at the armature hinge points. Pivot the mirror back and forth. Push it from

side to side. Hinge tabs should permit a slight sidewise movement. Dress down any burrs or rough spots on hinge tabs to eliminate interference.

If bright-to-dim action was good, but dim-to-bright action was delayed, check the strip of tape across the face of the armature. A tape off center will let adhesive squeeze out and cause the core to stick to the armature. Talcum powder should reduce the tendency of the core to stick.

Vibration. If the mirror chatters continuously after a one-minute warm-up, the difficulty is apt to be in the relay points or air gap adjustment. In a case like this, replace the unit. If the mirror vibrates when the car is in motion it may be due to a support arm that is too long. On cars equipped with Mirror-Matic, use the short mirror support arm (Part No. 2080409 for Plymouth, Part No. 2080018 for all other makes). Longer arms used for the standard mirror do not provide a support rigid enough for the heavy Mirror-Matic assembly.

Miscellaneous Tips. If you find the control switch knob is too loose, slide it off the switch blade. Cut through one side of the blade and bend the cut portion to provide a tighter fit between the blade and knob.

If the cement bond between the armature and mirror breaks, the armature will move without dimming the mirror. Since recementing the mirror is not too practical, replace the unit.

CONCLUSION

Since electrical accessories are here to stay—and are growing more popular with our owners—service on these items represents an added responsibility for the technician. The tips outlined in this book are designed to let you know what to do, when, and how, for best results. Reading these suggestions over thoroughly will help you make the most of our increasing opportunities in electrical accessory service.

RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 135

The tubes, resistors, and condensers in a transistor-powered set operate on only 12 volts which adds extra service life to these parts.	RIGHT	1	WRONG
Antenna trimmer and push-button adjustments are more critical on a vibrator-tube set than they are on a transistor-powered radio.	RIGHT	2	WRONG
Adjust the antenna trimmer prior to delivery, after any radio repair, in cases of poor reception, and *always* check it on dual antenna installations.	RIGHT	3	WRONG
To adjust the antenna trimmer, back off the adjusting screw first and then turn it clockwise to get maximum volume from either a weak station or a noise off-station.	RIGHT	4	WRONG
When you remove a radio for bench testing, be sure to ground the set to the battery negative terminal and connect the battery lead to the positive post.	RIGHT	5	WRONG
Since the speaker is a vital part of the circuit, never operate a radio without a speaker.	RIGHT	6	WRONG
The ball tip on the antenna is purely ornamentation and has no effect on radio reception.	RIGHT	7	WRONG
Side-to-side alignment of the scanner cannot be adjusted.	RIGHT	8	WRONG
Sensitivity of the Mirror-Matic mirror can be adjusted internally by moving the small arms on the two potentiometers.	RIGHT	9	WRONG
If a Mirror-Matic mirror doesn't operate, check the fuse first and then check for a short in the wire leading to the mirror.	RIGHT	10	WRONG

Litho in U.S.A.