

# ACCESSORIES

## CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Audio Systems .....	9A-1
Cruise Control .....	9B-1
Engine Coolant Heater .....	9E-1
Luggage Carrier.....	9F-1

## SECTION 9A

# AUDIO SYSTEMS

*NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.*

## CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
Audio Systems .....	9A- 2
General Description.....	9A- 2
Handling Electrostatic Discharge (ESD) Sensitive Parts.....	9A- 2
Description of Operation .....	9A- 2
AM Radio (UP4).....	9A- 2
AM/FM Stereo Radio (UM7, UM6, or UX1).....	9A- 4
Cassette Tape Player (UM6 or UX1).....	9A- 5
Diagnosis.....	9A- 6
Entertainment and Comfort Data Bus (E&C Data Bus) .....	9A- 6
Tech 1 Diagnosis .....	9A- 6
Noise Entry .....	9A- 6
Frontway Noise .....	9A- 6
Sideway Noise .....	9A- 6
Backway Noise.....	9A- 6
Harness Related Noise.....	9A- 6
On-Vehicle Service .....	9A-24
Radio Receiver.....	9A-24
Control Head .....	9A-24
Tape Player .....	9A-24
Tape Player and Cassette Care .....	9A-27
Amplifier.....	9A-27
Speakers .....	9A-27
Front Speakers .....	9A-27
Rear Speakers .....	9A-27

## CONTENTS (cont'd)

<u>SUBJECT</u>	<u>PAGE</u>
Side Door Speakers.....	9A-29
Rear Overhead Speakers.....	9A-29
Antennas.....	9A-32
General Description.....	9A-32
Diagnosis.....	9A-32
On-Vehicle Service.....	9A-33
Fixed Antenna.....	9A-33
Specifications.....	9A-34
Fastener Tightening Specifications.....	9A-34

## AUDIO SYSTEMS

### GENERAL DESCRIPTION

The radio receiver is mounted under the instrument panel. The control head is mounted in the instrument panel and connected to the speakers and receiver by an electrical harness (figure 1). The available radio systems are as follows:

1. UP4—AM Radio
2. UM7—AM/FM Stereo, Seek and Scan, Clock
3. UM6—AM/FM Stereo, Seek and Scan, Auto-Reverse Cassette, Clock
4. UX1—AM/FM Stereo, Seek and Scan, Auto-Reverse Cassette, Graphic Equalizer, Clock

### HANDLING ELECTROSTATIC DISCHARGE (ESD) SENSITIVE PARTS

Many solid-state electrical components can be damaged by electrostatic discharge (ESD). Some will display a label, but many will not (figure 2).

In order to avoid possibly damaging any components, observe the following:

1. Body movement produces an electrostatic charge. To discharge personal static electricity, touch a ground point (metal) on the vehicle. This should be done any time you:
  - Slide across the vehicle seat.
  - Sit down or get up.
  - Do any walking.
2. Do not touch exposed electric terminals on components with your finger or any tools. Remember, the connector that you are checking might be tied into a circuit that could be damaged by electrostatic discharge.
3. When using a screwdriver or similar tool to disconnect a connector, never let the tool come in contact with or come between the exposed terminals.
4. Never jumper, ground, or use test equipment probes on any components or connectors unless specified in diagnosis. When using test equipment, always connect the ground lead first.
5. Do not remove the solid state component from its protective packaging until you are ready to install the part.

6. Always touch the solid state components package to a ground before opening. Solid state components can also be damaged if:

- They are bumped or dropped.
- They are laid on any metal work benches or components that operate electrically, such as a TV, radio, or oscilloscope.

### DESCRIPTION OF OPERATION

#### AM RADIO (UP4)

##### Power (PWR) and Volume Knob

Pressing the "PWR-VOL-TONE" knob turns the sound system "On" and "Off." If the radio is "Off," pressing the knob will turn the system "On" and pressing the knob again will turn the system "Off." The ignition lock cylinder must be in the "ACCESSORY" or "RUN" position for the radio to operate.

Turn the knob to the right to increase volume and to the left to decrease volume.

##### Tone Control Ring

The control ring behind the "PWR-VOL" knob is the tone control. Turn the ring to the right to increase treble and to the left to increase bass.

##### Set Button (SET)

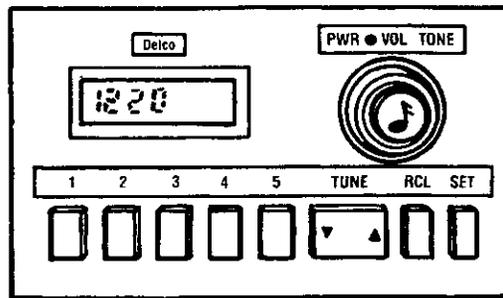
The "SET" push button is used in conjunction with the 5 radio station preset push buttons to program radio frequencies into the memory locations. See "Radio Frequency Preset Buttons" for instructions on presetting AM radio stations.

##### Radio Frequency Preset Buttons

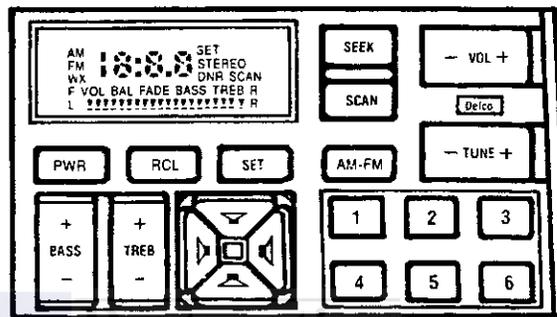
To preset 5 desired AM stations:

1. Tune in the desired station.
2. Press "Set" push button. (The "SET" indicator will light.)
3. Press a station push button. (The "SET" indicator will go out.) The radio will then tune in the selected station whenever that push button is pressed.

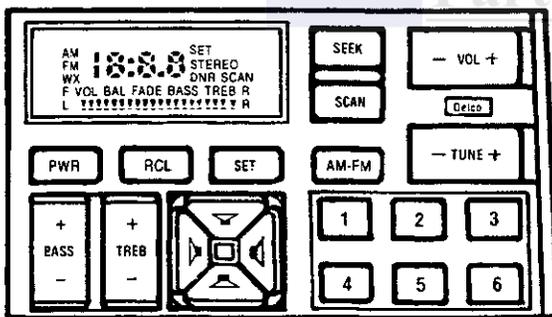
If electrical power is interrupted (by a blown fuse, discharged battery, etc.), the station(s) must be reset.



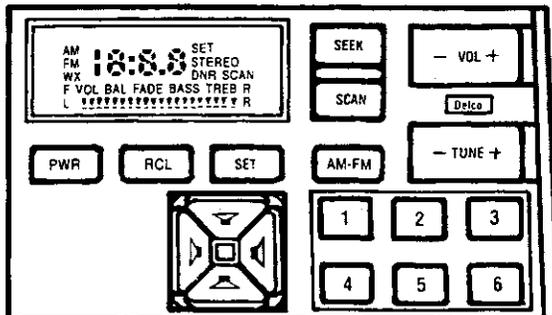
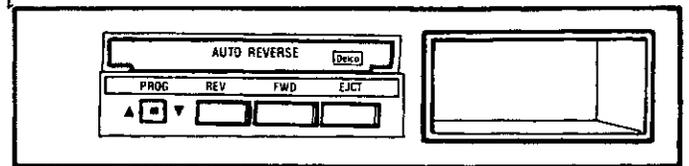
**UP4-AM RADIO**



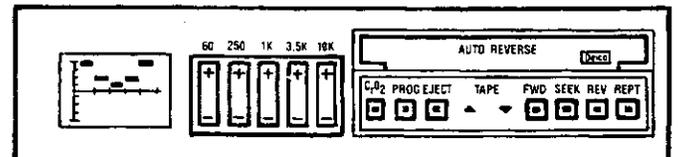
**UM7-AM/FM STEREO, SEEK AND SCAN, CLOCK**



**UM6-AM/FM STEREO, SEEK AND SCAN, AUTO REVERSE CASSETTE, CLOCK**



**UX1-AM/FM STEREO, SEEK AND SCAN, AUTO-REVERSE CASSETTE, GRAPHIC EQUALIZER, CLOCK**



**Figure 1—Radio Description**



Figure 2—Electrostatic Discharge Symbol

### Tune Button

Pressing the "TUNE" push button on the left side will decrease the frequency while pressing the "TUNE" push button on the right side will increase the frequency.

### AM/FM STEREO RADIO (UM7, UM6, or UX1)

#### Power (PWR)

The radio power switch is a push "On"/push "Off" control. If the radio is "Off," pressing the "PWR" push button will turn the system "On" and pressing the "PWR" push button again will turn the system "Off." The ignition lock cylinder must be in the "ACCESSORY" or "RUN" position for the radio to operate. Depressing the "PWR" push button while the ignition is turned "OFF" will not turn the radio "On" but will cause the display to indicate the correct time of day (TOD) for approximately 5 seconds.

#### Recall (RCL)

If the radio is "On," pressing the "RCL" push button will alternately cause the VF display to change from time of day to radio frequency display.

#### Band Switching (AM—FM)

Depression of the "AM-FM" push button will change the radio band to AM or FM. When this push button is depressed, the receiver will tune in the frequency last selected on the opposite band and the display will indicate the frequency and "AM" or "FM" mode.

#### Tuning (TUNE)

Depression of the "TUNE" push button to the right (+) side will increase the AM or FM frequency and pressing the "TUNE" push button to the left (-) will decrease the AM or FM frequency.

#### Volume (VOL)

Depression of the "VOL" push button on the right (+) side will increase the volume and pressing the "VOL" push button on the left (-) side will decrease the volume.

#### Seek (SEEK)

Depression of the "SEEK" push button causes the receiver to tune in the next station higher in frequency that may have sufficient signal strength to be listenable. The seeking action terminates at this point.

If the "SEEK" push button is depressed a second time while the tuner is seeking, the tuner will stop seeking and revert to the station that was being received

prior to initiation of the seek command. If one of the preset push buttons is depressed while the tuner is seeking, the receiver will immediately tune in the preset frequency. If the "SET" push button is depressed while the tuner is seeking, "SET" will be enabled for 5 seconds, "SEEK" will be immediately canceled and the receiver will stay tuned where it is.

#### Scan (SCAN)

Depression of the "SCAN" push button advances the tuning to the station at the next higher frequency and, provided the signal strength exceeds a predetermined level, stops at that station for approximately 5 seconds. If the "SCAN" push button is pressed again during that 5 second period, the receiver will remain tuned to that station. If the "SCAN" push button is not pressed again during that 5 second period, the tuning will advance again and repeat the cycle.

#### AM Stereo (UX1)

This is an automatic feature on the UX1 model. AM Stereo improves fidelity, but may increase noise on weaker stations. AM stereo does not have the flutter characteristics of FM (caused by tall buildings, hills, etc.). However, it is subject to interference from power lines, neon signs, atmospheric conditions, and unwanted stations. The stereo lamp will come on only when tuned to a clear, noise-free station broadcasting C-QUAM® AM stereo.

#### Set (SET)

The "SET" push button is a dual function push button. It is used in conjunction with the six radio station preset push buttons to program radio frequencies into the memory locations. Its second function is to set the time of day display (clock). To do this, the "SET" push button is used in conjunction with the "SEEK" and "SCAN" push buttons. Refer to "Clock" for detailed instructions on setting the time of day display. Refer to "Radio Frequency Preset Buttons" for instructions on presetting AM and FM radio stations.

#### Clock

To set the clock display, the ignition lock cylinder must be in the "ACCESSORY" or "RUN" position and the radio may be "On" or "Off."

The "HOUR" portion of the clock display is set by pressing the "SET" push button and within 5 seconds, pressing the "SEEK" push button until the correct hour is displayed.

The "MINUTE" portion of the clock display is set by pressing the "SET" push button and within 5 seconds, pressing the "SCAN" push button until the correct minute(s) are displayed. If the "SET" push button is pressed while the radio is turned on, the radio frequency will be displayed. The time of day will display when the "SEEK" and "SCAN" push button is pressed.

When the "SET" push button is pressed, the "SET" indicator will appear on the display for approximately 5 seconds. If the "SCAN" or "SEEK" push button is pressed after the "SET" push button is pressed and before the SET indicator goes out, the SET indicator will stay on while the clock is being set and then will go out about 5 seconds after the "SCAN" or "SEEK" push button has been released.

If electrical power is interrupted (by a blown fuse, discharged battery, etc.), the clock will need to be reset after power is restored.

### Radio Frequency Preset Buttons

To preset 6 desired AM or FM radio stations:

1. Select AM or FM, as desired, and tune in the desired station.
2. Press "Set" push button. (The "SET" indicator will light.)
3. Press a station push button. (The "SET" indicator will go out.) The radio will then tune in the selected station whenever that push button is pressed.

If electrical power is interrupted (by a blown fuse, discharged battery, etc.), the station(s) must be reset.

### Fade and Balance

The "butterfly" fade and balance function push buttons adjust the relative volume between front and rear speakers and between left and right speakers, respectively. Pressing the appropriate end of either push button adjusts the relative volume. For the fade function, the letters "F," "R," the word "FADE," will be lit on the display. Similarly, "L," "R," the word "BAL," will be lit on the display when the balance push button is actuated. After adjustment, the fade (or balance) functions will be displayed for approximately ten seconds, after which the display returns to the volume indication.

### Bass/Treble (BASS/TREB) (UM6 or UM7)

The non-equalizer units will have bass and treble controls instead of a graphic equalizer. The bass and treble controls will be rocker switches. When the upper (+) end of the "BASS" switch is depressed, the audio response at the low frequencies is increased. Conversely, when the lower (-) end of the "BASS" switch is depressed, the audio response at the low frequencies is decreased.

Similarly, when the upper (+) end of the "TREB" switch is pressed, the audio response at high frequencies is increased, and when the lower (-) end of the button is pressed, the audio response at high frequencies is decreased.

### Loudness

These units contain an auto-loudness feature. This feature boosts low-frequency audio response to compensate for the inability of the ear to hear low-level, low-frequency tones. This compensation varies inversely with the volume control setting. That is, at low volume settings, the low frequencies are boosted much more than at high volume settings.

### CASSETTE TAPE PLAYER (UM6 or UX1)

To play a tape, the ignition lock cylinder must be in "ACCESSORY" or "RUN" position and the receiver/tape player must be turned "On." Insert the tape squarely through the door, exposed tape side of the cassette first. When the tape is fully inserted, the AM/FM portion of the radio will turn "Off" and the tape will begin playing.

### Fast Forward (FWD)

To advance the tape, press the "FWD" push button. If the end of the tape is reached while in the "FWD" position, the tape will change direction, and play will resume in the opposite direction at normal speed. If the "FWD" or "PROG" push button is depressed while in the "FWD" position, "FWD" will terminate, and play will resume in the original direction at normal speed. "FWD" may also be terminated by depressing "REV," "EJCT," "SEEK," or "RPT." In each case, the chosen function will be activated.

### Reverse (REV)

To rewind the tape, press the "REV" push button. If the end of the tape is reached while in the "REV" position, play will resume in the original direction prior to activation of "REV." If the "REV" or "PROG" push button is depressed while in the "REV" position, "REV" will terminate, and play will resume in the original direction at normal speed. "REV" may also be terminated by depressing "FWD," "EJCT," "SEEK," or "RPT." In each case, the chosen function will be activated.

### CrO<sub>2</sub> Button (Chrome Dioxide) (UX1)

The "CrO<sub>2</sub>" push button is used to select the proper tape bias for the tape to be played. Chrome dioxide tapes use 70 microsecond equalization and normal bias tapes use 120 microsecond equalization. For chrome dioxide (CrO<sub>2</sub>) tapes, push the button and the light in the center of the button will illuminate when CrO<sub>2</sub> is activated. For normal bias tapes, push the button so the light is off. The tape bias (normal or high) is printed on the cassette.

### Five-Band Equalizer (UX1)

A five-band equalizer is available on the UX1 sound system. The five-band equalizer lets you tailor the frequency response from 60Hz to 10KHz.

The "60" (hertz) and "250" (hertz) push buttons control bass response. The 1K (hertz) push button controls midrange. Treble is controlled by the "3.5K" (hertz) and "10K" (hertz) push buttons.

Press a push button up to increase the frequency range, or down to decrease it. Observe the graphic display to determine the relative bass or treble response.

### Seek (UX1)

The UX1 model has the "SEEK" feature. The "SEEK" feature is activated by pressing the "SEEK" push button. When the "SEEK" feature is activated, the tape will rapidly advance to the beginning of the next selection.

NOTE: This feature works by "listening" for a "quiet" section. The "SEEK" feature may stop the tape at a "quiet" section and resume play even though this may not be the beginning of the current or next selection.

### Repeat (UX1)

Press the "REPT" push button to repeat a selection on the tape. Pressing the "REPT" push button will cause the tape to reverse to the beginning of the last selection.

## 9A-6 AUDIO SYSTEMS

### Tape Direction Indicators (UM6 and UX1)

The direction the tape is being played or the side of the tape being played is indicated by indicator arrows. When the indicator arrow on the left side is on, the top

side of the tape is being played and the tape direction is to the left. When the indicator arrow on the right side is on, the bottom side of the tape is being played and the tape direction is to the right.

## DIAGNOSIS

### ENTERTAINMENT AND COMFORT DATA BUS (E&C DATA BUS)

The remote receiver, cassette tape player, and radio control head communicate over a serial communication data bus. Since other GM vehicles using the same communication scheme also include HVAC controls on the same data line, it is also known as the E&C Data Bus (Entertainment and Comfort Data Bus).

The units will generate a carrier voltage that will read with a digital voltmeter as 9 volts DC or above depending on the actual battery voltage. When data is being transmitted, the line is pulled low. If continuous data is being transmitted, such as pressing and holding the "TUNE" button, the DC voltage reading may drop by 1 - 1.5 volts.

One example of communications occurring on the E&C Bus would be the radio tuner "SEEK" function:

1. The "SEEK" push button on the control head is pressed.
2. The control head sends the digital command over the E&C Bus to the remote receiver box.
3. The remote receiver tunes in the next station.
4. The remote receiver reports the new station number to the control head over the E&C Bus.
5. The control head displays the new station.

### TECH 1 DIAGNOSIS

The above example demonstrates the interaction between the remote receiver and the control head. An audio system malfunction could be caused by either of these components not able to process the signals correctly (assuming power and grounds have been checked), in addition to speaker, connector, or wiring malfunctions. Due to the complexity of this system, The Tech 1 scan tool with an diagnostic cartridge has been developed to properly diagnose these problems.

The E&C Bus is accessed at pin J of the Data Link Connector (DLC). Through this connection, the Tech 1 may be used to monitor or send commands to the remote receiver. Refer to figures 7, 8, 9, and 10 for available entertainment system Tech 1 tests.

- Tech 1 cartridge TK 03040B "88-93" Body Cartridge

Detailed instructions, cautions, and schematics for Tech 1 E&C Bus diagnosis can also be found in the cartridge user's manual. If unfamiliar with the Tech 1 or if using the E&C cartridge for the first time, take the time to look at the user's manual.

## NOISE ENTRY

### FRONTWAY NOISE

Any noise which can be eliminated by unplugging the antenna from the back of the radio receiver.

### Some Causes:

- Poor grounding or missing grounds of: the antenna base, the receiver, some electrical components, and body parts.
- Defective or marginal components (relays, switches, and electric motors).
- Something near the antenna lead-in or corrosion at lead-in connections.

### Solutions:

- Always verify grounding first. If more than one component interferes, a poor ground probably exists.
- Pinpoint the source: suppress, shield, or replace.
- Reroute noisy wires if necessary.

### SIDEWAY NOISE

Any noise which is reduced or eliminated when slowly moving the audio component from its mounted location.

### Some Causes:

- Noisy wiring or harnesses behind or on top of the audio component or antenna lead-in.

### Solutions:

- Suppress or shield the noisy wire or harness or reroute it.
- Shield the radio case.

### BACKWAY NOISE

Any noise that can be heard at minimum volume.

### Some Causes:

- Poor grounding of the radio.
- Unsuppressed electrical components.
- Poorly routed wires.
- Defective suppression of components.

### Solutions:

- Suppression (capacitors, etc.) can be installed at the source (preferable), the radio, or both.
- Switch pops are backway noise and are best suppressed using capacitors.
- Squeals and buzzes are best suppressed using filter packages.

### HARNES RELATED NOISE

### Some Causes:

- Broken, pinched, or shorted audio wires.
- Screw through wire harness.
- Faulty shield wires.

### Solutions:

- Localize problem to one side, front or back speaker location. Preferably done by using the fade and balance controls; if not, try reversing the speaker leads at the radio connector.

## AUDIO SYSTEMS 9A-7

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- Check wiring for defects, breaks, pinches, or shorts.
- Check wiring near known noisy components.

Many conditions that affect radio operation may be corrected without removing the radio or tape player from the vehicle. Verify the condition and follow the diagnosis charts to isolate and determine the cause of the problem (figures 3 through 19).

Because radio service problems are usually corrected at authorized Warranty Repair Stations, the tendency is to remove the radio or tape player when a problem is reported, without any preliminary diagnosis. A large number of radios received by the Warranty Repair Sta-

tions are found to be okay. This indicates that the trouble could have been corrected without removing the radio. The inconvenience to an owner of having to drive without a radio while it is at a Warranty Repair Station can frequently be avoided if the diagnosis is used before removing the radio for repairs.

If possible, determine from the owner the exact nature of the radio problem as an aid to diagnosis. Knowing whether the condition is intermittent or constant, whether it occurs with the engine off or running, with the vehicle stationary or moving, will help pinpoint the problem. Also, check that the antenna is functioning properly and that the lead-in is not at fault. Refer to "Antenna Diagnosis" later in this section.

## 9A-8 AUDIO SYSTEMS

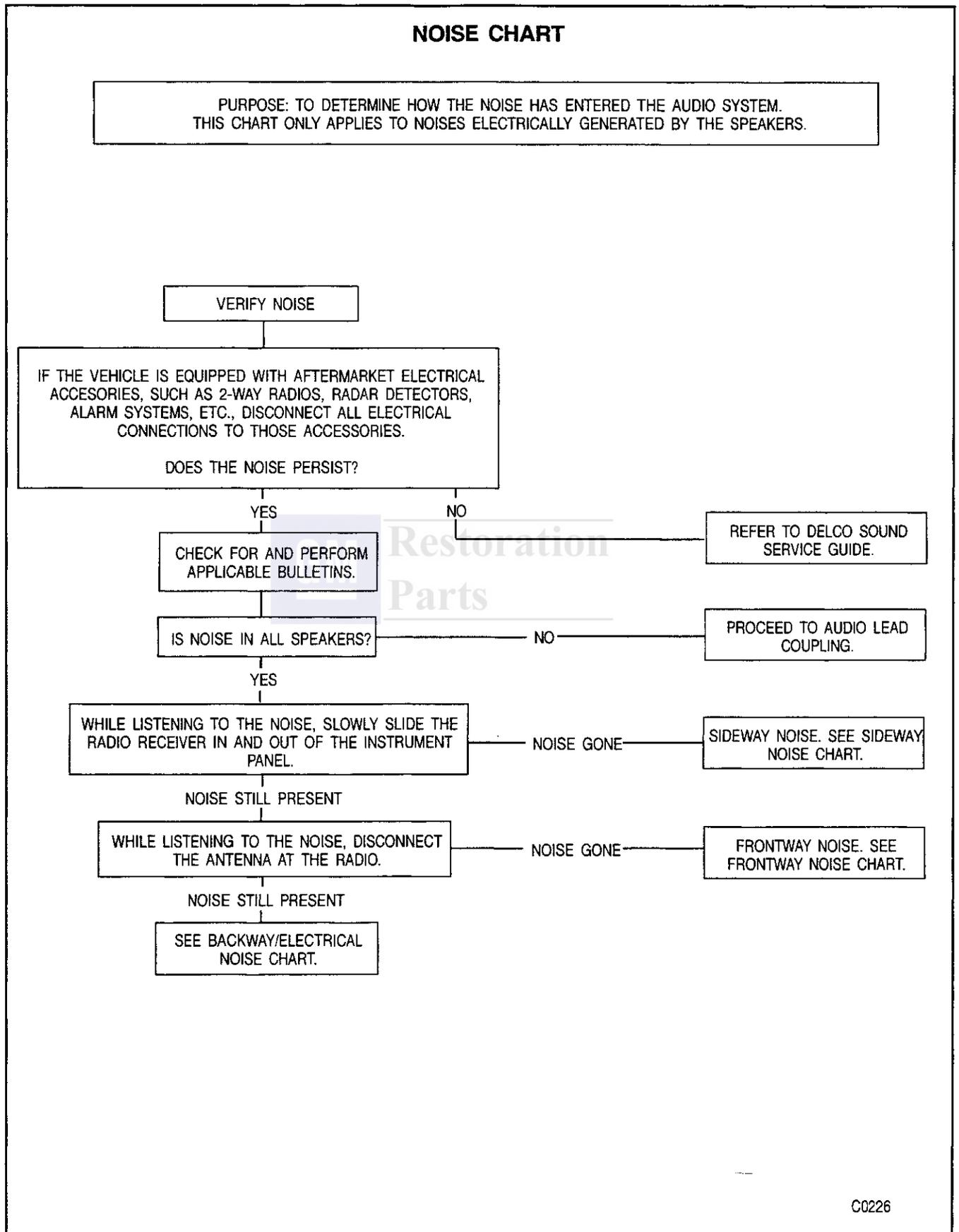
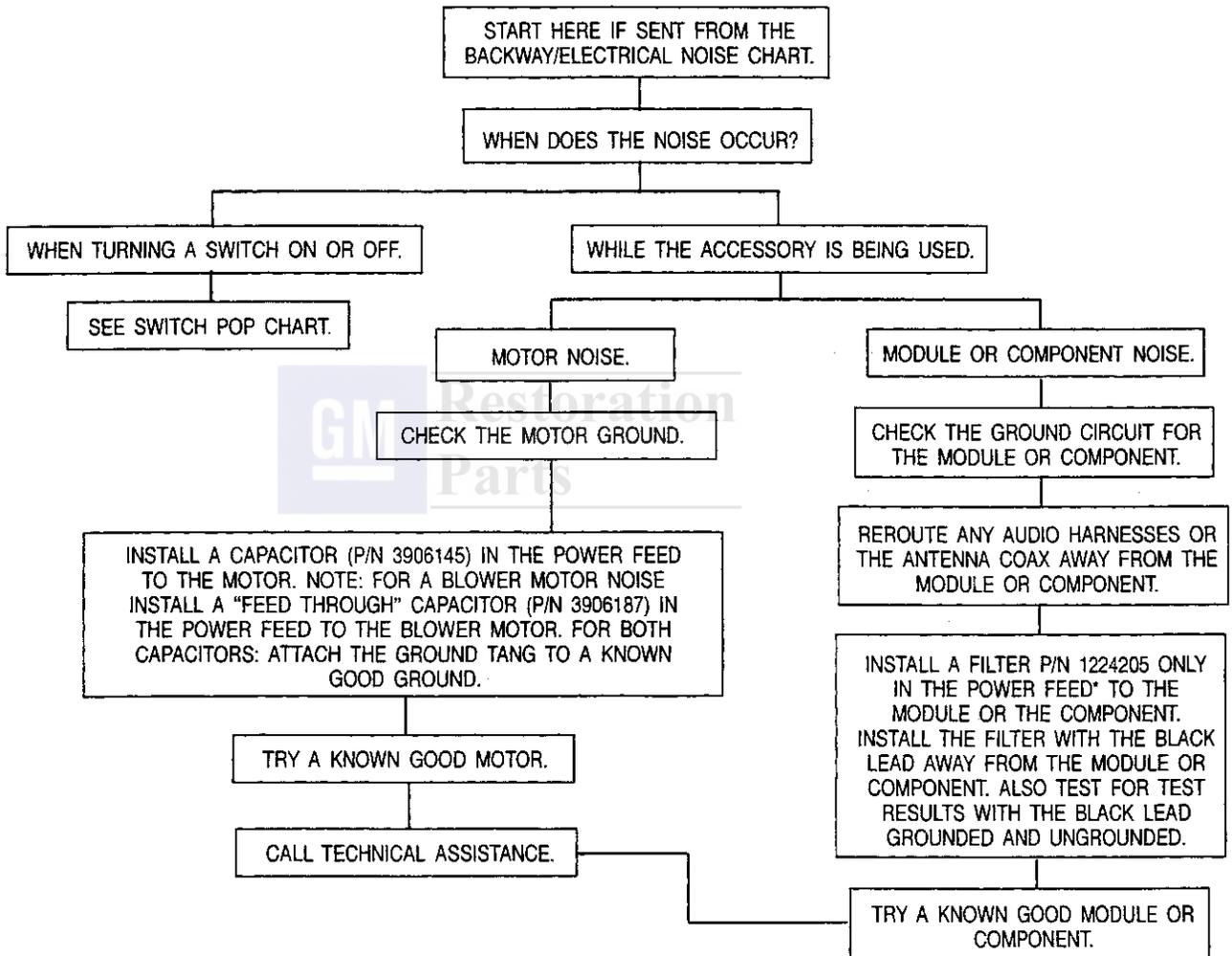


Figure 3—Noise Chart

**ACCESSORY NOISE**

PURPOSE: TO RESOLVE NOISES CAUSED BY VEHICLE ACCESSORIES.



\*ADDING SUPPRESSION TO A SIGNAL LEAD MAY CAUSE A CHECK ENGINE LIGHT OR MALFUNCTION OF COMPONENT.

**Figure 4—Accessory Noise**

## 9A-10 AUDIO SYSTEMS

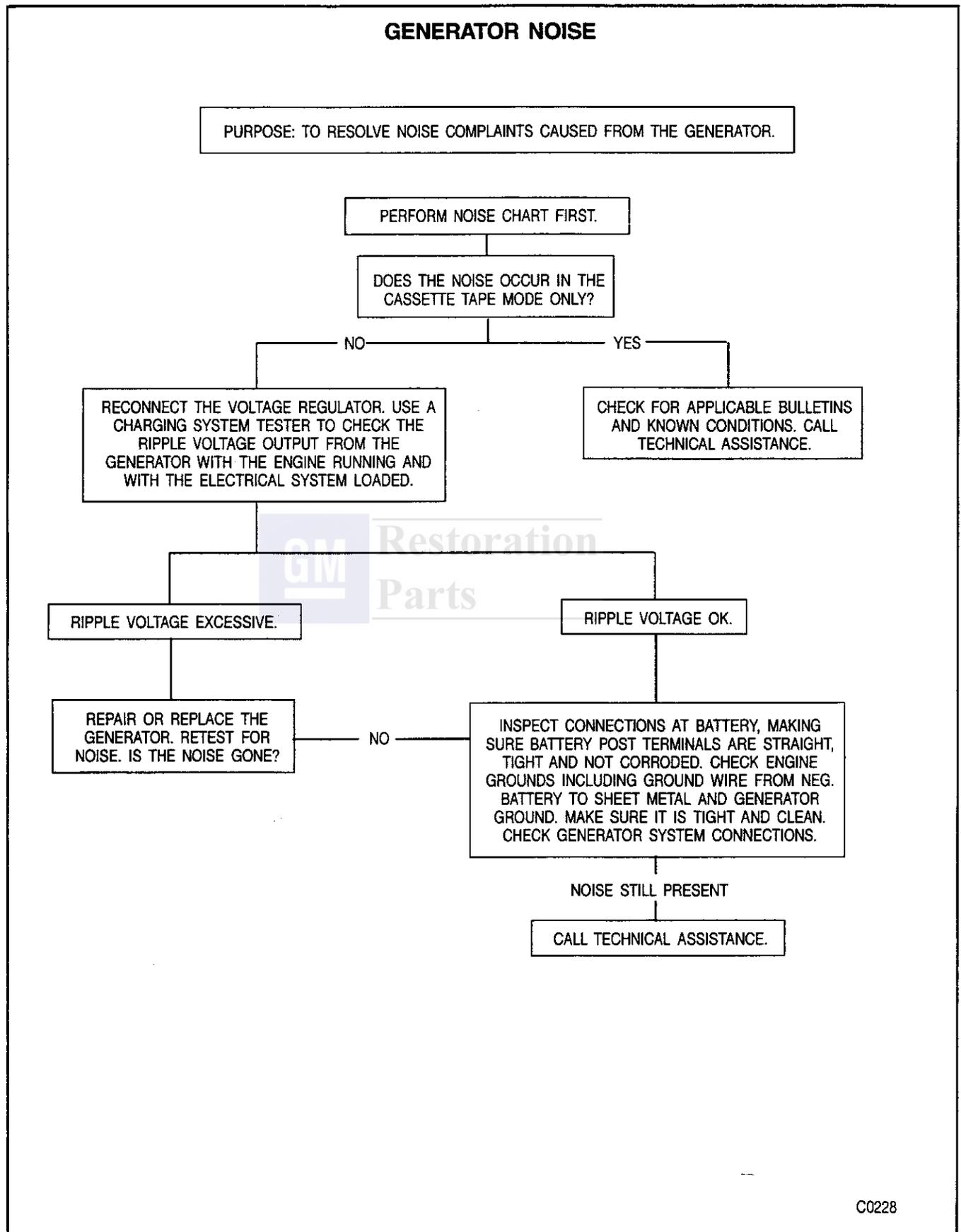


Figure 5—Generator Noise

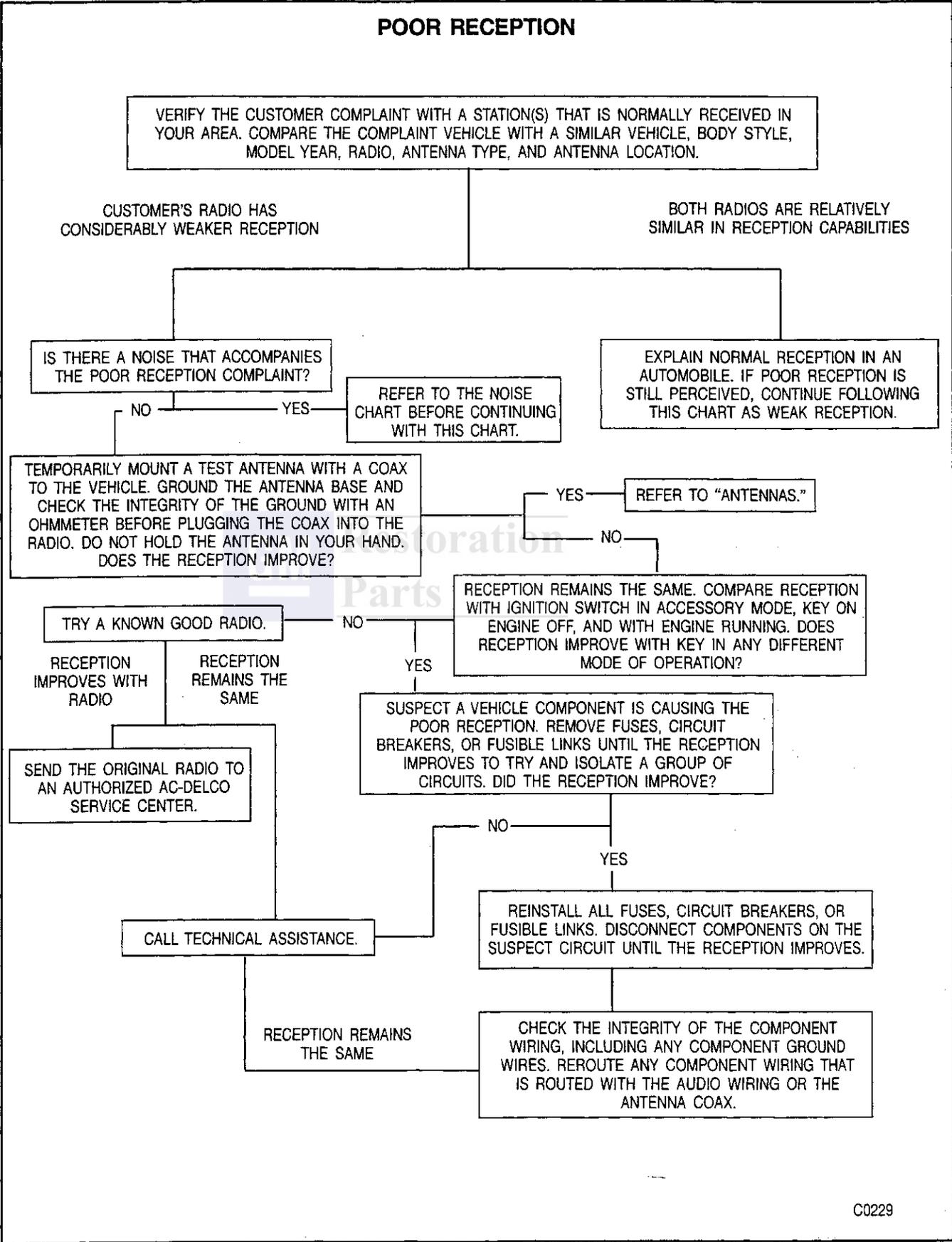


Figure 6—Poor Reception

# 9A-12 AUDIO SYSTEMS

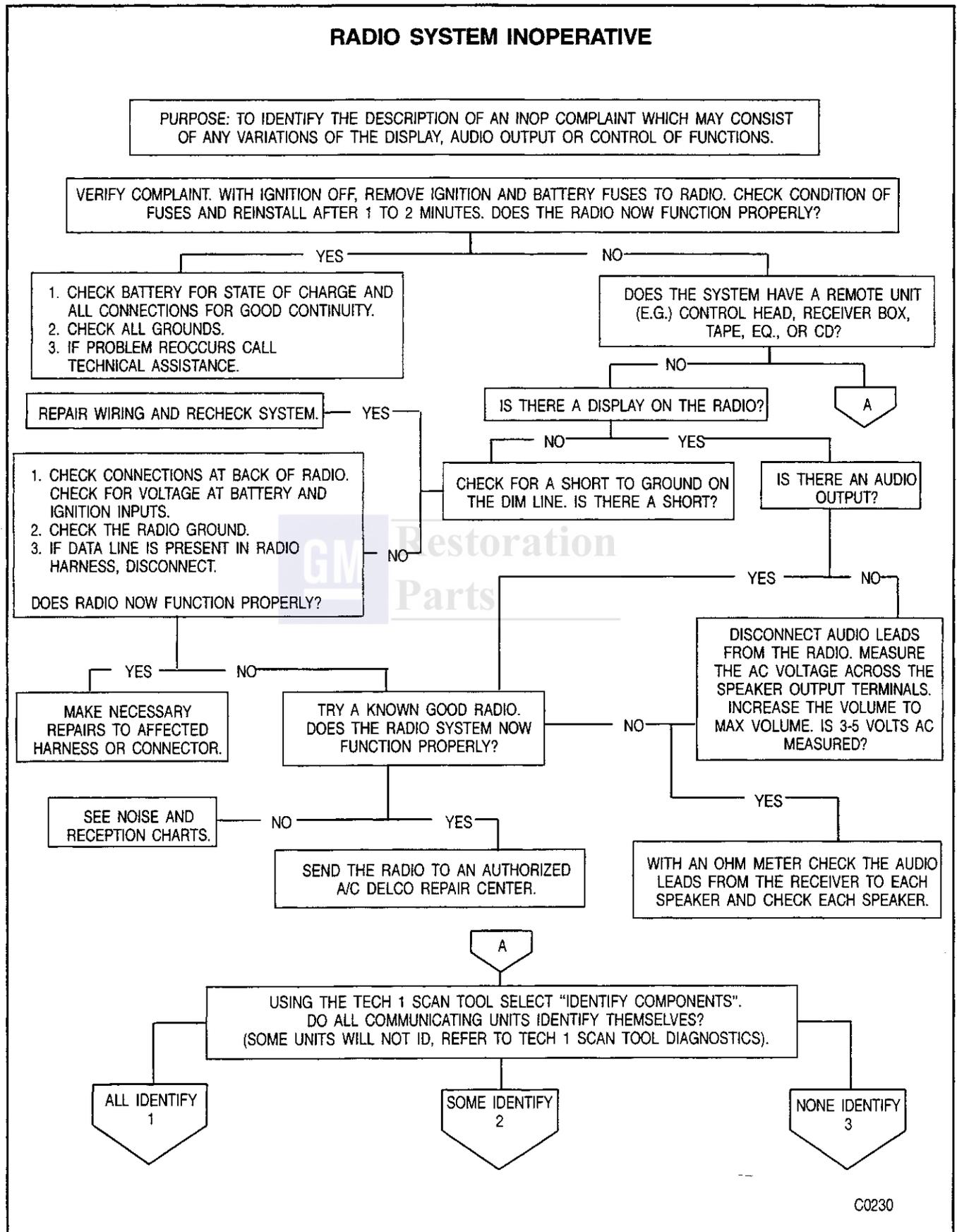
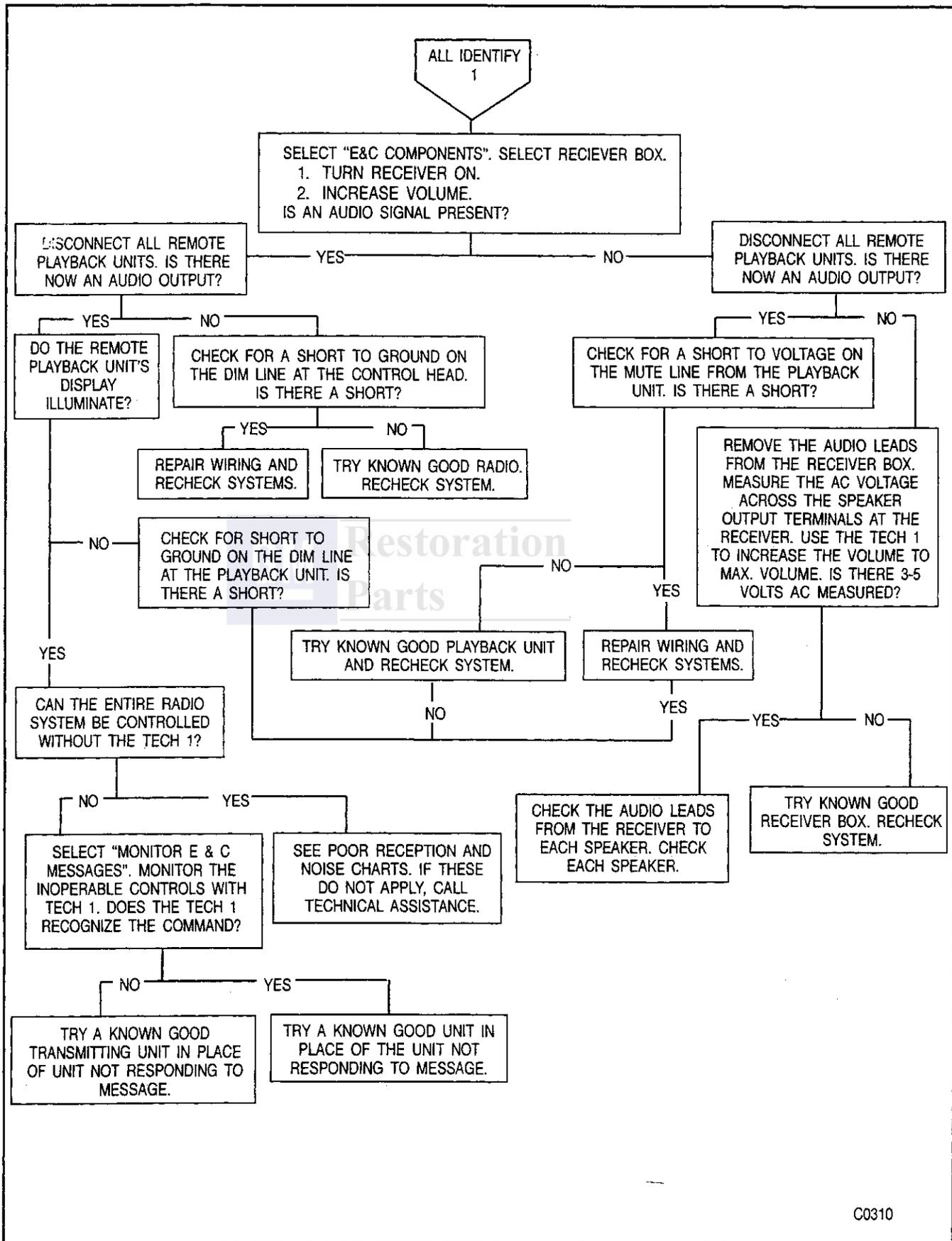
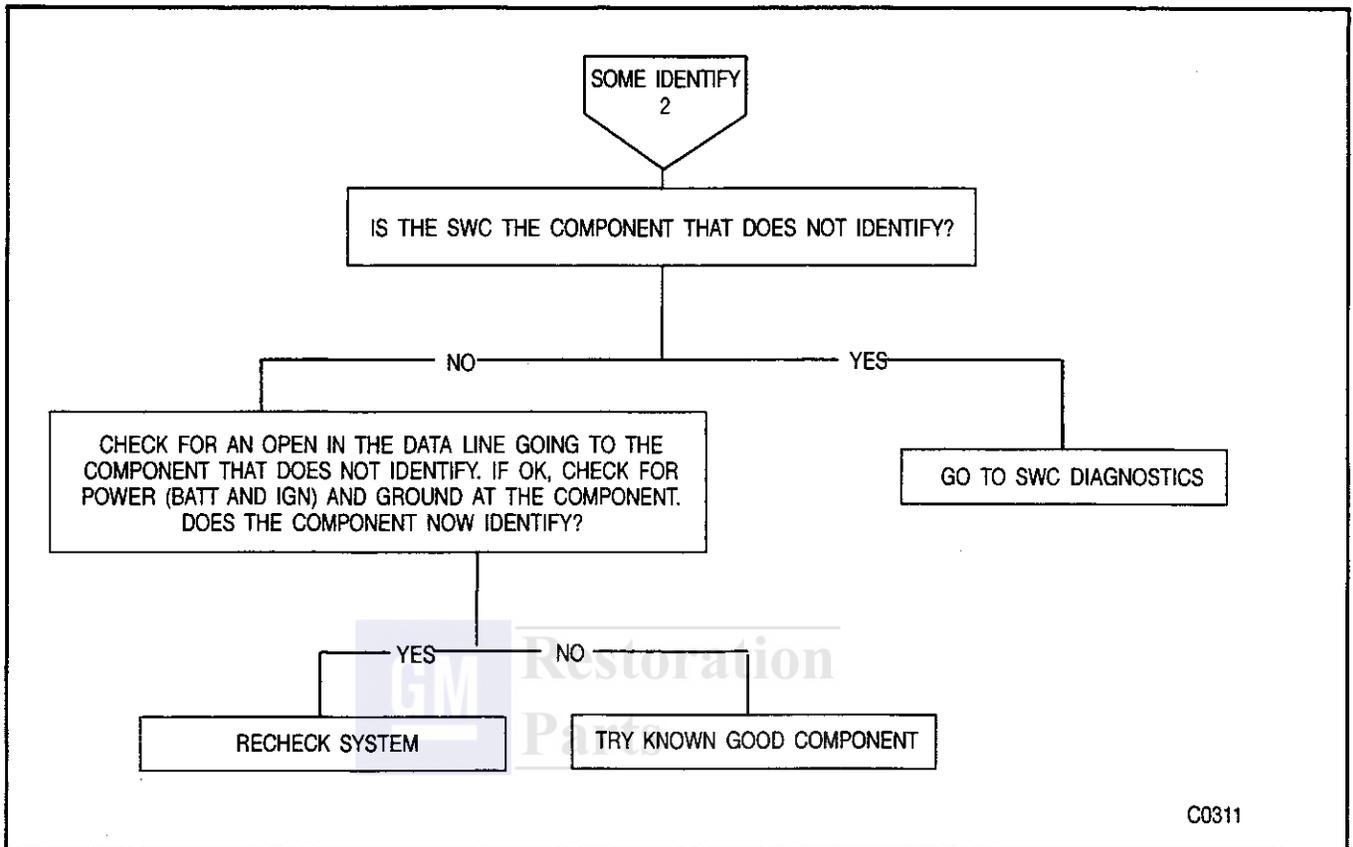


Figure 7—Radio System Inoperative



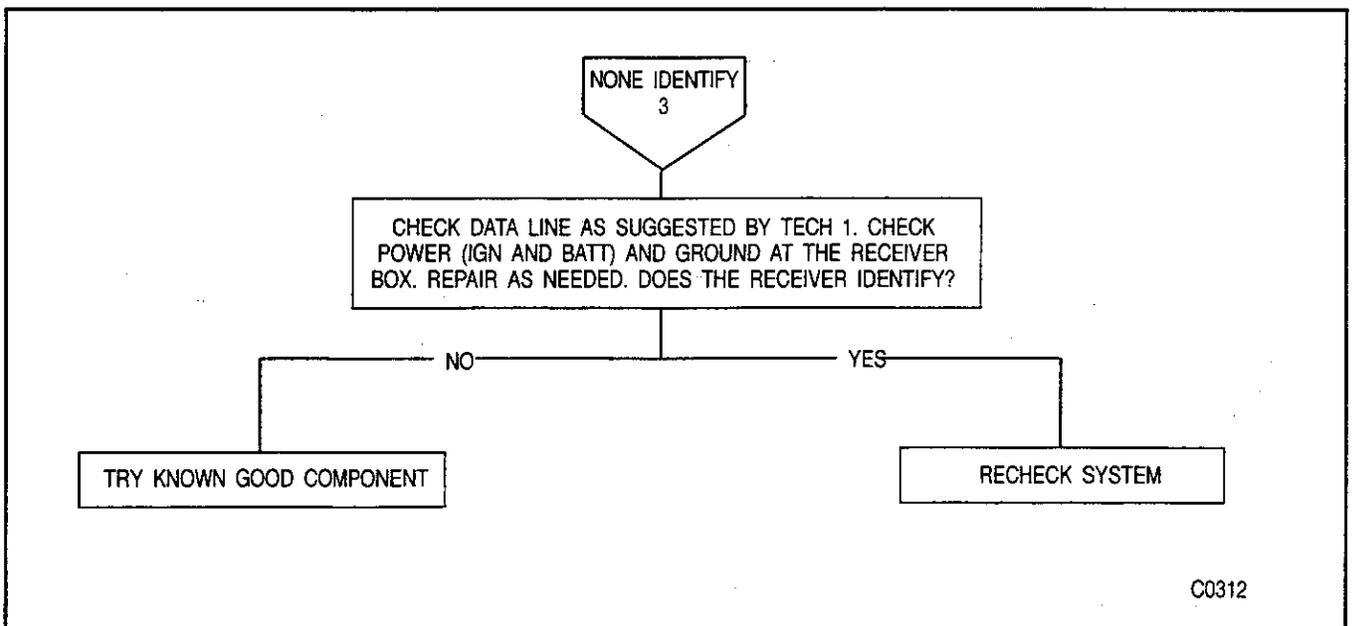
**Figure 8—Radio System Inoperative (Cont.)**

## 9A-14 AUDIO SYSTEMS



C0311

Figure 9—Radio System Inoperative (Cont.)

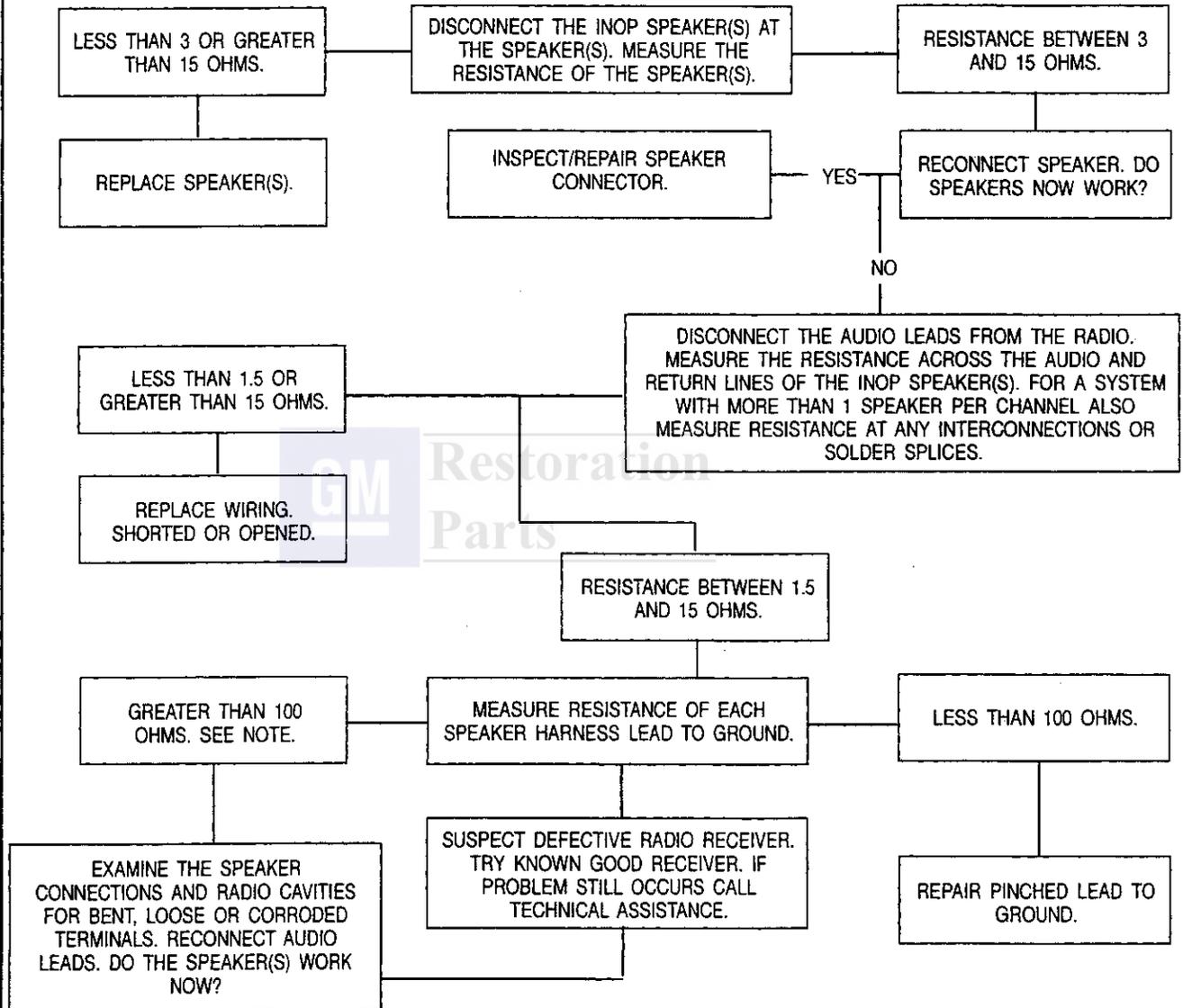


C0312

Figure 10—Radio System Inoperative (Cont.)

**SPEAKER(S) INOPERATIVE**

THIS CHART IS APPLICABLE FOR RADIOS WITH 4 CHANNELS. EACH CHANNEL MAY HAVE MORE THAN ONE SPEAKER. IF AN EXTERNAL AMPLIFIER IS USED IN THIS SYSTEM, REFER TO DEALER SERVICE MANUAL FOR DIAGNOSIS.



**NOTE:** ANY RESISTANCE MEASUREMENT EXCEPT INFINITE BETWEEN THE SPEAKER LEADS AND GROUND SHOULD BE INVESTIGATED FOR A SHORT TO GROUND.

**Figure 11—Speaker(s) Inoperative**

# 9A-16 AUDIO SYSTEMS

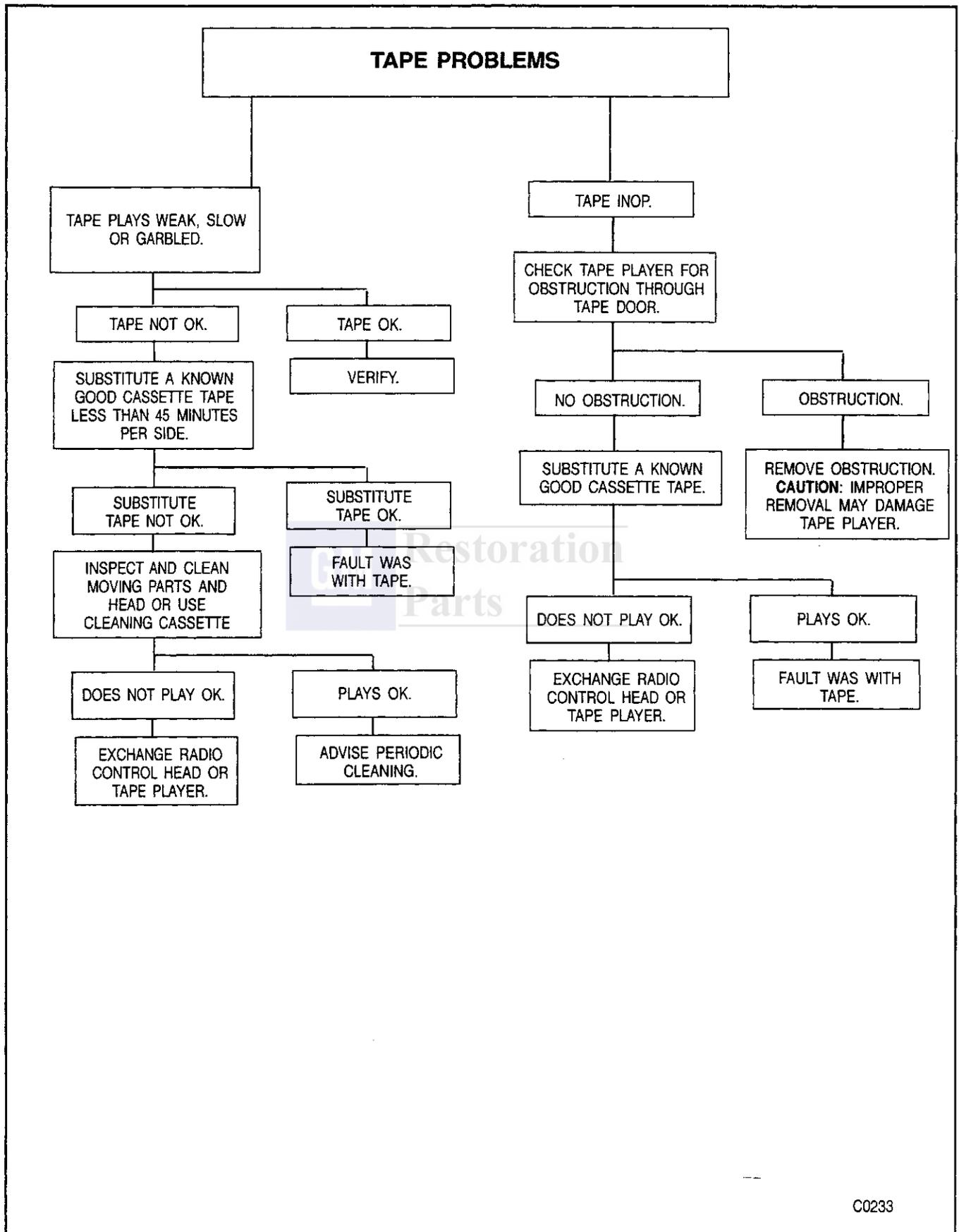
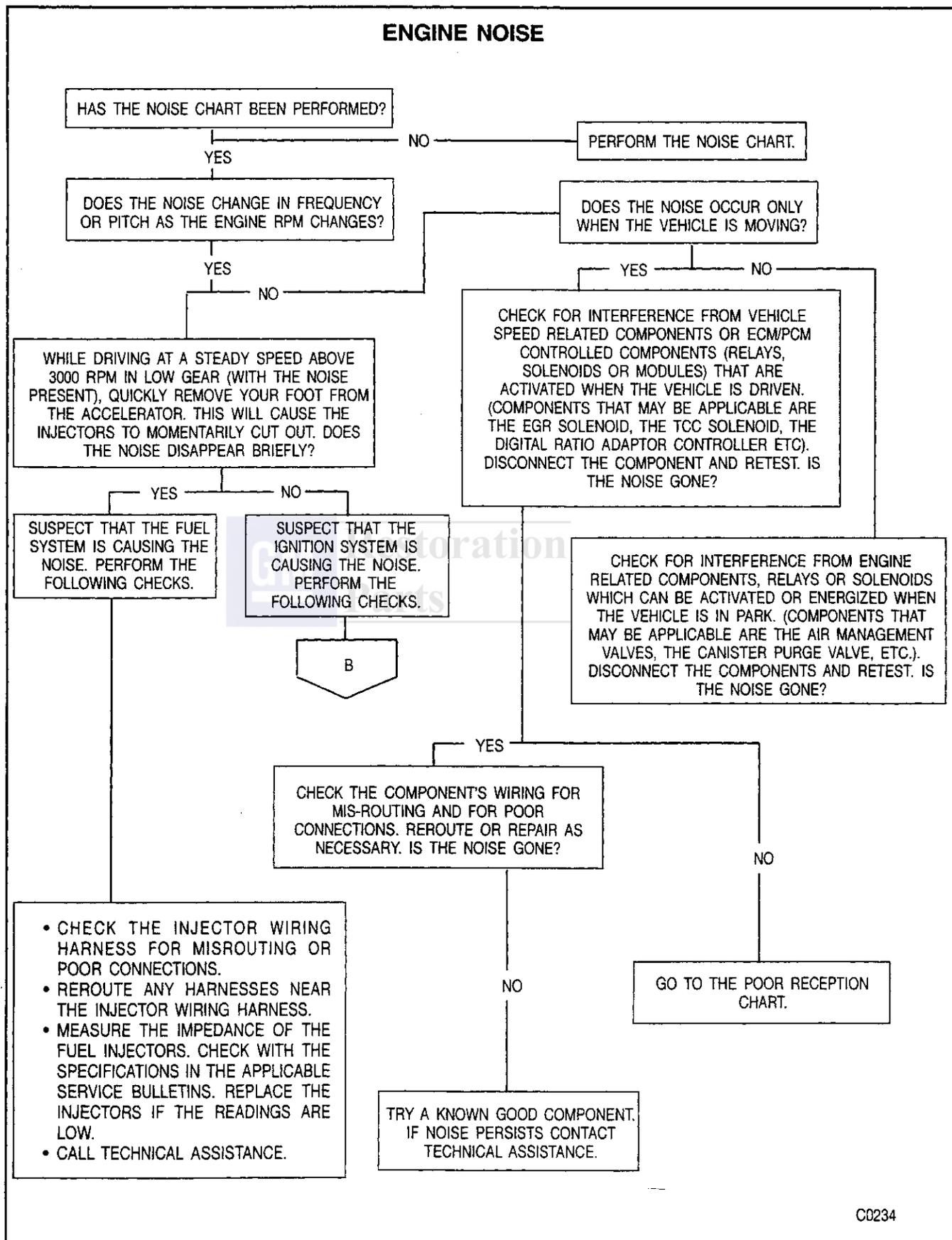


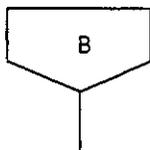
Figure 12—Tape Problems



C0234

**Figure 13—Engine Noise**

### ENGINE NOISE (CONTINUED)



- CHECK FOR CLEAN AND TIGHT BATTERY CONNECTIONS INCLUDING THE BATTERY GROUNDS.
- CHECK FOR LOOSE OR DEFECTIVE SPARK PLUG WIRES.
- CHECK FOR DEFECTIVE SPARK PLUGS OR THE WRONG SPARK PLUG GAP.
- WITH THE ENGINE RUNNING, HAVE AN ASSISTANT LISTEN TO THE RADIO AND CHECK FOR CHANGES IN THE NOISE WHILE MOVING THE SPARK PLUG WIRES. IF THE NOISE CHANGES, CHECK FOR PROPER SPARK PLUG WIRE ROUTING. REFER TO SECTION 6D4 FOR THE CORRECT ROUTING. FOLLOW THE SAME PROCEDURE FOR CONDUCTIVE VACUUM HOSES THAT MAY BE CONDUCTING NOISE TO THE RADIO. CONDUCTIVE VACUUM HOSES USUALLY DO NOT HAVE A STRIPE ON THEM.
- CHECK AND CLEAN SPARK PLUG WIRE BOOTS FOR EXCESSIVE SILICON GREASE.
- CLEAN THE ROTOR AND DISTRIBUTOR CAP OF ANY EXCESS CARBON BUILD-UP.
- CHECK THE DISTRIBUTOR CAP FOR CRACKS, EXCESSIVE WEAR OR EXCESSIVE PLAY OF THE CARBON CENTER CONTACT.
- CHECK THE ROTOR FOR CRACKS, EXCESSIVE WEAR, OR A BURNED THROUGH CONDITION.
- CHECK THE RESISTANCE OF ALL GROUNDS WITH THE NEGATIVE BATTERY CABLE DISCONNECTED. REPAIR OR REPLACE IF RESISTANCE IS EXCESSIVE.
- FOR AN HEI SYSTEM WITH A REMOTE IGNITION COIL:
  1. CHECK THE CONDITION OF THE SECONDARY IGNITION WIRE TO THE COIL. REPAIR OR REPLACE AS NEEDED.
  2. CHECK THE IGNITION COIL FOR A BURNT CONDITION.
  3. CHECK FOR AN OPEN SECONDARY IGNITION COIL.
  4. INSTALL A 0.5 UFD CAPACITOR (P/N 3906145) IN THE POWER FEED TO THE COIL.
- CALL TECHNICAL ASSISTANCE.

SWITCH POP

DETERMINE WHICH SWITCH IS CAUSING A POP WHEN ACTIVATED.

DETERMINE IF FIG. #A OR FIG. #B CONFIGURATION IS BEING USED. ADD CAPACITOR #1.

IS THE POP STILL PRESENT?

YES

INSTALL CAPACITOR #2 TO THE FIGURE THAT APPLIES.

IS THE POP STILL PRESENT?

YES

INSTALL CAPACITOR #3 TO THE FIGURE THAT APPLIES.

IS THE POP STILL PRESENT?

YES

CALL TECHNICAL ASSISTANCE.

NO

NO

NO

RECHECK SYSTEM TO DETERMINE IF ANY POPS REMAIN.

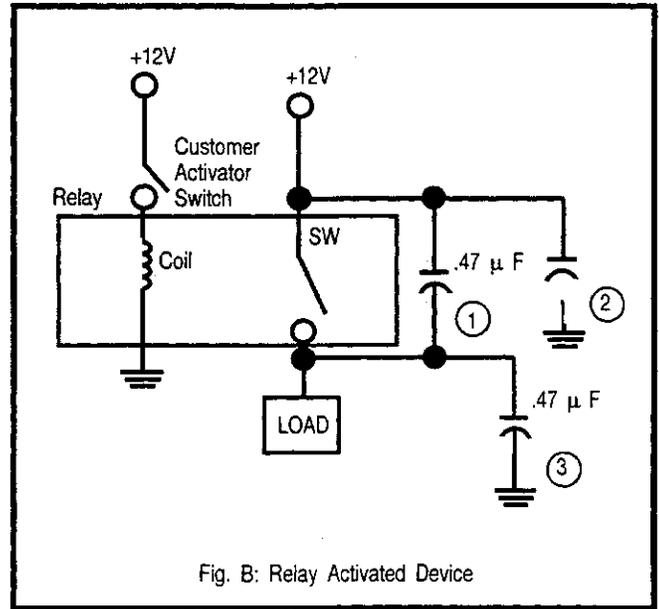
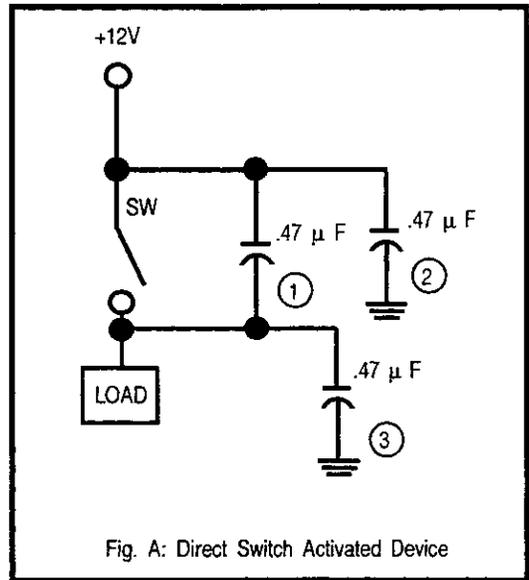


Figure 15—Switch Pop

# 9A-20 AUDIO SYSTEMS

## SIDWAY NOISE

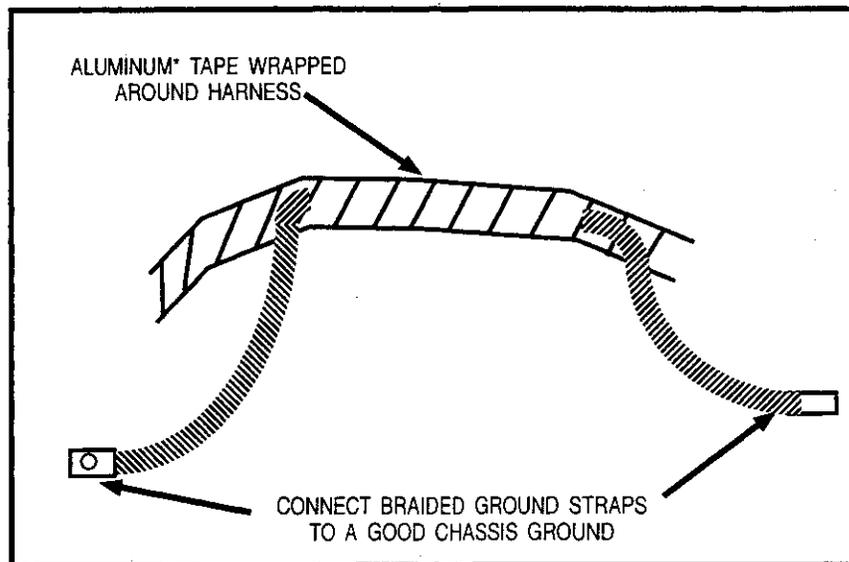
PURPOSE: TO RESOLVE NOISE COMPLAINTS THAT ENTER THE RADIO THROUGH ITS CHASSIS.

WHERE POSSIBLE, REROUTE VEHICLE WIRING HARNESSES AWAY FROM THE RADIO RECEIVER.

IF UNABLE TO REROUTE A HARNESS, SHIELD THE HARNESS BY WRAPPING IT WITH ALUMINUM TAPE. BE SURE NOT TO LEAVE GAPS BETWEEN THE WRAPS OF THE TAPE. GROUND EACH END OF THE SHIELD BY TAPING A BRAIDED GROUND STRAP TO IT AND ATTACHING THE STRAPS TO A GOOD CHASSIS GROUND.

IF NOISE PERSISTS, REMOVE THE RECEIVER HARNESS GROUND WIRE AND ATTACH A BRAIDED GROUND STRAP TO THE RECEIVER CASE. CONNECT THE OTHER END OF THE STRAP TO A GOOD CHASSIS GROUND.

IF NOISE PERSISTS, PROCEED TO BACKWAY/ELECTRICAL NOISE CHART.



\*ALUMINUM TAPE WILL ONLY PROTECT AGAINST ELECTRICAL INTERFERENCE.

C0237

Figure 16—Sideway Noise

**FRONTWAY NOISE**

PURPOSE: TO RESOLVE NOISE COMPLAINTS THAT ENTER THE RADIO THROUGH THE ANTENNA SYSTEM.

TEST ANTENNA. REFER TO "ANTENNAS."

CHECK ALL COAX CONNECTORS, PARTICULARLY ON MULTI-PIECE ANTENNA COAXES, FOR CORROSION, TIGHTNESS. TRY RE-ROUTING THE COAX AWAY FROM OTHER ELECTRICAL COMPONENTS AND THEIR WIRING.

IF NECESSARY, CLEAN THE CONNECTORS AND WRAP THEM WITH ALUMINUM TAPE. ATTACH WITH THE TAPE A BRAIDED GROUND STRAP CONNECTED TO A GOOD CHASSIS GROUND.

CHECK ALL ANTENNA MOUNTS FOR GOOD GROUNDS. ENSURE ALL MOUNTING SCREWS ARE CLEAN AND TIGHT. IF POWER ANT. MAKE SURE UPPER BRACKET IS TIGHTENED BEFORE LOWER BRACKET IS SECURED. ALSO TIGHTEN THE ANTENNA BEZEL NUT TO THE PROPER TORQUE.

IF NOISE PERSISTS, REMOVE THE RECEIVER HARNESS GROUND WIRE AND ATTACH A BRAIDED GROUND STRAP TO THE RECEIVER CASE. CONNECT THE OTHER END OF THE STRAP TO A GOOD CHASSIS GROUND.

IF NOISE PERSISTS, PROCEED TO BACKWAY/ELECTRICAL NOISE CHART.

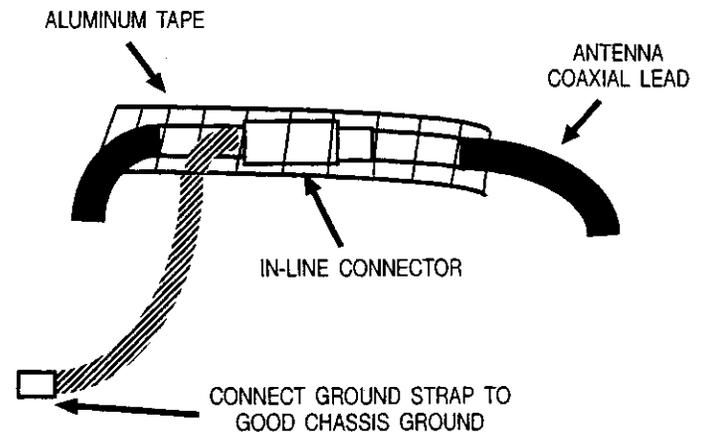
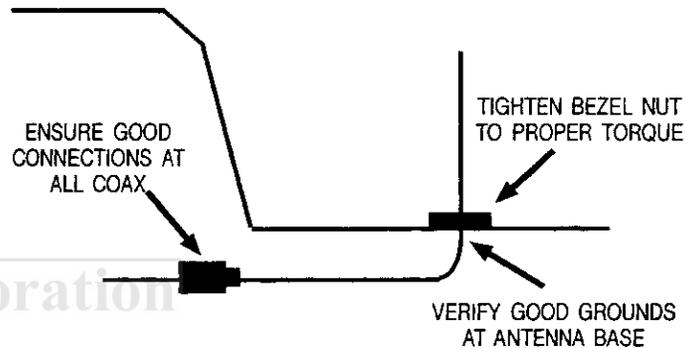
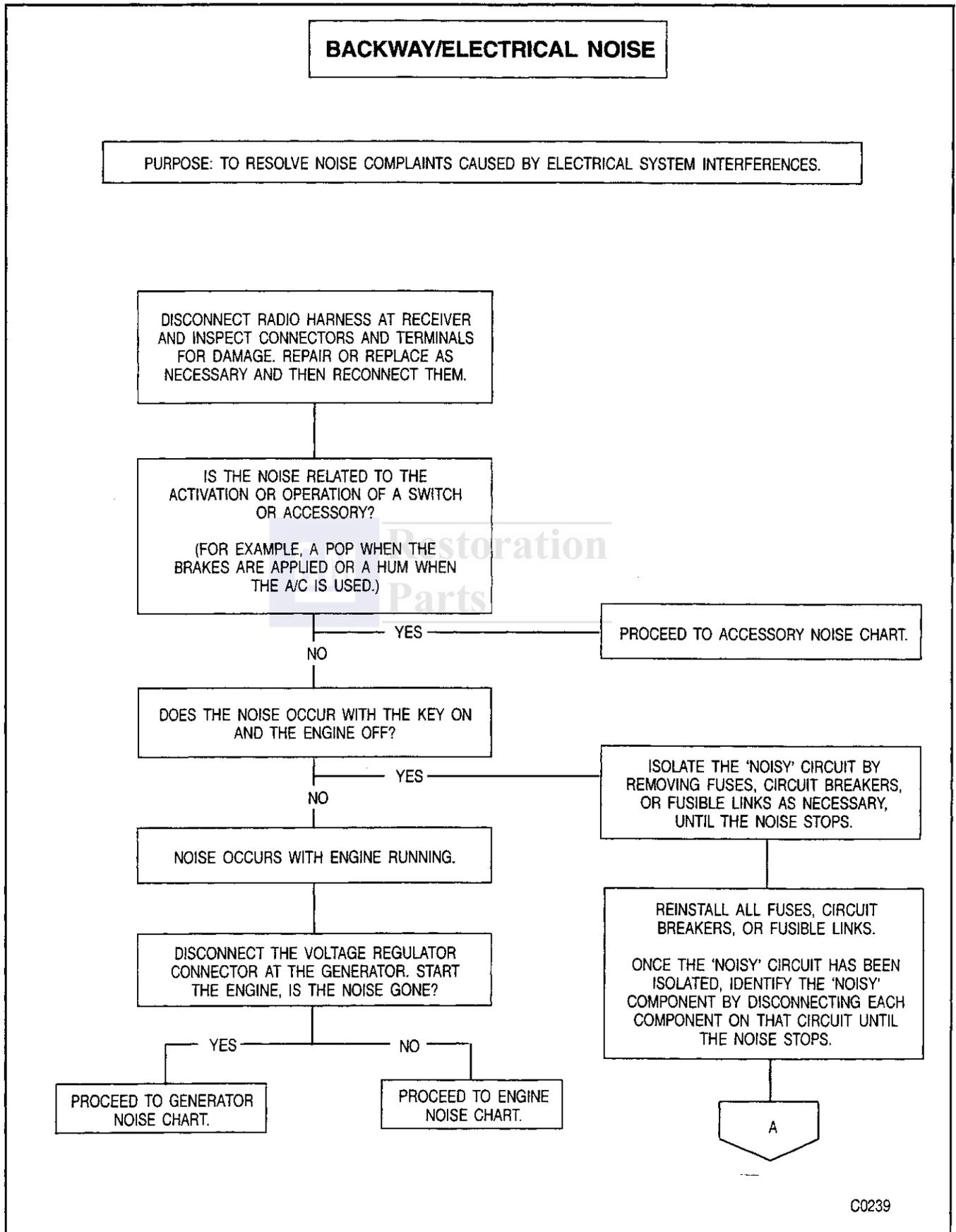


Figure 17—Frontway Noise

# 9A-22 AUDIO SYSTEMS



C0239

Figure 18—Backway/Electrical Noise

BACKWAY/ELECTRICAL NOISE (CONTINUED)

A

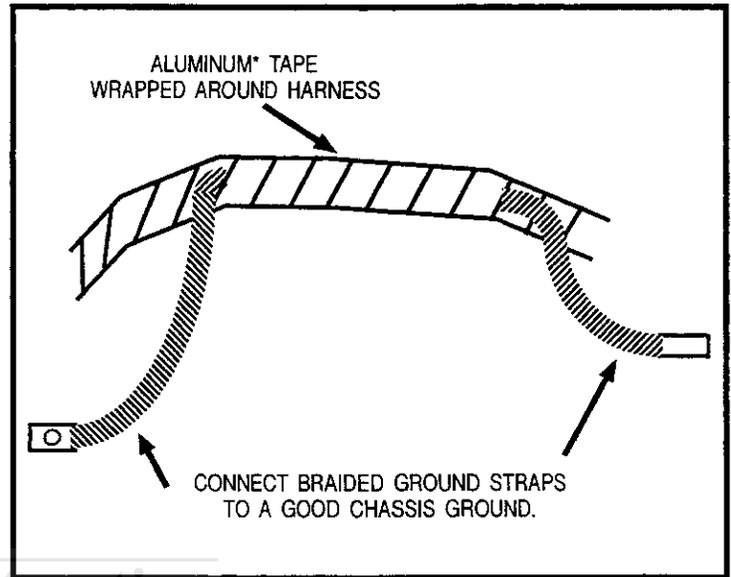
REROUTE RADIO SYSTEM HARNESSSES AWAY FROM OTHER VEHICLE WIRING AND ELECTRICAL COMPONENTS. REMOVE RADIO SYSTEM WIRING FROM HARNESSSES WHEN BUNDLED WITH OTHER VEHICLE WIRING.

ESTABLISH A NEW COMPONENT GROUND IF CURRENTLY SHARED WITH THE AUDIO SYSTEM. IF ROUTED TOGETHER WITH AUDIO SYSTEM WIRING, SEPARATE AND SHIELD THE COMPONENT WIRING. THE WIRING CAN BE SHIELDED BY WRAPPING IT WITH ALUMINUM\* TAPE. BE SURE NOT TO LEAVE GAPS BETWEEN THE WRAPS OF THE TAPE. GROUND EACH END OF THE SHIELD BY TAPING A BRAIDED GROUND STRAP TO IT AND ATTACHING THE STRAPS TO A GOOD CHASSIS GROUND.

INSTALL A FILTER PACKAGE P/N 1224205, ONLY ON THE POWER FEEDS TO THE 'NOISY' COMPONENT. INSTALL THE FILTER WITH THE BLACK LEAD AWAY FROM THE COMPONENT. ALSO TEST FOR BEST RESULTS WITH THE BLACK LEAD GROUNDED AND UNGROUNDED.

IF THE NOISE PERSISTS, REMOVE THE RADIO GROUND WIRE AND ATTACH A BRAIDED GROUND STRAP TO THE RADIO CASE. CONNECT THE OTHER END TO A GOOD CHASSIS GROUND.

CONTACT TECHNICAL ASSISTANCE.



\*ALUMINUM TAPE WILL ONLY PROTECT AGAINST ELECTRICAL INTERFERENCE.

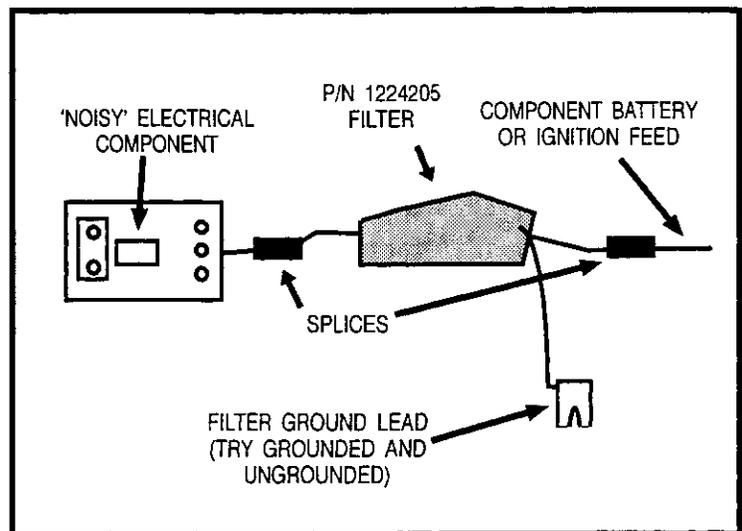


Figure 19—Backway/Electrical Noise (Cont.)

## ON-VEHICLE SERVICE

### RADIO RECEIVER

**↔** Remove or Disconnect (Figure 20)

1. Negative battery cable. Refer to SECTION 0A.
2. Steering column filler panel. Refer to SECTION 10A4.
3. Ashtray. Refer to SECTION 10A4.
4. Electrical connectors, as necessary.
5. Screw (2) from receiver bracket (4).
6. Nut (7).
7. Receiver (8) from center support (6).
8. Nut (3) from receiver bracket (4).
9. Bracket (4) and clip (5) from receiver (8).

**↔** Install or Connect (Figure 20)

1. Clip (5) and bracket (4) to receiver (8).

**NOTICE:** For steps 2, 4, and 5, refer to "Notice" on page 9A-1.

2. Nut (3) to receiver bracket (4).



- Nut (3) to 2.5 N.m (22 lbs. in.).

3. Receiver (8) to center support (6).
4. Nut (7).



- Nut (7) to 2.5 N.m (22 lbs. in.).

5. Screw (2) to receiver bracket (4).



- Screw (2) to 1.9 N.m (17 lbs. in.)

6. Electrical connectors, as necessary.
7. Ashtray. Refer to SECTION 10A4.

8. Steering column filler panel. Refer to SECTION 10A4.

9. Negative battery cable.
  - Check circuit operation.

### CONTROL HEAD

**↔** Remove or Disconnect (Figures 21 and 22)

1. Negative battery cable. Refer to SECTION 0A.
2. Instrument panel bezel. Refer to SECTION 10A4.
3. HVAC control. Refer to SECTION 1A or 1B.
4. Screws (11).
5. Control head (10).
6. Electrical connectors and antenna cable, as necessary.

**↔** Install or Connect (Figures 21 and 22)

1. Electrical connectors and antenna cable, as necessary.
2. Control head (10).

**NOTICE:** Refer to "Notice" on page 9A-1.

3. Screws (11).



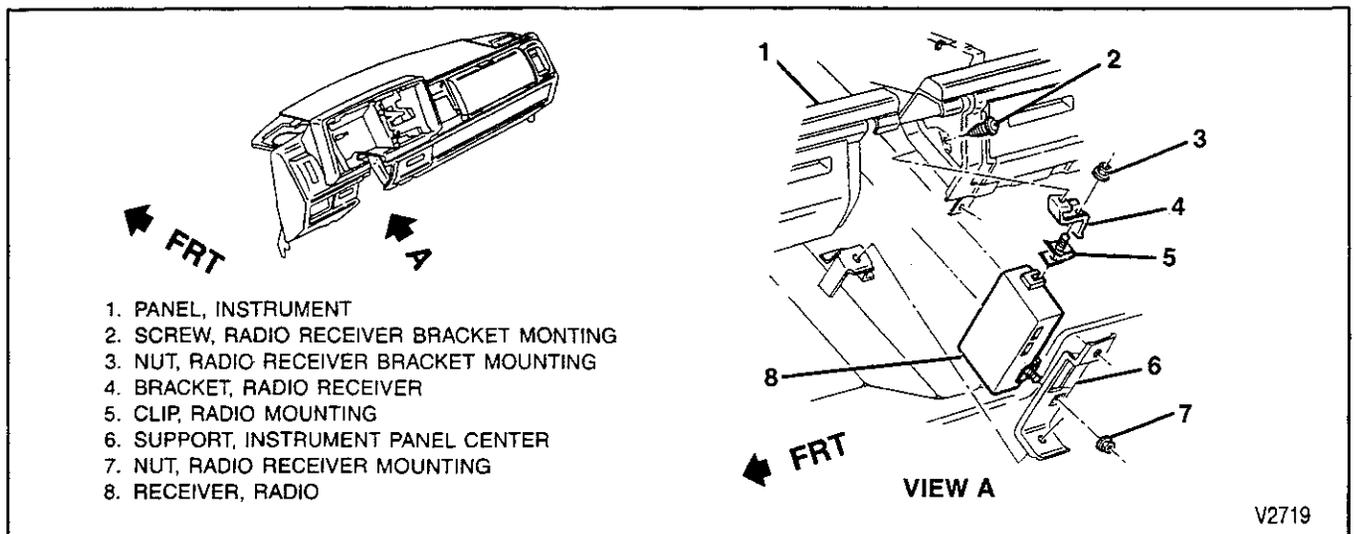
- Screws (11) to 1.9 N.m (17 lbs. in.).

4. HVAC control. Refer to 1A or 1B.
5. Instrument panel bezel. Refer to SECTION 10A4.
6. Negative battery cable.
  - Check circuit operation.

### TAPE PLAYER

**↔** Remove or Disconnect (Figure 23)

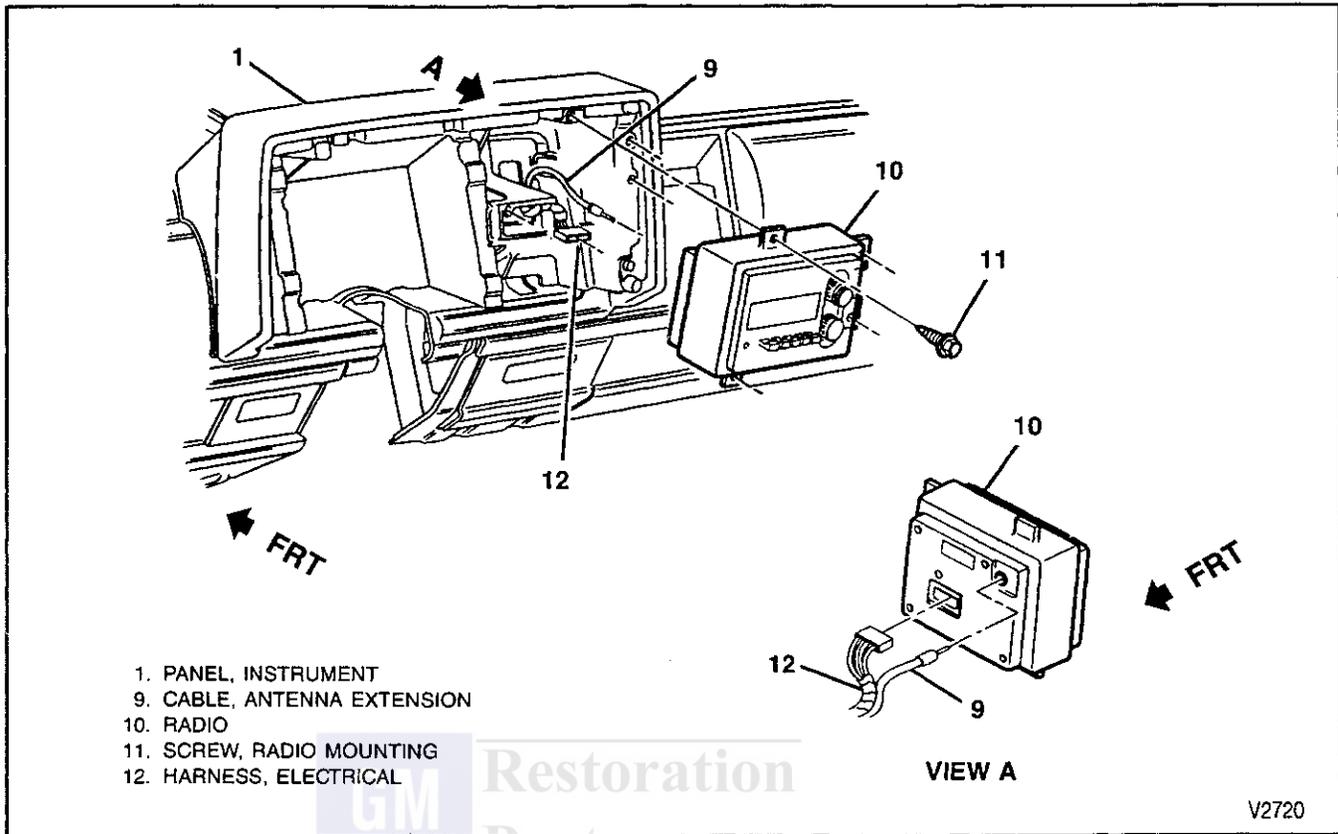
1. Negative battery cable. Refer to SECTION 0A.
2. Accessory trim plate. Refer to SECTION 10A4.
3. Electrical connectors, as necessary.



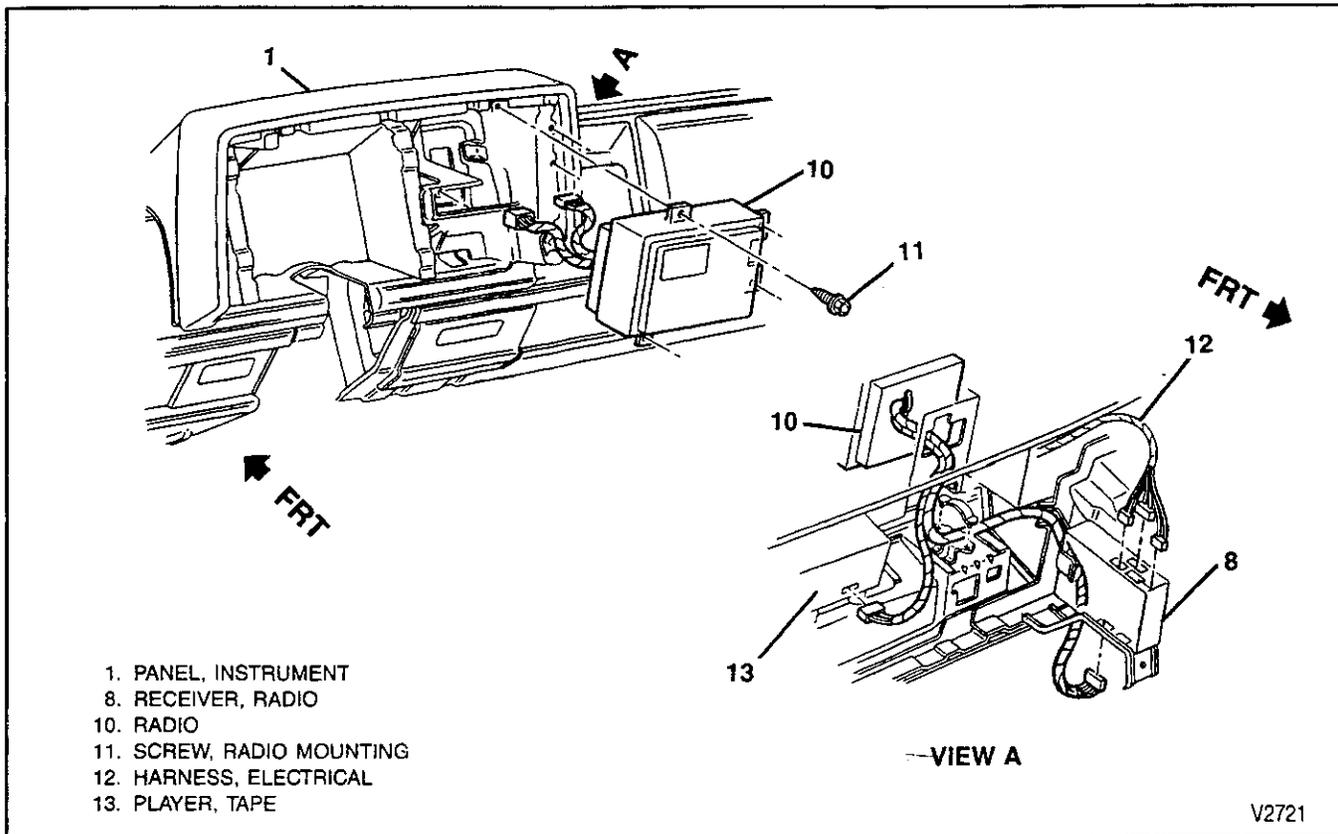
1. PANEL, INSTRUMENT
2. SCREW, RADIO RECEIVER BRACKET MONTING
3. NUT, RADIO RECEIVER BRACKET MOUNTING
4. BRACKET, RADIO RECEIVER
5. CLIP, RADIO MOUNTING
6. SUPPORT, INSTRUMENT PANEL CENTER
7. NUT, RADIO RECEIVER MOUNTING
8. RECEIVER, RADIO

V2719

Figure 20—Radio Receiver Assembly



**Figure 21—Control Head Assembly (AM—UP4)**



**Figure 22—Control Head Assembly (AM/FM—UM6, UM7, UX1)**

# 9A-26 AUDIO SYSTEMS

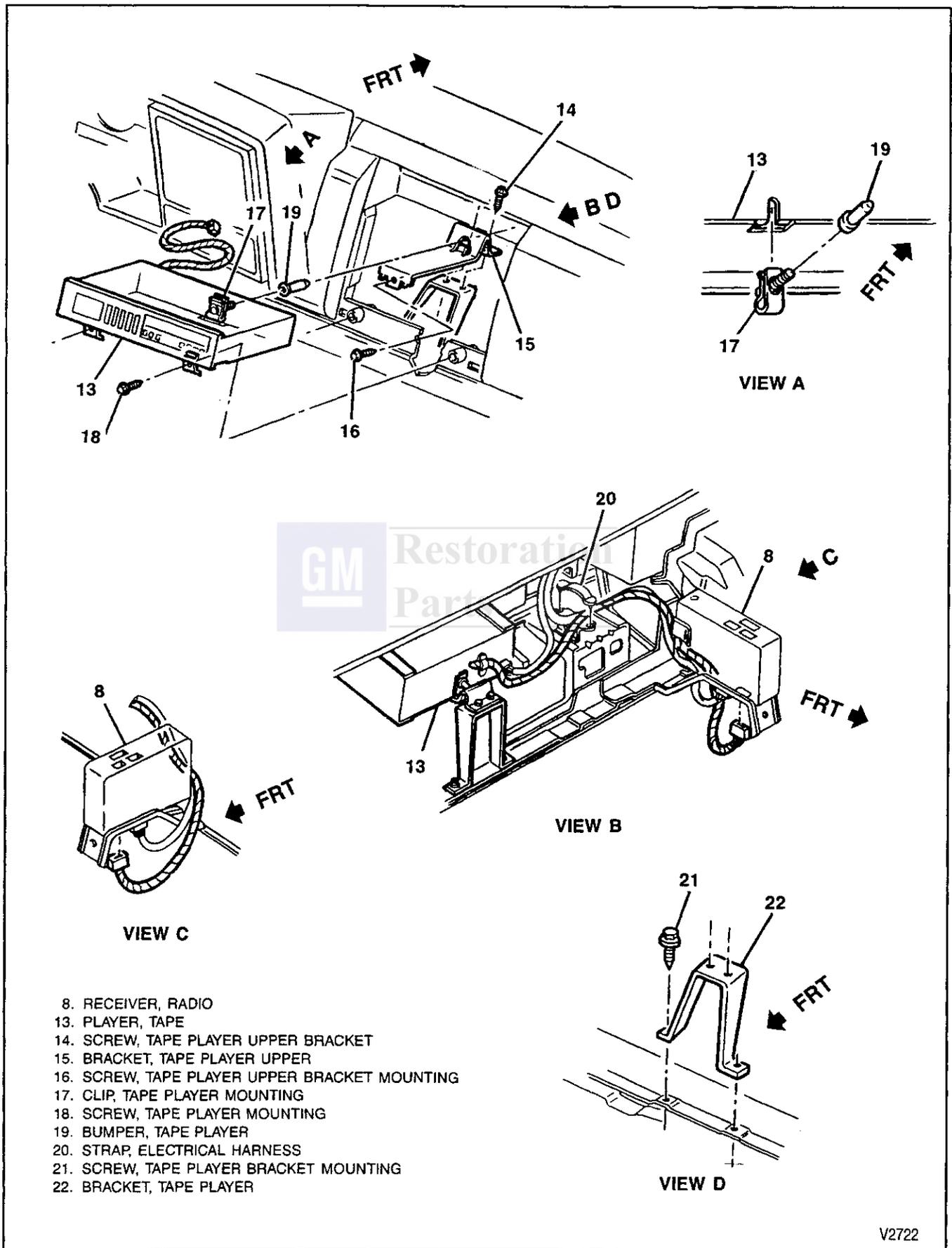
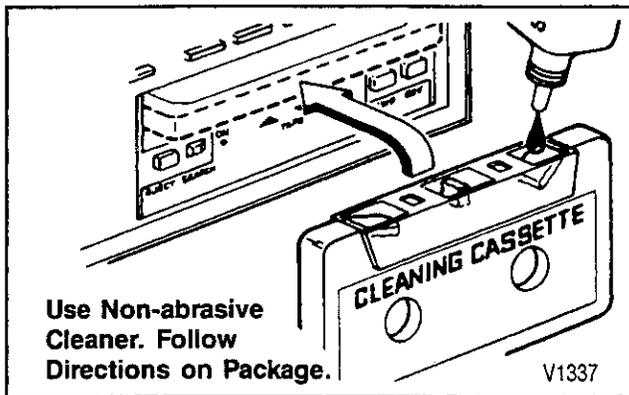


Figure 23—Tape Player Assembly



**Figure 24—Use of Cleaning Cassette**

4. Screws (18).
5. Tape player (13).
6. Bumper (19) and clip (17) from tape player (13).

**↔ Install or Connect (Figure 23)**

1. Clip (17) and bumper (19) to tape player (13).
2. Tape player (13).
  - Make sure the bumper goes into the hole in the bracket.

**NOTICE:** Refer to "Notice" on page 9A-1.

3. Screws (18).

**⌚ Tighten**

- Screws (18) to 1.9 N.m (17 lbs. in.).
4. Electrical connectors, as necessary.
  5. Accessory trim plate. Refer to SECTION 10A4.
  6. Negative battery cable.
    - Check circuit operation.

**TAPE PLAYER AND CASSETTE CARE**

For the best operation of the cassette tape player, do not use cassette tapes that are longer than 90 minutes in playback time (45 minutes per side). Cassette tapes longer than 90 minutes may cause tape slippage or jamming.

**Tape Head and Capstan Cleaning**

There are two parts that are cleaned on a tape player: the head and the capstan. Since they can be reached through the tape door, leave the tape player in the vehicle. This service should be performed every 50 hours of operation.

To clean the head and capstan, use a cotton swab dipped in ordinary rubbing alcohol, or use a cleaning cassette.

As an alternate way to clean the head and capstan, a cleaning cassette kit may be purchased (figure 24). Follow the instructions included with the kit to clean the tape player.

Do not contact the tape head with magnetized tools. If the head becomes magnetized, every cassette played in the player will be degraded.

No service is performed on the tapes and warranty of these tapes is handled by the cassette manufacturer,

not by the dealer. Any test tape used by the dealer should be stored in its container to keep the tape clean. Store cassettes away from extreme heat or direct sunlight.

**AMPLIFIER**

**↔ Remove or Disconnect (Figures 25 and 26)**

1. Negative battery cable. Refer to SECTION 0A.
2. Electrical connectors, as necessary.
3. Amplifier (24) from bracket (25).

**↔ Install or Connect (Figures 25 and 26)**

1. Amplifier (24) to bracket (25).
2. Electrical connectors, as necessary.
3. Negative battery cable. Refer to SECTION 0A.
  - Check circuit operation.

**SPEAKERS**

**FRONT SPEAKERS**

**↔ Remove or Disconnect (Figure 27)**

1. Speaker grille (28).
2. Screws (29).
3. Speaker (30).
4. Electrical connectors, as necessary.

**↔ Install or Connect (Figure 27)**

1. Electrical connectors, as necessary.
2. Speaker (30).

**NOTICE:** Refer to "Notice" on page 9A-1.

3. Screws (29).

**⌚ Tighten**

- Screws (29) to 1.9 N.m (17 lbs. in.).
4. Speaker grille (28).
    - Check circuit operation.

**REAR SPEAKERS**

**↔ Remove or Disconnect (Figures 28 through 32)**

1. Speaker grille (36) or rear trim panel (35).
2. Screws (34).
3. Speaker (33).
4. Electrical connectors, as necessary (figures 29, 30, and 32).

**↔ Install or Connect (Figures 28 through 32)**

1. Electrical connectors, as necessary (figures 29, 30, and 32).
2. Speaker (33).

# 9A-28 AUDIO SYSTEMS

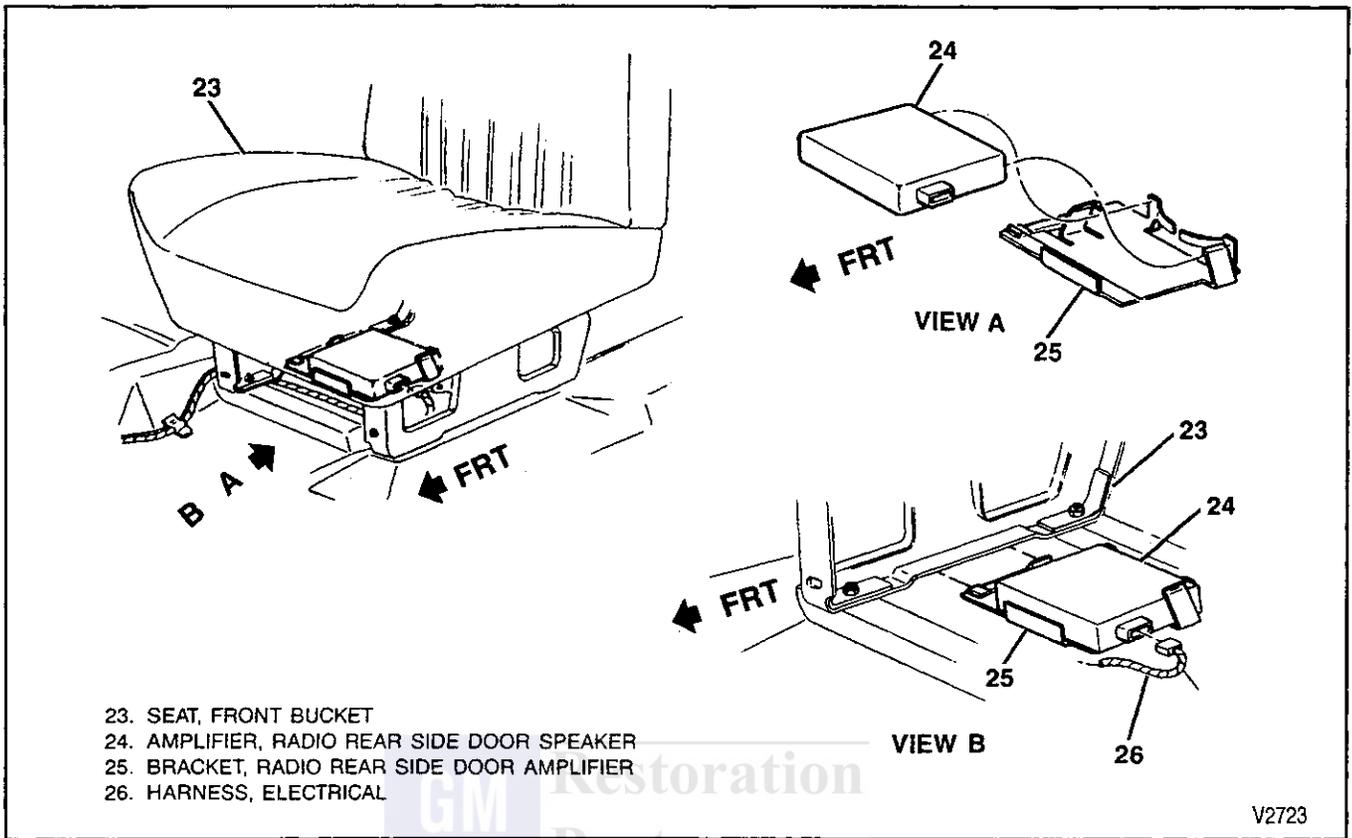


Figure 25—Amplifier Assembly (Front Bucket Seat-Suburban Models)

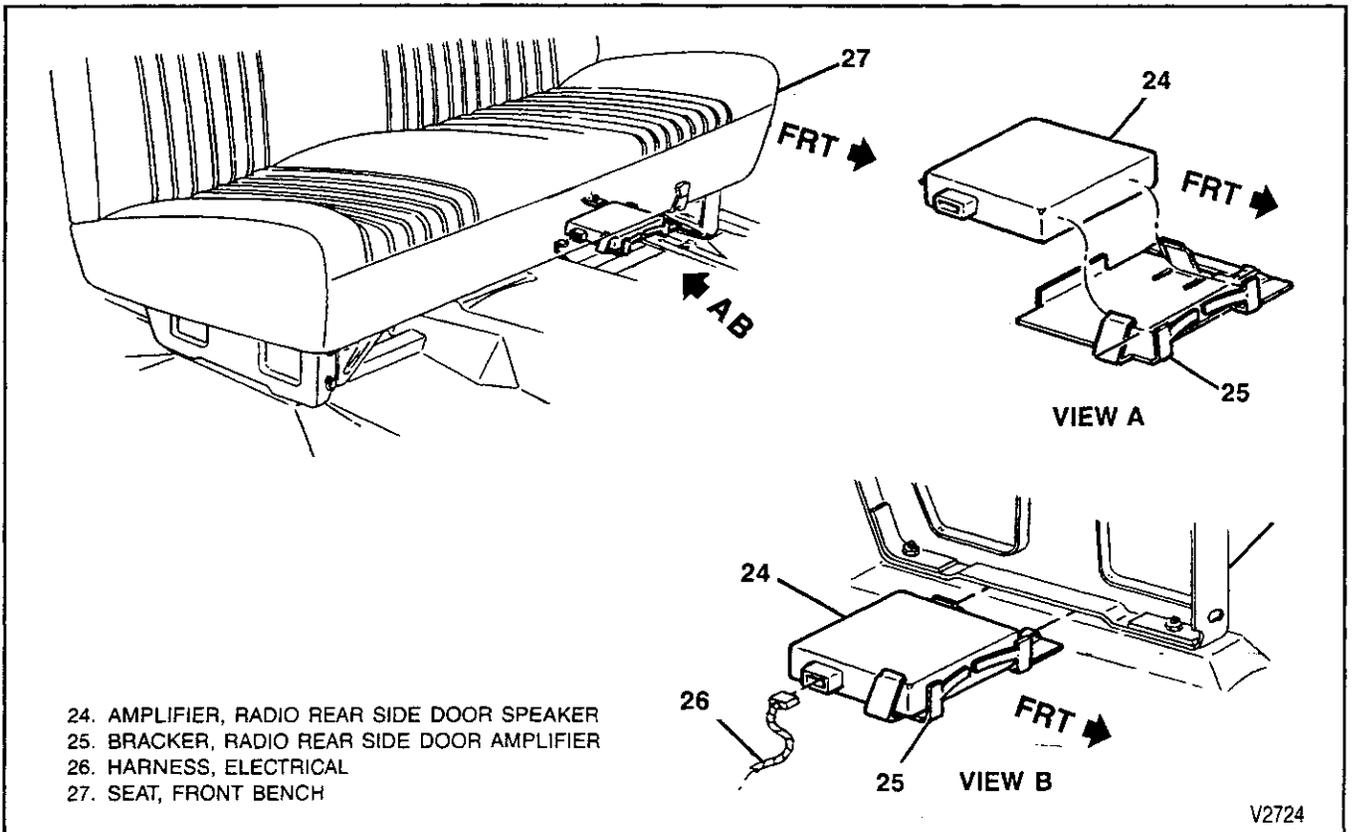
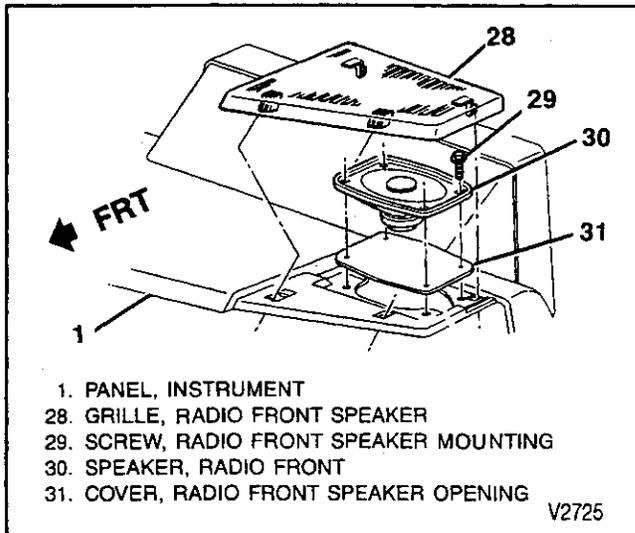


Figure 26—Amplifier Assembly (Front Bench Seat-Suburban Models)



**Figure 27—Front Speaker Assembly**

**NOTICE: Refer to "Notice" on page 9A-1.**

3. Screws (34).



- Screws (34) to 1.9 N-m (17 lbs. in.).
- 4. Speaker grille (36) or rear trim panel (35).
  - Check circuit operation.

**SIDE DOOR SPEAKERS**



1. Side door map pocket (38). Refer to SECTION 10A1.
2. Electrical connectors, as necessary.
3. Screws (40).
4. Speaker (39) from side door map pocket (38).



1. Speaker (39) to side door map pocket (38).

**NOTICE: Refer to "Notice" on page 9A-1.**

2. Screws (40).

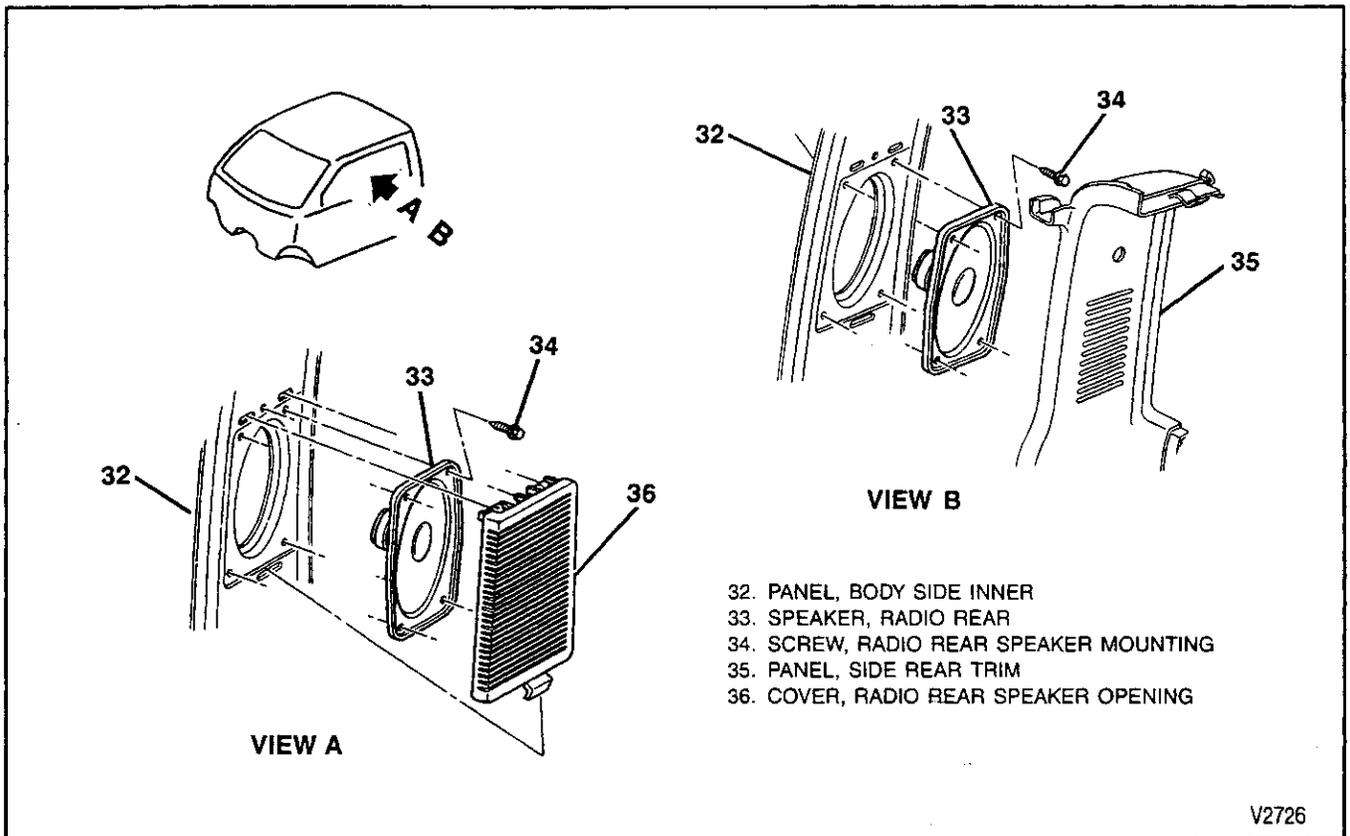


- Screws (40) to 1.6 N-m (14 lbs. in.).
- 3. Electrical connectors, as necessary.
- 4. Side door map pocket (38). Refer to SECTION 10A1.
  - Check circuit operation.

**REAR OVERHEAD SPEAKERS**

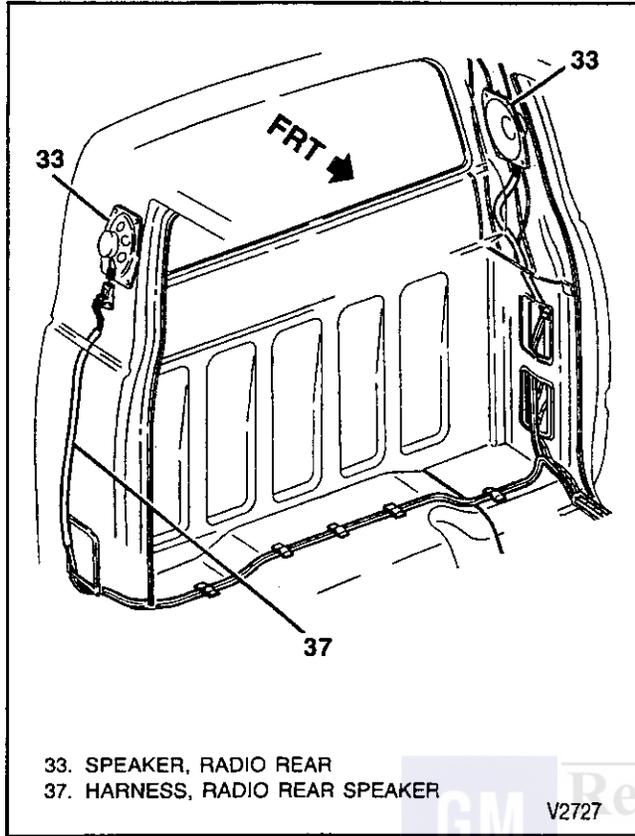


1. Speaker grille (45).
2. Roof inner trim panel, if necessary. Refer to SECTION 10A4.



**Figure 28—Rear Speaker Assembly (Pickup/Chassis-Cab Models)**

# 9A-30 AUDIO SYSTEMS



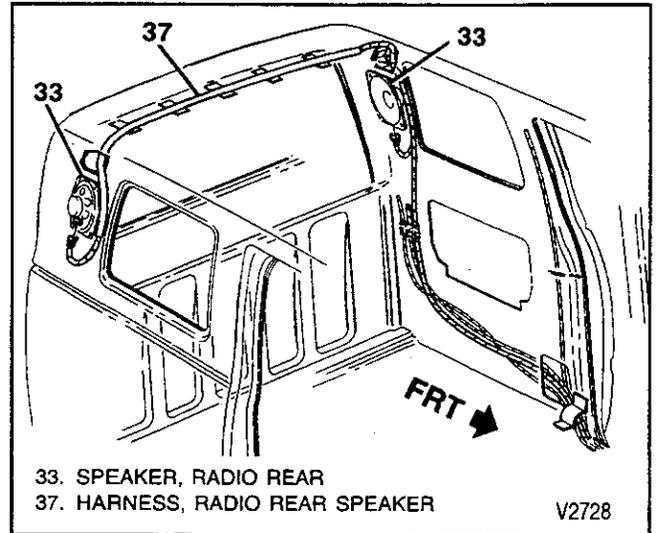
**Figure 29—Rear Speaker Harness Routing (Pickup/Chassis-Cab Models)**

3. Screws (46).
4. Speaker (43) from bracket (42).
5. Electrical connectors, as necessary.

**↔ Install or Connect (Figure 34)**

1. Electrical connectors, as necessary.
2. Speaker (43) to bracket (42).

**NOTICE:** Refer to "Notice" on page 9A-1.

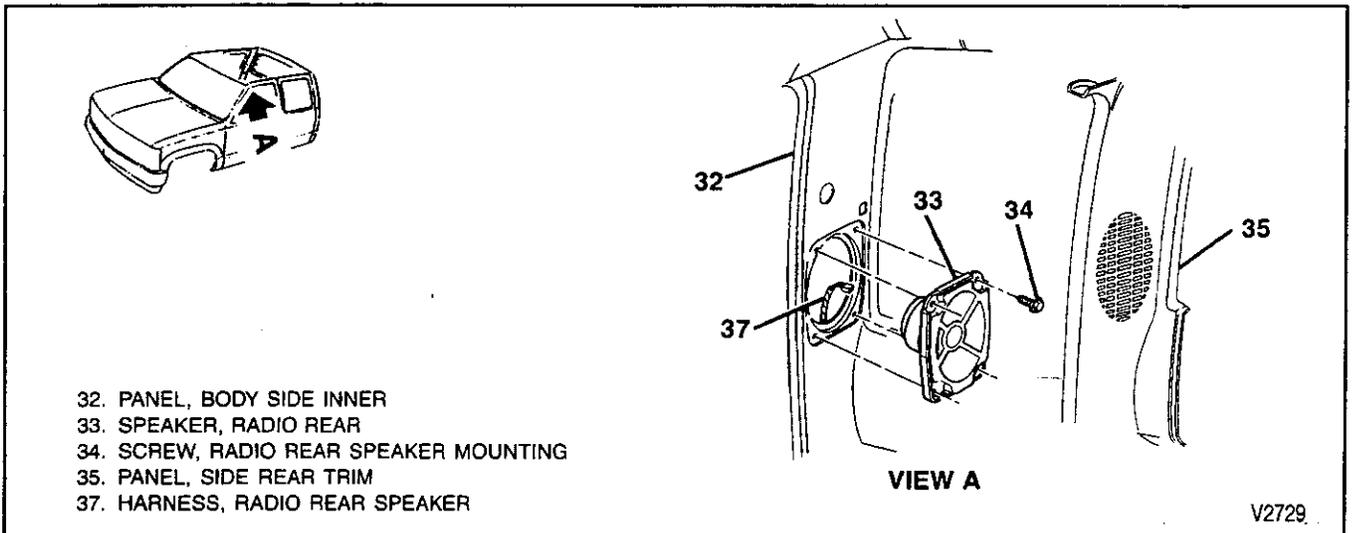


**Figure 30—Rear Speaker Harness Routing (Extended Cab Models)**

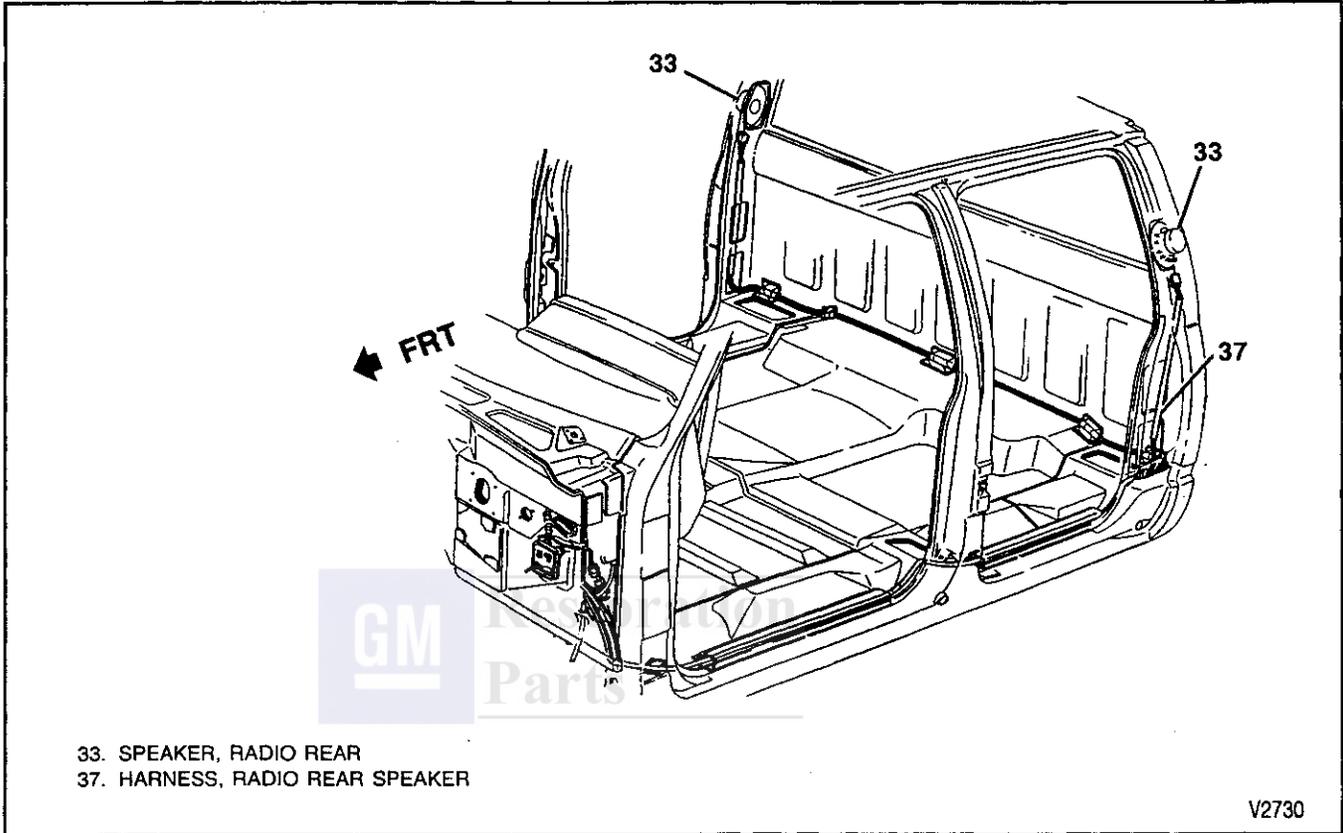
3. Screws (46).

**⌚ Tighten**

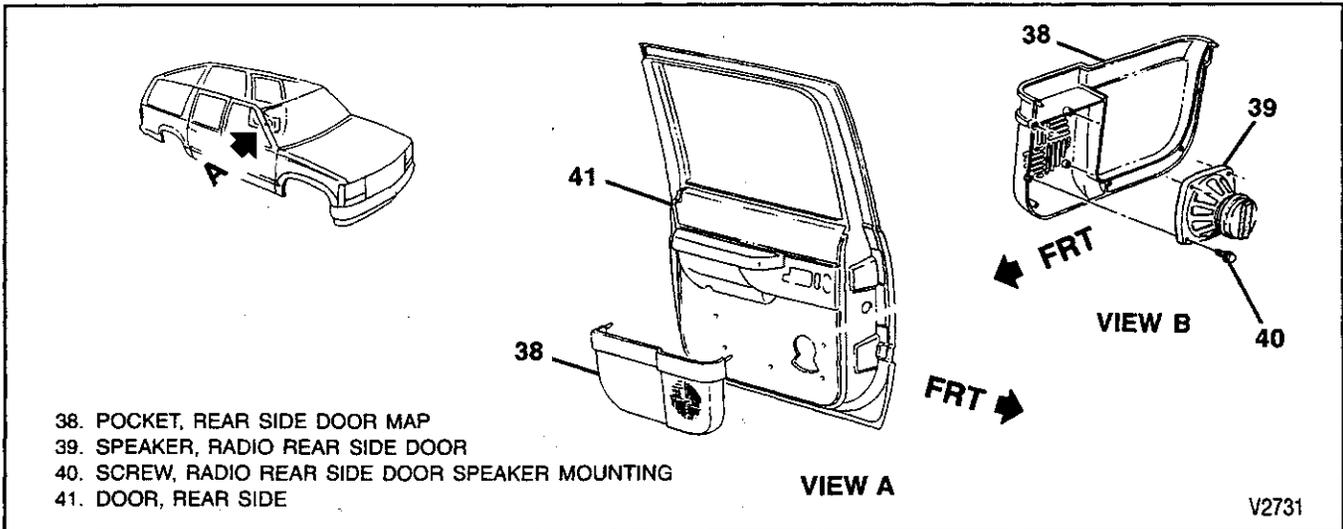
- Screws (46) to 1.9 N.m (17 lbs. in.).
4. Roof inner trim panel, if necessary. Refer to SECTION 10A4.
  5. Speaker grille (45).
- Check circuit operation.



**Figure 31—Rear Speaker Assembly (Extended Cab/Crew Cab Models)**



**Figure 32—Rear Speaker Harness Routing (Crew Cab Models)**



**Figure 33—Rear Side Door Speaker Assembly (Suburban Models)**

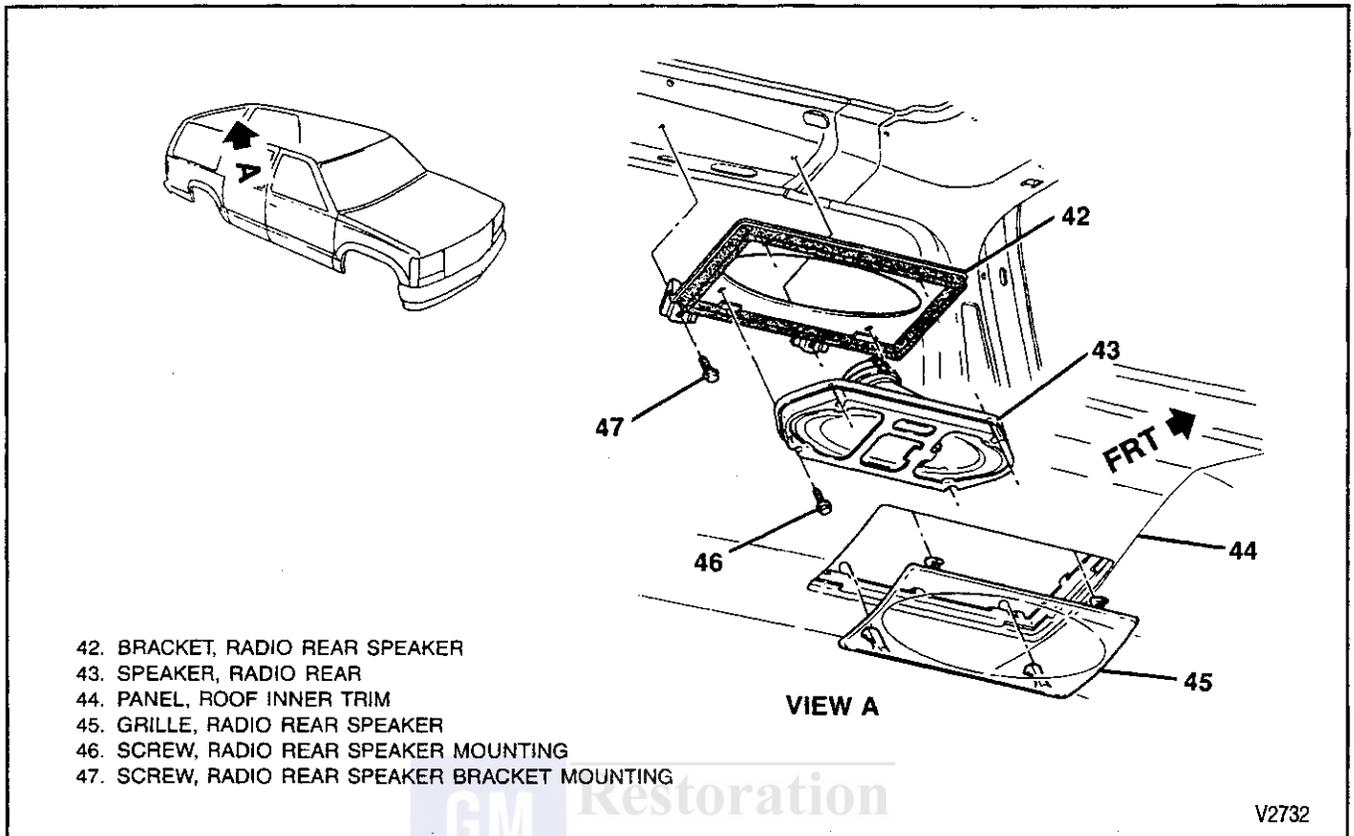


Figure 34—Rear Overhead Speaker Assembly (Suburban and Utility Models)

## ANTENNAS

### GENERAL DESCRIPTION

The fixed mast barbless antenna is designed to withstand most car washes without damage. It cannot be adjusted up or down. If the mast becomes slightly bent, straighten it by hand. The antenna can be replaced if it becomes severely bent. Antennas must be kept clean for good performance.

### ! Important

- When using a replacement radio, inspect the antenna connector(s) for the proper type. If necessary, use one of the following adapters.
  - Barbed-to-Barbless Antenna Adapter (GM P/N 16169611)
  - Barbless-to-Barbed Antenna Adapter (GM P/N 16169591)

## DIAGNOSIS

Disconnect antenna from the extension cable and plug in a test antenna. Make sure the test antenna is grounded to the vehicle chassis and keep hands off of the antenna. Check radio reception in an area away from electrical interferences such as tall buildings, metal structures, power lines, fluorescent lighting, and power tools. Tune to high and low ends of the dial on both AM and FM, checking weak and strong station reception. If reception is okay, the problem exists with the antenna and/or its lead-in cable. If reception is still poor, refer to "Diagnostic Charts" earlier in this section.

### Testing for Good Ground of Antenna Mounting and Connections

Poor grounding at the antenna mounting or any connection in the antenna/lead-in system can result in seri-

ously reduced radio performance. A poor ground can be a reason for excess ignition noise on AM or erratic audio. Also, be sure lead-in connectors are free of dirt and corrosion, and are tightly fastened.

Possible ground loss or high-resistance ground points are:

- Antenna upper mounting (loose screws, paint overspray, etc.).
- Lead-in cable connector at antenna (loose or internally corroded).
- Lead-in cable connector at radio (loose or internally corroded).
- Quick connect connector (corroded).
- Missing ground lead.

**Checking Lead-In Cable**

Usually, a broken center conductor of the lead-in cable will result in no AM and weak FM. In case of continued reception or noise complaints, always check the lead-in with an ohmmeter (figure 35).

When checking resistance, wiggle the lead-in tip and cable. If the readings shown in figure 35 are not obtained, some portion of the lead-in is intermittent and the lead-in should be replaced.

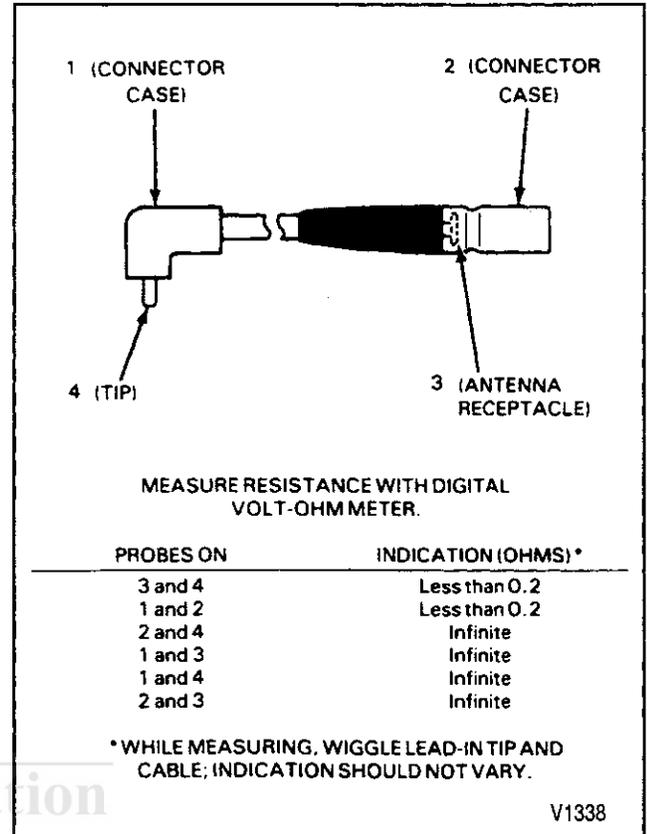


Figure 35—Lead-In Cable Diagnosis



**ON-VEHICLE SERVICE**

**FIXED ANTENNA**

**←→** Remove or Disconnect (Figures 36 and 37)

1. Antenna mast (44).
2. Nut (47).
3. Bezel (45).
4. Antenna cable (43) from extension cable (9).

**→←** Install or Connect (Figures 36 and 37)

1. Antenna cable assembly (43).

**NOTICE:** For steps 2 and 5, refer to "Notice" on page 9A-1.

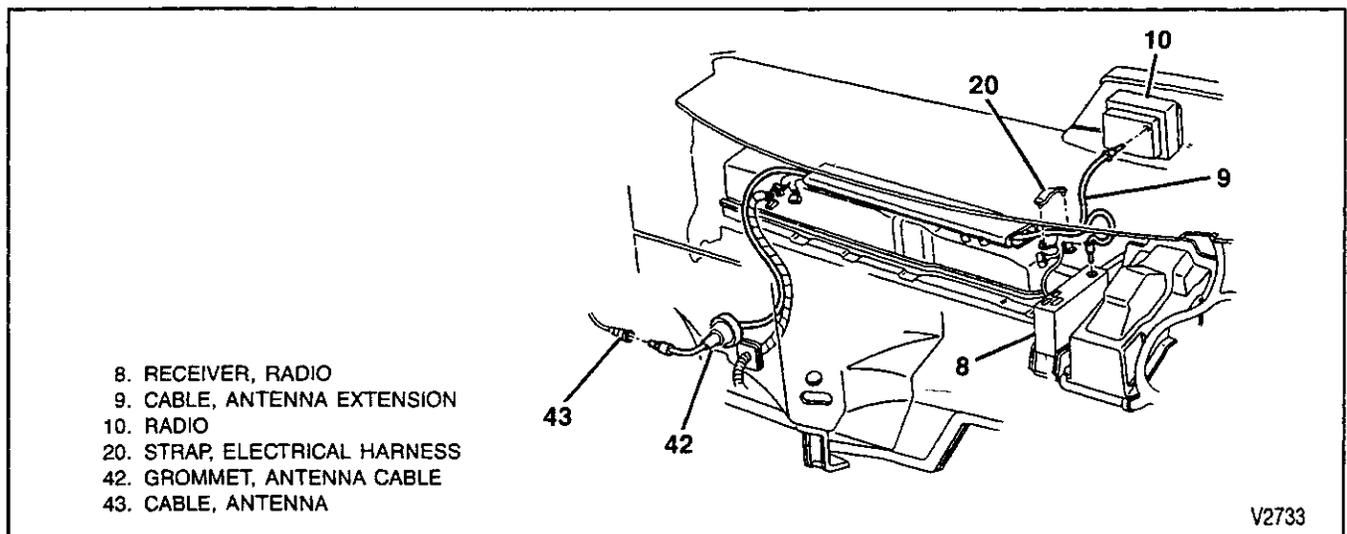


Figure 36—Antenna Extension Cable Routing

## 9A-34 AUDIO SYSTEMS

2. Screws (46).



**Tighten**

- Screws (46) to 5 N·m (58 lbs. in.).

3. Antenna cable (43) to extension cable (9).

4. Bezel (45).

5. Nut (47).



**Tighten**

- Nut (47) to 5 N·m (58 lbs. in.).

6. Antenna mast (44).

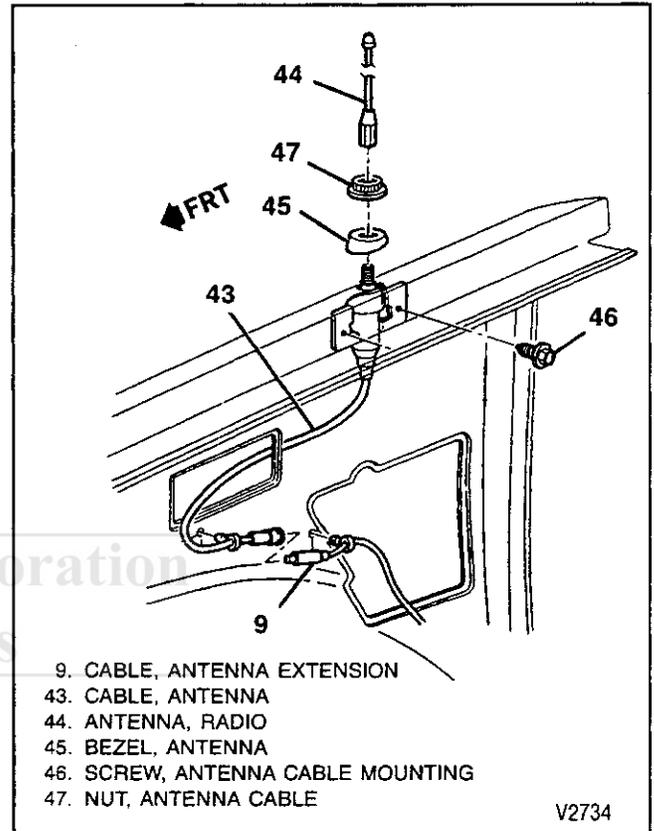


Figure 37—Antenna Cable Assembly

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Antenna Cable Mounting Screw.....	5 N·m (58 lbs. in.)
Antenna Mounting Nut.....	5 N·m (58 lbs. in.)
Control Head Mounting Screw.....	1.9 N·m (17 lbs. in.)
Front Speaker Mounting Screw.....	1.9 N·m (17 lbs. in.)
Radio Receiver Bracket-to-Instrument Panel Screw.....	1.9 N·m (17 lbs. in.)
Radio Receiver-to-Mounting Bracket Nut.....	2.5 N·m (22 lbs. in.)
Rear Overhead Speaker Mounting Screw.....	1.9 N·m (17 lbs. in.)
Rear Speaker Mounting Screw.....	1.9 N·m (17 lbs. in.)
Side Door Speaker Mounting Screw (Suburban).....	1.6 N·m (14 lbs. in.)
Tape Player Mounting Screw.....	1.9 N·m (17 lbs. in.)

T2848

**SECTION 9B**

**CRUISE CONTROL**

***NOTICE:** When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.*

**CONTENTS**

<u>SUBJECT</u>	<u>PAGE</u>
General Description .....	9B-1
Cruise Control Module.....	9B-2
Brake Release Switches.....	9B-2
Vehicle Speed Sensor.....	9B-2
Vehicle Speed Sensor Buffer.....	9B-2
Function Control Switches.....	9B-2
On/Off.....	9B-2
Set/Coast Button Switch.....	9B-2
Resume/Accel Switch.....	9B-3
Diagnosis.....	9B-3
Preliminary Inspection.....	9B-3
Cruise System Functional Check.....	9B-3
On-Vehicle Service.....	9B-3
Cruise Control Cable.....	9B-3
Module.....	9B-5
Engagement Switch.....	9B-6
Specifications .....	9B-6
Fastener Tightening Specifications.....	9B-6

**GENERAL DESCRIPTION**

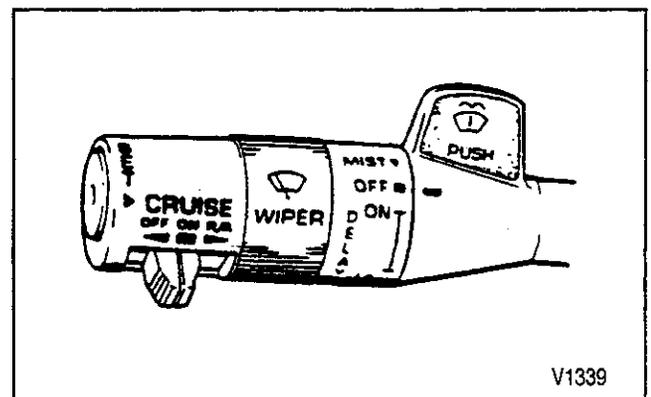
The AC Electro-Motor Cruise System is a speed control system that maintains a desired vehicle speed under normal driving conditions. The system also has the capability to CRUISE, COAST, RESUME SPEED, ACCELERATE, TAP-UP, and TAP-DOWN.

The main components of this system are the functional control switches, cruise control module, vehicle speed sensor, vehicle speed sensor buffer, electrical release switches, and electrical harness.

The cruise control module contains an electronic controller and an electric stepper motor. The controller monitors vehicle speed and operates the electric stepper motor. The motor moves a band and throttle linkage, in response to the controller, to maintain the desired cruise speed.

The cruise control module contains a low speed limit which will prevent system engagement below a minimum speed, about 40 km/h (25 mph). The controller operates in response to the functional control switches located on the turn signal lever (figure 1).

Release switches disengage the cruise system. They are mounted either on the brake pedal bracket (automatic transmission models), or the clutch pedal bracket (manual transmission models). When the brake or



**Figure 1—Turn Signal Lever**

## 9B-2 CRUISE CONTROL

clutch pedal is depressed, the cruise system is electrically disengaged and the throttle is returned to the idle position.

**NOTICE:** *To keep the vehicle under control, and to prevent possible vehicle damage, it is not advisable to use the cruise control on slippery roads. Using the cruise control in conditions such as on winding roads or in traffic or varying volume is not recommended. When traveling down a steeply graded hill, the cruise control should be disengaged by pressing the brake or clutch pedal lightly. The transmission can then be shifted to a lower gear range to help control vehicle speed.*

### CRUISE CONTROL MODULE

The cruise control module assembly is mounted on the cowl. The assembly has an electronic controller and an electric stepper motor to vary the throttle with each different cruise control mode. The module assembly is not serviceable.

### BRAKE RELEASE SWITCHES

These switches are used to disengage the cruise control system. A TCC/cruise control switch and a stoplamp switch mounted on the brake or clutch pedal mounting bracket disengage the system electrically when the brake or clutch pedal is depressed. This is done by interrupting the flow of the current to the module. The speed of the vehicle at brake actuation will be stored in the memory of the system. The cruise function remains disengaged after the brake or clutch pedal is released.

For replacement procedures, refer to SECTION 5.

### VEHICLE SPEED SENSOR

The vehicle speed sensor (VSS) is mounted to the automatic/manual transmission assembly and produces an AC signal. The frequency of this signal is proportional to the speed at which the automatic/manual transmission output shaft rotates, which in turn, is proportional to the speed of the vehicle.

The AC signal produced by the VSS is amplified and converted by the VSS buffer assembly. The signal is supplied to the ECM/PCM, cruise control module, and speedometer assembly by the VSS buffer. The VSS buffer assembly produces the signal by opening and closing internal solid state switches to ground.

The signal to the ECM/PCM, cruise control module, and speedometer pulses at a rate of 4,000 times per mile. The ECM/PCM, cruise control module, and speedometer internally convert the number of pulses per mile per second to determine vehicle speed.

For replacement procedure, refer to SECTION 7A14A, 7A17A, or 7B.

### VEHICLE SPEED SENSOR BUFFER

The vehicle speed sensor (VSS) buffer receives a signal from the VSS (permanent magnet generator) indicating the speed of the vehicle. This signal is then

processed by the VSS buffer assembly and supplied to the ECM/PCM, cruise control module, and the speedometer assembly.

For replacement procedures, refer to SECTION 8C.

## FUNCTION CONTROL SWITCHES

### ON/OFF

The "ON" and "OFF" position slide switch, located on the multifunction lever assembly, controls electrical power to the cruise control system. When the switch is in the "OFF" position the system cannot be engaged. When the switch is in the "ON" position the system may be engaged by either the "SET" or "RESUME" switch at any speed above approximately 40 km/h (25 mph).

### SET/COAST Button Switch

The cruise control "SET/COAST" switch controls three functions.

- **The Set Function**--When the "SET/COAST" switch is depressed and then released, with vehicle speed above the low speed limit point, and the "ON/OFF" switch in the "ON" position, the cruise speed will be set at the particular speed the vehicle was at when the button was released. Cruise speed will be within  $\pm 1.6$  km/h (1 mph) of the actual speed when engaged. The system will cruise until either the "ON/OFF" switch is moved to "OFF," the ignition switch is turned off, and/or the "SET/COAST" button is pushed in fully and held. Pushing the brake or clutch pedal disengages the system, but the set speed is maintained in memory allowing a "RESUME" at a later time.
- **The Coast (Trim) Function**--When the "SET/COAST" button switch is fully depressed, the driver can raise or lower his control speed. To increase control speed, the driver would accelerate to a new speed, fully depress the switch, so the ECM/PCM releases previously set speed, and release the button. Upon releasing the button, a new speed is set. An increased control speed can also be more easily set by the "RESUME/ACCEL" switch as described later. To decrease cruise speed, the "SET/COAST" switch is held in the depressed position, disengaging the cruise system, allowing the throttle to return to the idle position. When the vehicle has slowed to the desired lower cruise speed, releasing the switch will cause the system to cruise at the new speed.
- **The "Tap Down" Function**--For this function to operate, the cruise must be engaged and operating. "Tapping down" is done by quickly pressing the "SET/COAST" button to the depressed position and quickly releasing it, or "tapping" the button. Do not hold the button in the depressed position or the system will revert to the "coast" mode. "Tap down" is a function in which cruise speed can be decreased by 1.6 km/h (1 mph) increments (one tap = 1 mph decrease). The system can "tap down" to a limited speed of 40 km/h (25 mph). Below this speed, cruise control will not operate.

The accelerator may be depressed at any time to override the cruise system. Release of the accelerator will return the vehicle to the previous set cruise speed.

**RESUME/ACCEL Switch**

The "RESUME/ACCEL" switch controls three functions.

- **The Resume Function**--If the cruise system has been disengaged by depressing the brake or clutch pedal, it may be reactivated by momentarily holding the "RESUME/ACCEL" switch. This will cause the vehicle to accelerate to the previously set speed and cruise at that speed. The resume function will not work if the cruise "ON/OFF" switch or the ignition switch has been cycled since the last time cruise was active or the vehicle speed is below the low speed lockout 40 km/h (25 mph).

- **The Accelerate Function**--By sliding the "RESUME/ACCEL" switch and holding it, the vehicle will accelerate until the switch is released. The cruise "ON/OFF" switch must be on and the vehicle speed must be above the low speed lockout 40 km/h (25 mph) for this function to operate.
- **The "Tap Up" Function**--For this function to operate, the cruise must be engaged and operating. "Tapping up" is done by quickly pressing the slide switch toward the "R/A" position and quickly releasing it, or "tapping" the lever. Do not hold the lever in the "R/A" position or the system will revert to the "Accel" mode. "Tap up" is a function in which cruise speed can be increased by 1.6 km/h (1 mph) increments (one tap=1 mph increase). The system cannot "tap up" beyond 210 km/h (125 mph).

**DIAGNOSIS**

Malfunctions can be either mechanical or electrical. In resolving any cruise system problem, first complete the following initial inspection.

**PRELIMINARY INSPECTION**

- Check "GAGES" 20 amp fuse.
- Check for bare, broken, or disconnected wires.
- Check for dirty, corroded, or loose ground terminals.
- Check for binding or sticking linkage at the throttle body.
- Check for damaged or mispositioned brake and/or clutch switches.

**CRUISE SYSTEM FUNCTIONAL CHECK**

The procedure below is used to check the operating modes of the cruise control system. This procedure should always be used after repair work has been completed on the cruise system. Steps 1-7 and 10 are used with automatic and manual transmission models, while steps 8 and 9 are for manual transmission models only.

1. Slide the turn signal lever cruise switch to the "ON" position.
2. **Check the Low Speed Inhibit:** Drive the vehicle at 32 km/h (20 mph). Depress "SET" push button and release. Cruise control must not engage.
3. **Check Set Speed:** Drive vehicle at steady speed of 89 km/h (55 mph). Depress "SET" push button completely and release. Cruise control should engage at approximately 89 km/h (55 mph).

4. **Check Brake Release:** Depress brake pedal. The cruise control must release throttle, allowing the vehicle speed to drop. The system must not re-engage when the brake is released.
5. **Check Resume Feature:** With the vehicle speed at approximately 72 km/h (45 mph), slide the cruise switch momentarily (less than 1 second) to the "R/A" position. The vehicle should accelerate to approximately 89 km/h (55 mph).
6. **Check Coast Feature:** Depress the "SET" push button and hold. Allow the vehicle speed to drop to 80 km/h (50 mph) and release push button. Cruise control should hold vehicle speed at approximately 80 km/h (50 mph).
7. **Check Accelerate Feature:** Slide the cruise switch to the "R/A" position and hold. The vehicle speed should begin to increase. Allow the speed to increase to 89 km/h (55 mph) and release switch. The cruise control should hold the vehicle at approximately 89 km/h (55 mph).
8. **Check Clutch Release:** Depress clutch pedal. The cruise control must release throttle, allowing the vehicle speed to drop. The system must not re-engage when the clutch pedal is released.
9. Slide the turn signal lever cruise switch to the "R/A" position momentarily to resume 89 km/h (55 mph).
10. **Check Off Switch:** Turn the turn signal lever cruise switch to the "OFF" position. This must disengage the cruise control system.

If preliminary inspection reveals no solution, refer to the "Driveability, Emissions, and Electrical Diagnosis Manual" for these models.

**ON-VEHICLE SERVICE**

**CRUISE CONTROL CABLE**



**Remove or Disconnect (Figures 2 and 3)**

1. Cable end fitting from cable stud.

2. Cable conduit from the cable bracket.
3. Cable conduit from the module housing.
4. Cable bead from the end of the ribbon.

# 9B-4 CRUISE CONTROL

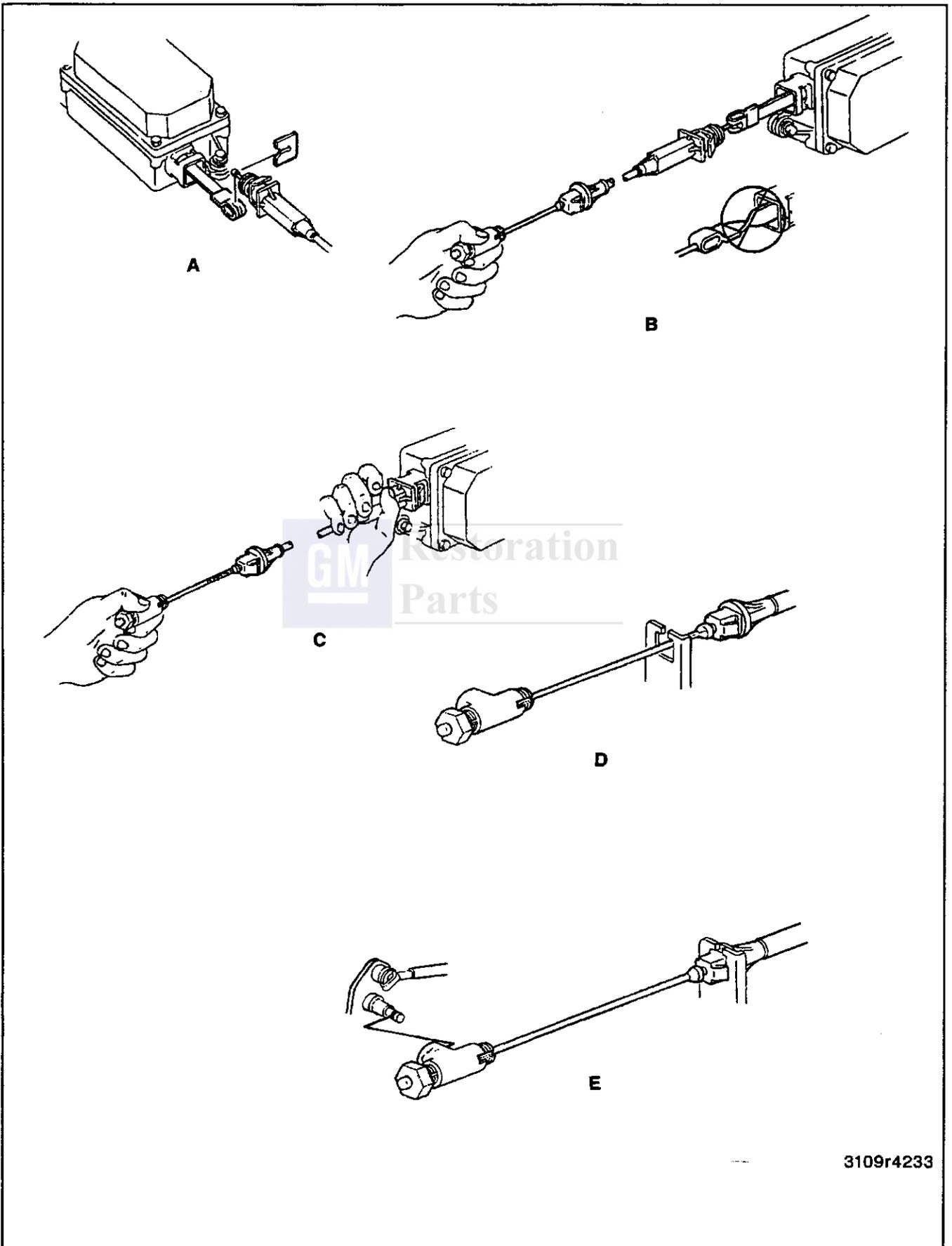
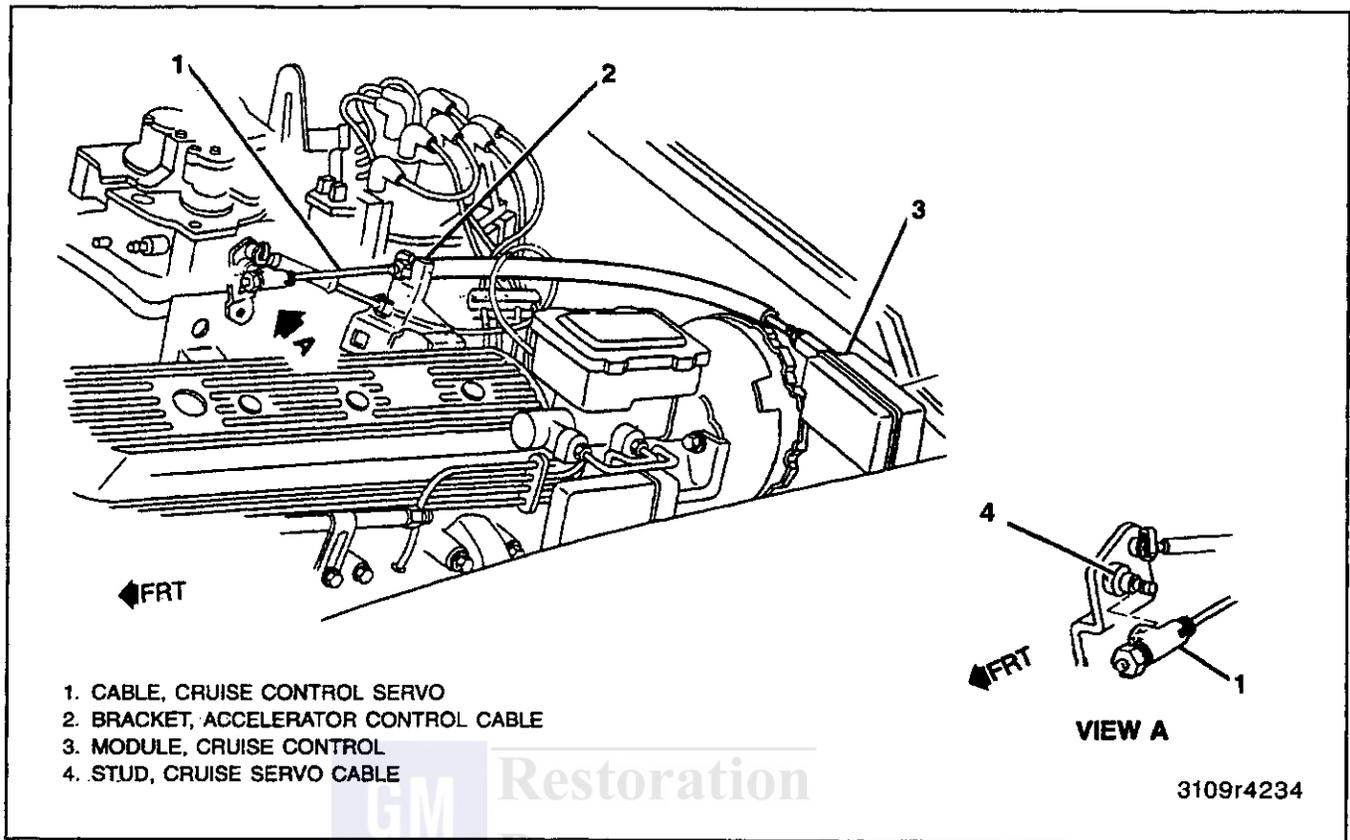


Figure 2—Cruise Control Cable



**Figure 3—Cruise Control Cable Routing**

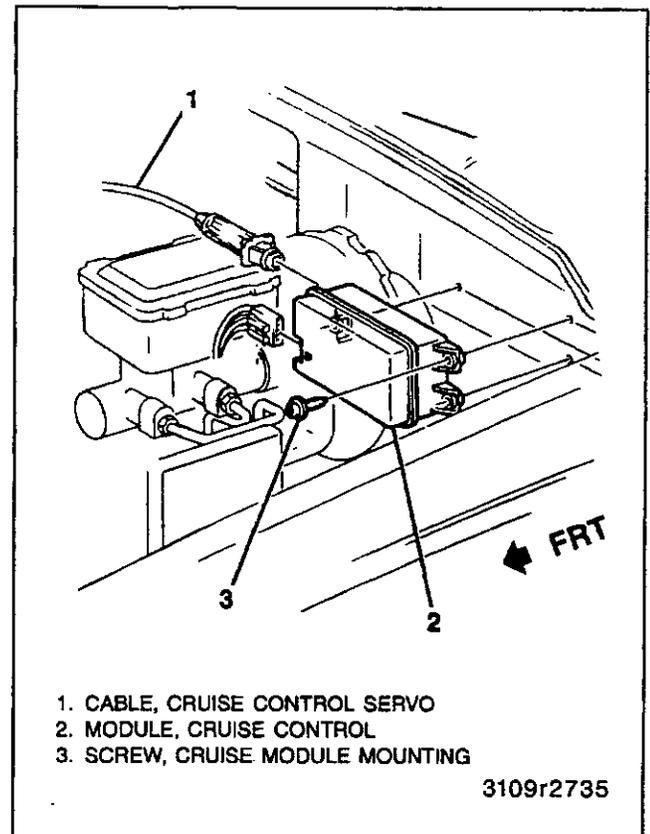
**Install or Connect (Figures 2 and 3)**

1. Attach cable end to cruise motor ribbon end fitting. (Refer to A in figure 2.)
2. Pull cruise cable engine end fitting until cable is taut. (Refer to B in figure 2.)
3. Turn cruise cable engine end fitting to straighten ribbon. Ribbon must be flat and horizontal. (Refer to B in figure 2.)
4. Slide cable conduit over ribbon and install tangs in cruise motor housing. (Refer to C in figure 2.)
5. Install cable conduit in engine bracket. Press firmly until the tangs lock. (Refer to D in figure 2.)
6. Install cable end fitting to TBI lever stud. (Refer to E in figure 2.)
7. Check for 0.0 to 5.0-mm (0.197-inch) clearance, or lash, in cruise cable. Turn adjuster screw, if required.

**MODULE**

**Remove or Disconnect (Figure 4)**

1. Negative battery cable. Refer to SECTION 0A.
2. Cruise control cable. Refer to "Cruise Control Cable."
3. Electrical connector(s), as necessary.
4. Mounting screws.
5. Module.



**Figure 4—Cruise Control Module**

## 9B-6 CRUISE CONTROL

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Install or Connect (Figure 4)

1. Module.

*NOTICE: Refer to "Notice" on page 9B-1.*

2. Mounting screws.



Tighten

- Screws to 4.5 N.m (40 lbs. in.).

3. Electrical connector(s), as necessary.
4. Cruise control cable. Refer to "Cruise Control Cable."
5. Negative battery cable.
  - Check circuit operation.

### ENGAGEMENT SWITCH

The cruise control engagement switch is part of the multifunction lever assembly and is not serviceable by itself. The multifunction lever and switch must be replaced as an assembly. For replacement procedures, refer to SECTION 3F.

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Cruise Control Module Mounting Screw.....	4.5 N·m (40 lbs. in.)
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SECTION 9E

ENGINE COOLANT HEATER

**NOTICE:** When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
General Description .....	9E-1
On-Vehicle Service .....	9E-1
Engine Coolant Heater .....	9E-1
Specifications .....	9E-5
Fastener Tightening Specifications .....	9E-5

GENERAL DESCRIPTION

The optional engine coolant heater (RPO K05) is used to preheat engine coolant for cold weather starting. The engine coolant heater operates from a 110-volt AC power source and uses a heating element which is installed in the water jacket of the engine block. The

heating element warms the coolant as long as the heater cord is plugged into the AC power source.

The unit has a detachable electrical cord. If the heater fails to operate, check the cord, connections, and power supply before replacing the heating element.

ON-VEHICLE SERVICE

ENGINE COOLANT HEATER



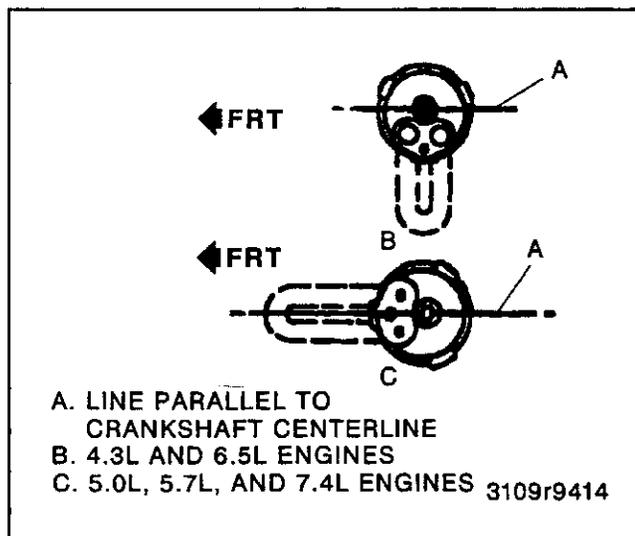
Remove or Disconnect (Figures 1 through 5)

1. Engine coolant. Refer to SECTION 6B1.
2. Coolant jacket plug.
  - If not originally equipped with an engine coolant heater, remove the coolant jacket plug. Carefully tap it near its outer edge, causing it to rotate out of the hole. Do not score the machined surface of the hole. Grasp with pliers and pull to remove.
3. Cord from engine coolant heater.
4. Loosen bolt.
5. Engine coolant heater.



Clean

- Core plug hole, removing any burrs, compound, paint, or rough spots.



A. LINE PARALLEL TO  
CRANKSHAFT CENTERLINE  
B. 4.3L AND 6.5L ENGINES  
C. 5.0L, 5.7L, AND 7.4L ENGINES 3109r9414

Figure 1—Engine Coolant Heater

## 9E-2 ENGINE COOLANT HEATER

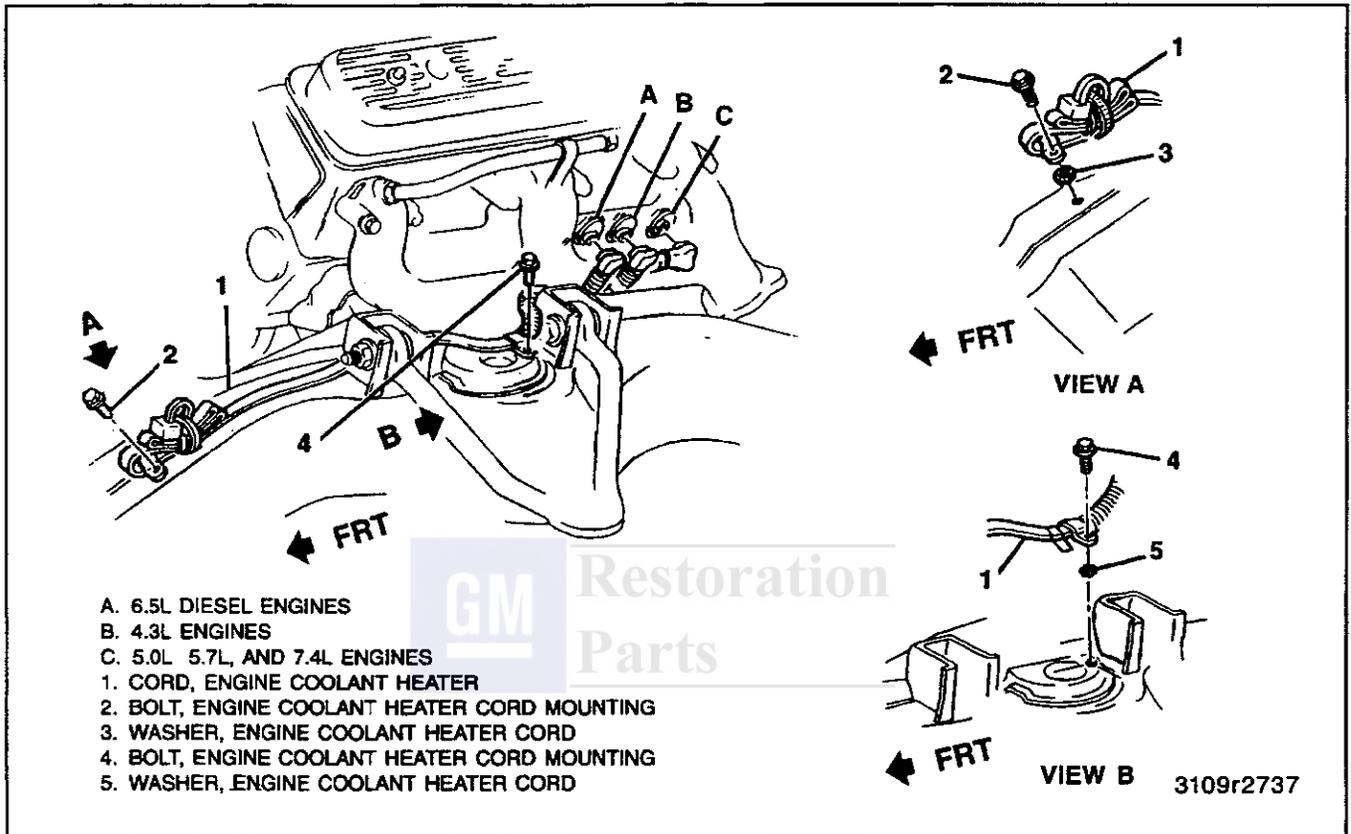


Figure 2—Engine Coolant Heater Cord Routing (Two-Wheel Drive Models)

### Install or Connect (Figures 1 through 5)

1. Apply a coating of lubricant to the O-ring seal and the cleaned surface of plug opening in the block. Use a water spray resistant, high-temperature grease (GM P/N 9985164) or equivalent.
2. The coolant heater and push tight to the block.

#### Important

- Install the heater element in the correct direction to avoid element contact to the inside walls of the engine block as shown in figures 1 and 2.

**NOTICE:** Refer to "Notice" on page 9E-1.

3. Tighten screw until both locking wings draw tight against inner wall of engine block.

### Tighten

- Screw to 1.8 N·m (16 lbs. in.).

4. Heater cord to the coolant heater and route heater cord (figures 3 through 6).

### Important

- The heater cord must not touch the engine, hot pipes, manifold, or any moving parts.
5. Engine coolant. Refer to SECTION 6B1.
    - Check the system for leaks.

## ENGINE COOLANT HEATER 9E-3

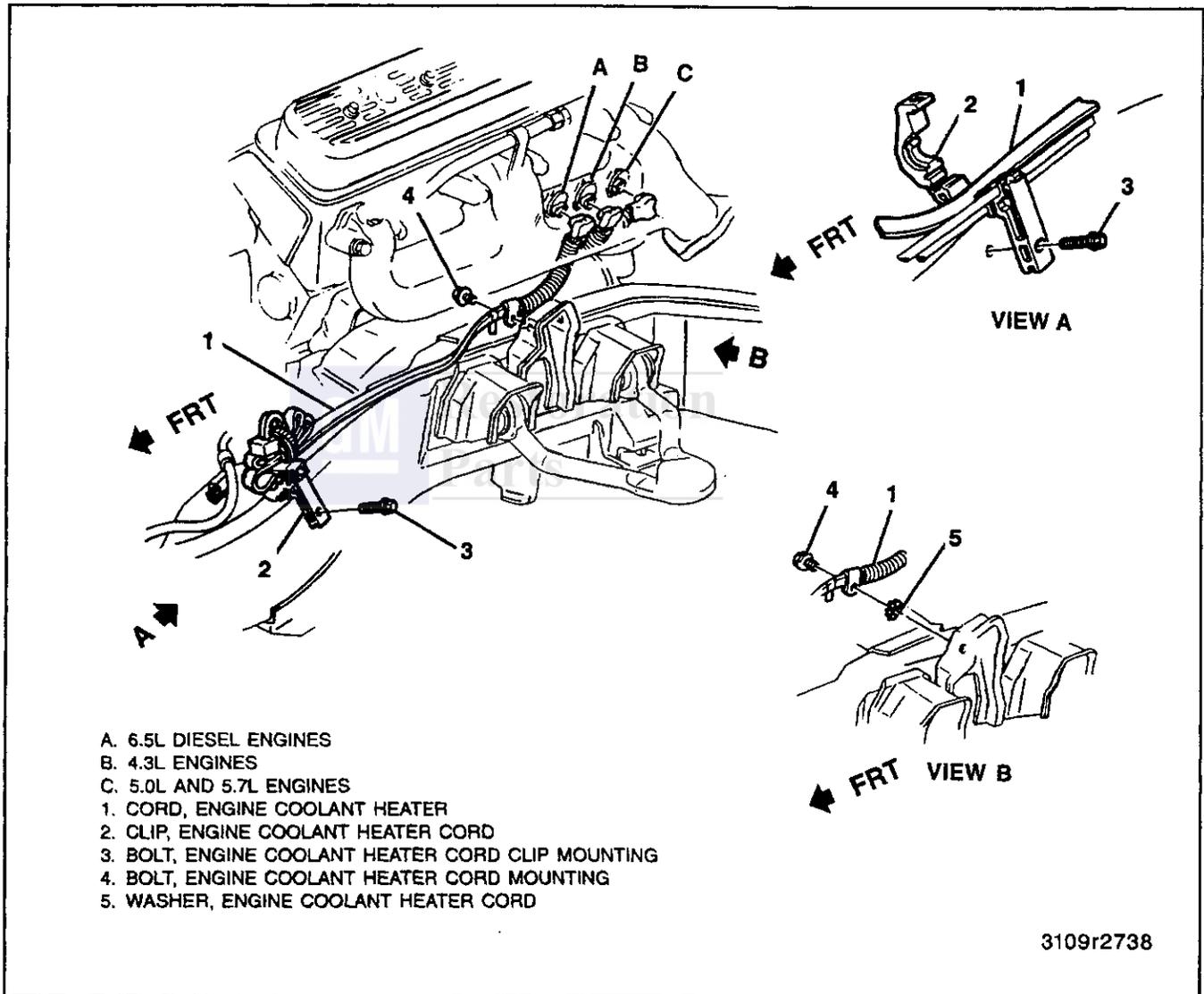


Figure 3—Engine Coolant Heater Cord Routing (Four-Wheel Drive Models)

## 9E-4 ENGINE COOLANT HEATER

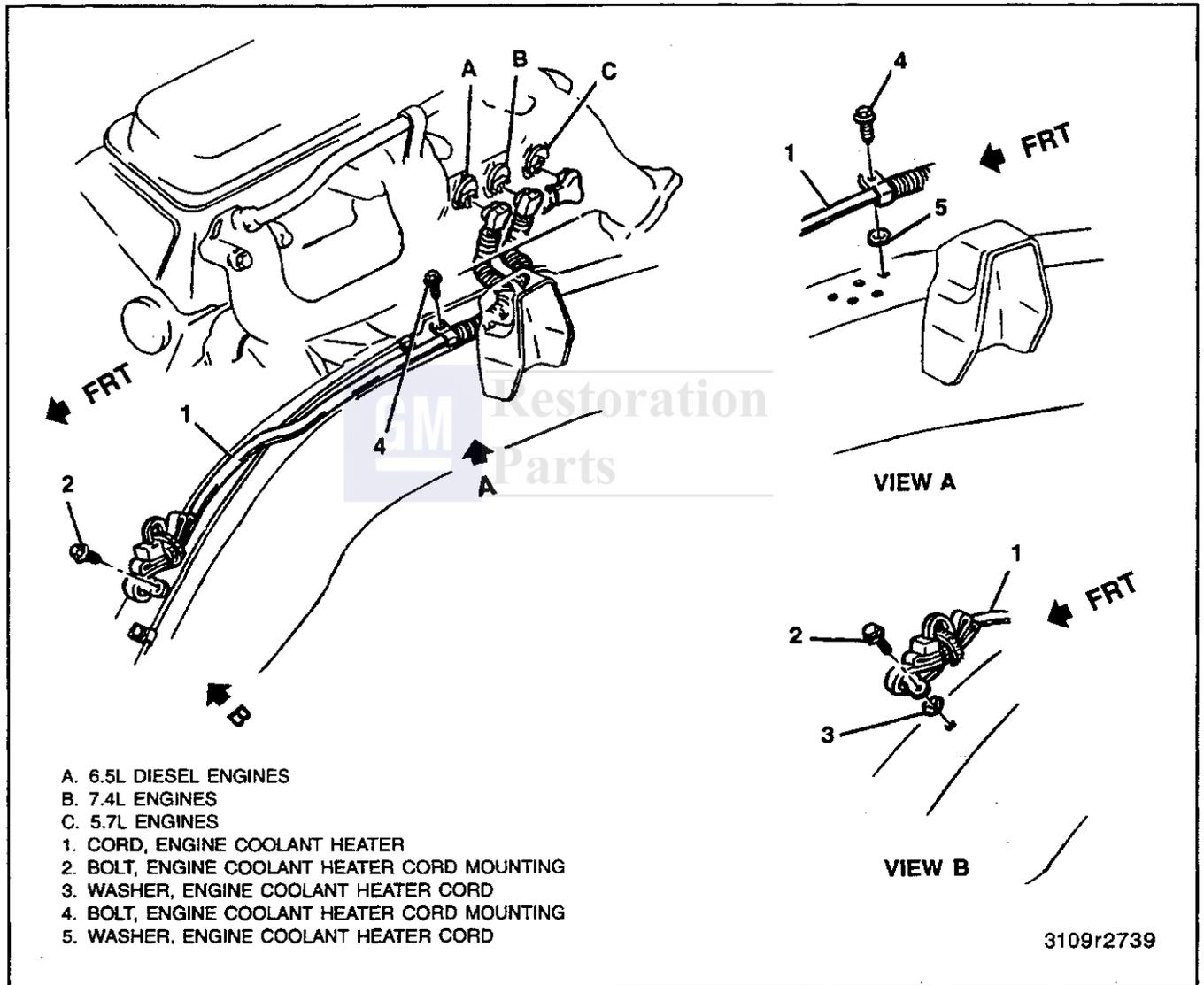


Figure 4—Engine Coolant Heater Cord Routing (Two-Wheel Drive - 1 Ton Models)

## ENGINE COOLANT HEATER 9E-5

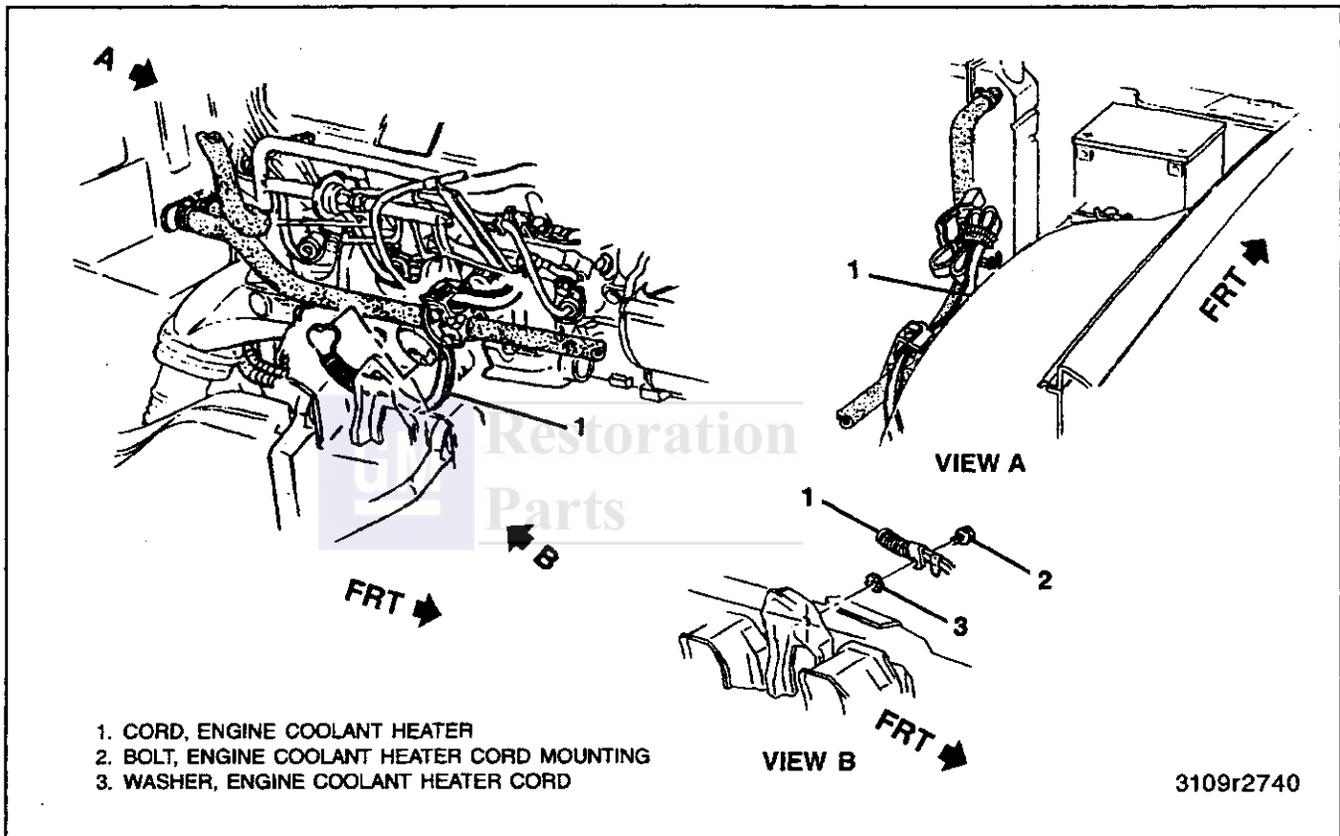


Figure 5—Engine Coolant Heater Cord Routing (Four-Wheel Drive Models with 7.4L Engine)

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Engine Coolant Heater Mounting Screw.....	1.8 N·m (16 lbs. in.)
Engine Coolant Heater Cord Mounting Screw.....	8 N·m (71 lbs. in.)

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## **9E-6 ENGINE COOLANT HEATER**

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### **NOTES**



**SECTION 9F**

**LUGGAGE CARRIER**

**NOTICE:** When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

**CONTENTS**

<u>SUBJECT</u>	<u>PAGE</u>
General Description .....	9F-1
On-Vehicle Service .....	9F-1
Luggage Carrier Replacement .....	9F-1
Specifications .....	9F-4
Fastener Tightening Specifications.....	9F-4

**GENERAL DESCRIPTION**

The luggage carrier is available as a dealer-installed option. Skid strips and support mounting anchor nuts are installed at the factory. During predelivery operations, the dealer will complete assembly installation.

The following procedures are for complete replacement of a previously installed luggage carrier.

**ON-VEHICLE SERVICE**

**LUGGAGE CARRIER REPLACEMENT**



Remove or Disconnect (Figures 1, 2, and 3)

1. Rubber side rail cap from the center rail support (figure 3).
2. Screws from the center supports (figure 3).
3. Screws from the end supports.
4. Luggage carrier from the roof.
5. Center rail supports.
6. Side and center rail support gaskets.

Disassemble

1. Remove screws from the side rail supports (figure 1).
2. Side rail supports from the side rails.
3. Remove screws from the cross rails.
4. Cross rails from the sliders.
5. Screws from the sliders and the lock plates.
6. Sliders from the slots in the side rails.

**NOTICE:** For steps 2, 4, and 6, refer to "Notice" on page 9F-1.

1. Sliders into the slots in the side rails.
2. Screws into the sliders and the lock plates.

Tighten

- Slider to the side rail screws to 2.8 N·m (25 lbs. in.).

3. Cross rails onto the sliders.
4. Screws to cross rails.

Tighten

- Cross rail screws to 1.9 N·m (17 lbs. in.).

5. Side rail supports to the side rails.
6. Screws to the side rail supports.

Tighten

- Side rail support screws to 1.9 N·m (17 lbs. in.).

## 9F-2 LUGGAGE CARRIER

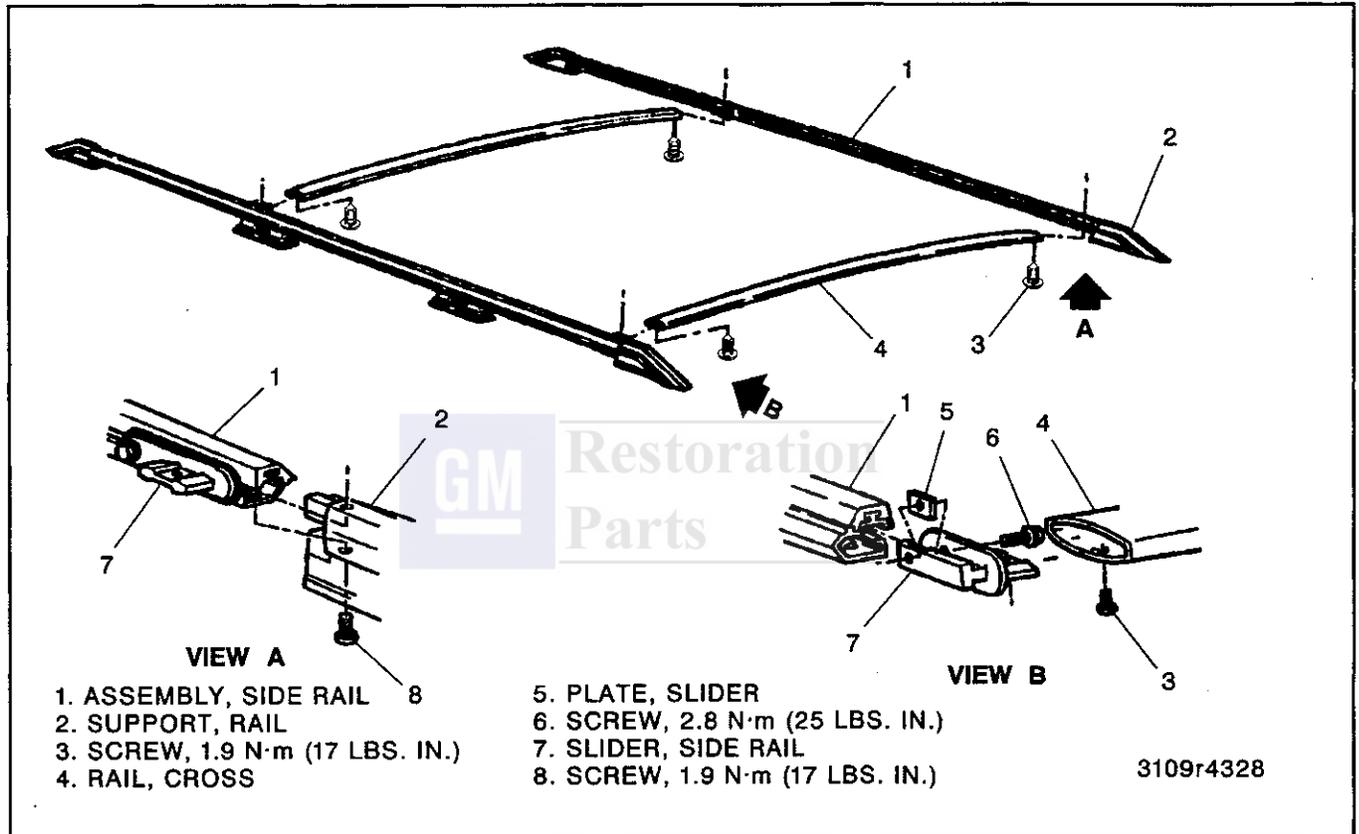


Figure 1—Luggage Carrier Components

 Install or Connect (Figures 1, 2, and 3)

**NOTICE:** For steps 4 and 5, refer to "Notice" on page 9F-1.

1. Side and center rail support gaskets.
2. Center rail supports.
3. Luggage carrier onto the roof.
4. End support to the vehicle screws.

 Tighten

- End support screws to 2.8 N·m (25 lbs. in.).
- 5. Screws into the center supports.

 Tighten

- Center support screws to 2.8 N·m (25 lbs. in.).
- 6. Rubber side rail cap to the center rail support.

**LUGGAGE CARRIER 9F-3**

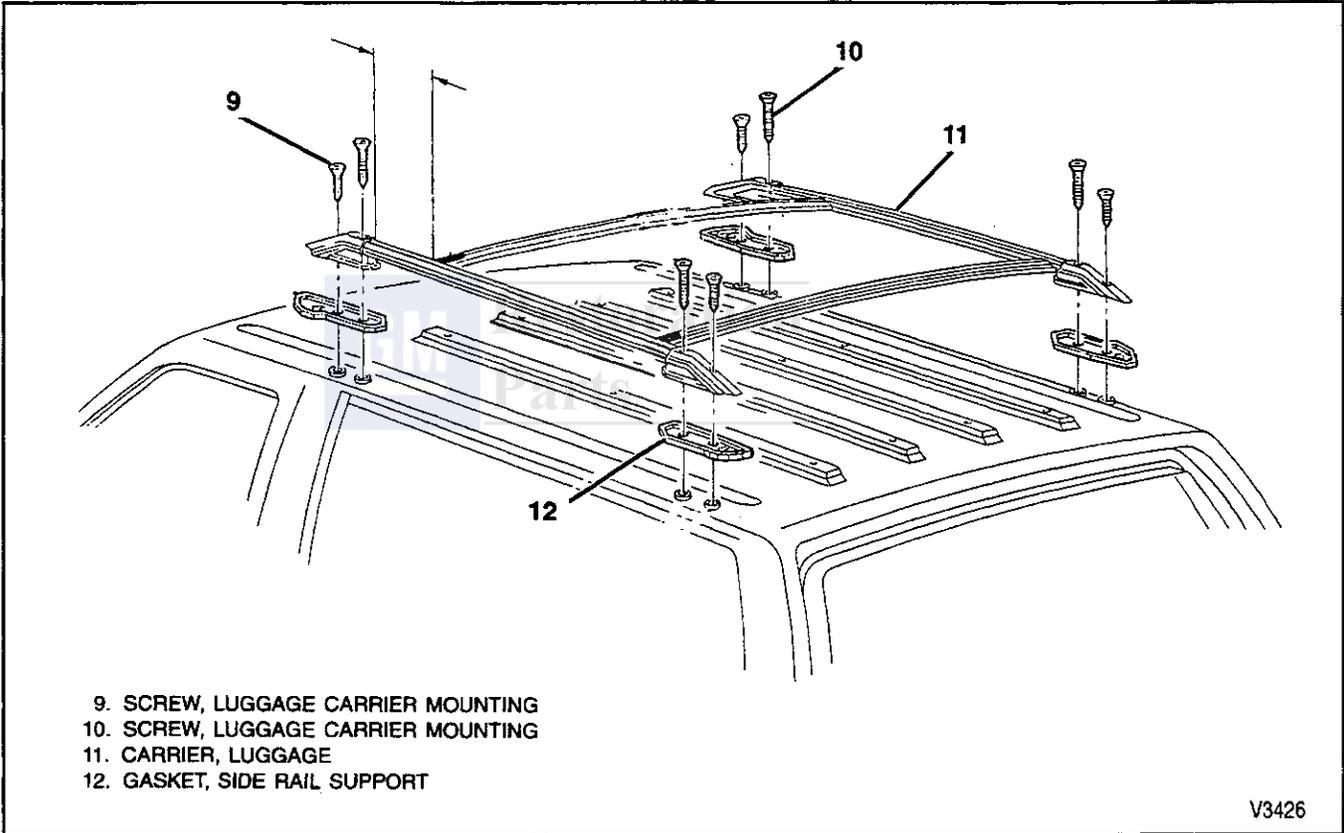


Figure 2—Luggage Carrier (Utility)

## 9F-4 LUGGAGE CARRIER

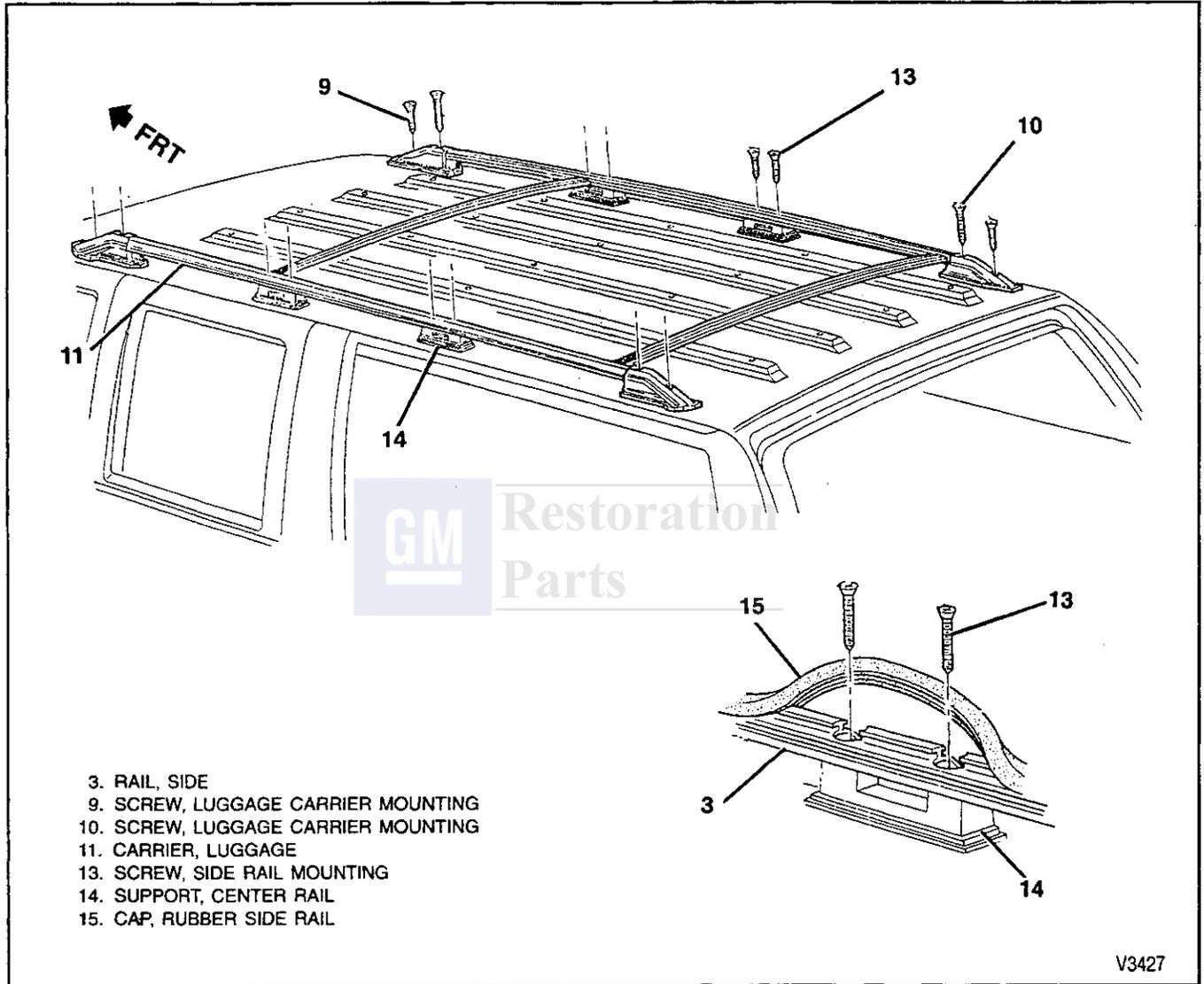


Figure 3—Luggage Carrier (Suburban)

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Cross Rail-to-Side Rail Slider Screw .....	1.9 N·m (17 lbs. in.)
Side Rail Support-to-Side Rail Screw .....	1.9 N·m (17 lbs. in.)
Side Rail-to-Body Mounting Screw.....	2.8 N·m (25 lbs. in.)

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