AUDIO SYSTEMS

CONTENTS

GENERAL INFORMATION

Following are general descriptions of major components used in XJ (Cherokee)/YJ (Wrangler) audio systems. Refer to Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

RADIOS

Radio options for the XJ and YJ models include an AM/FM stereo or an AM/FM stereo/cassette receiver. Both units are Electronically-Tuned Radios (ETR) and include a clock function. For more information on radio features, setting procedures, and control functions refer to the owner's manual.

IN-LINE FUSE

Each radio receives fused battery feed when the ignition switch is in the ON or ACCESSORY position. There is an additional in-line fuse in the back of the radio chassis. The in-line fuse (Fig. 1) will blow to protect the vehicle electrical system in the event of internal radio failure.

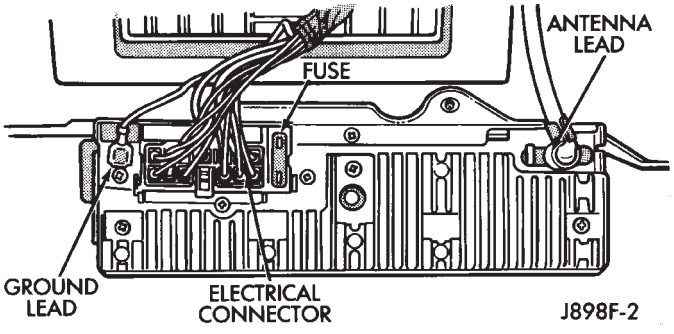


Fig. 1 In-Line Fuse

IGNITION-OFF DRAW FUSE

All vehicles are equipped with an Ignition-Off Draw (IOD) fuse that is removed when the vehicle is shipped from the factory. This fuse feeds various accessories that require current when the ignition switch is in the OFF position, including the clock and radio station preset memory functions. The fuse is removed to prevent battery discharge during vehicle storage.

The IOD fuse should be checked if the radio station preset memory or clock functions are erratic or inoperative. The IOD fuse is located in the Power Distribution Center (PDC). Refer to underside of PDC cover for IOD fuse identification.

RADIO ILLUMINATION RELAY

All radios are connected to a radio illumination relay. The relay controls the source of battery feed for radio/clock display illumination.

When the park and headlamp switch is in the OFF position, the radio illumination relay remains de-energized. The radio/clock display receives full battery voltage through the normally closed contacts of the relay. This results in the radio/clock display being illuminated at full brightness for easier visibility in daylight.

When the park and headlamp switch is in the ON position, the radio illumination relay coil is energized. With the relay coil energized, the normally closed contacts of the relay open, and the normally open contacts of the relay close. This causes the radio/clock display to receive battery feed through the instrument panel dimmer switch. The display illumination brightness can now be adjusted with other panel lamps for night visibility.

SPEAKERS

Speaker system options include two, four or six (XJ only) speaker locations. On XJ model two-speaker systems, one speaker is located in each front door. Four-speaker systems add one speaker at each end of a rear-mounted overhead sound bar. The premium six-speaker option upgrades all the speakers in the above locations, and adds one tweeter at each end of the lower instrument panel.

On YJ model two-speaker systems, one speaker is located at each end of the instrument panel. Four-speaker systems add one speaker at each end of a rear-mounted overhead sound bar.

ANTENNA

All models use a fixed-length stainless steel rod-type antenna mast, installed at the right front (fender on XJ, cowl side on YJ) of the vehicle. The antenna mast is connected to the center wire of the coaxial antenna cable and is not grounded to any part of the vehicle.

To eliminate static, the antenna base must have a good ground. The coaxial antenna cable shield (the outer wire mesh of the cable) is grounded to the antenna base and the radio chassis.

The factory installed ETRs automatically compensate for radio antenna trim. Therefore, no antenna trimmer adjustment is required or possible when replacing the receiver or the antenna.

RADIO NOISE SUPPRESSION

Radio Frequency Interference (RFI) and Electro-Magnetic Interference (EMI) noise suppression is accomplished primarily through circuitry internal to the radio receivers. These internal suppression devices are only serviced as a part of the radio receiver.

External suppression devices that are serviceable and should be checked in the case of RFI or EMI noise complaints include the following:

- radio antenna base ground
- engine-to-body ground strap
- resistor-type spark plugs
- radio suppression-type secondary ignition wiring.

In addition, if the source of RFI or EMI noise is identified as a component on the vehicle (i.e.:generator, blower motor, etc.), the ground path for that component should be checked. If excessive resistance is found in that circuit, repair as required before considering any component replacement.

Fleet vehicles are available with an extra-cost RFI-suppressed Powertrain Control Module (PCM). This unit reduces interference generated by the PCM on some radio frequencies used in two-way radio communications. However, this unit will not resolve complaints of RFI in the commercial AM or FM radio frequency ranges.

DIAGNOSIS

RADIO

CAUTION: Do not operate the radio with speaker leads detached since damage to the transistors may result.

(1) Check fuse 2 in fuseblock module and fuse in back of radio chassis. If OK, go to next step. If not OK, replace fuse.

(2) Turn ignition switch to ON position. Check for battery voltage at fuse 2. If OK, go to next step. If not OK, repair circuit to ignition switch as required.

(3) Turn ignition switch to OFF position. Disconnect battery negative cable. Remove instrument cluster bezel. Remove radio, but do not unplug any connections. Check for continuity between the radio chassis and a good ground. There should be continuity. If OK, go to next step. If not OK, repair radio ground circuit as required.

(4) Connect battery negative cable. Turn ignition switch to ON position. See Radio Connections chart. Check for battery voltage at cavity 3 of radio connector. If OK, go to next step. If not OK, repair circuit to fuse 2 as required.

(5) Turn ignition switch to OFF position. Check for battery voltage at cavity 4 of radio connector. If OK, replace radio. If not OK, repair circuit to IOD fuse in PDC as required.

SPEAKERS

CAUTION: Do not operate the radio with speaker leads detached since damage to the transistors may result.

(1) Turn radio on and adjust balance and fader controls to check performance of each individual speaker. Note the speaker locations that are not performing correctly. Go to next step.

(2) Turn radio off. Disconnect battery negative cable. Remove instrument cluster bezel and remove radio. See Radio Connections chart. Check both the speaker feed and return cavities at radio for continuity to a good ground. There should be no continuity. If OK, go to next step. If not OK, repair wiring circuit as required.

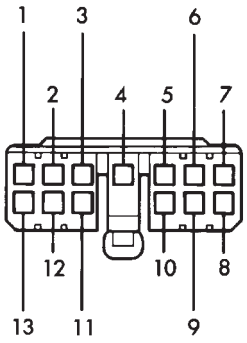
(3) Check resistance between speaker feed and return cavities. Meter should read between 3 and 8 ohms (speaker impedance). If OK, see diagnosis for Radio. If not OK, go to next step.

(4) Unplug speaker wiring connector. Check for continuity between speaker feed cavity at radio and at speaker. Repeat check between speaker return cavity at radio and at speaker. If OK, replace speaker. If not OK, repair wiring circuit as required.

RADIO DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
NO AUDIO	1. Fuse faulty.	1. Check radio fuses in fuseblock module and in radio chassis. Replace fuses, if required.
	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
	3. Wiring faulty.	3. See Radio Connector illustration, in this group. Check for battery voltage at radio feed cavities. Repair feed circuits, if required.
	4. Ground faulty.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair radio ground, if required.
	5. Radio faulty.	5. Exchange or replace radio, if required.
	6. Speakers faulty.	6. See Speaker Diagnosis, in this group.
NO DISPLAY	1. Fuse faulty.	1. Check radio and panel lamps fuses in fuseblock module. Replace fuse, if required.
	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
	3. Wiring faulty.	3. See Radio Connector illustration, in this group. Check for battery voltage at radio feed cavities. Repair feed circuits, if required.
	4. Ground faulty.	4. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair radio ground, if required.
	5. Illumination relay faulty.	5. See Radio Illumination Relay diagnosis, in this group. Repair relay circuits or replace faulty relay, if required.
	6. Radio faulty.	6. Exchange or replace radio, if required.
NO MEMORY	1. Fuse faulty.	1. Check ignition - off draw fuse. Replace fuse, if required.
	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
	3. Wiring faulty.	3. See Radio Connector illustration, in this group. Check for battery voltage at battery feed cavity. Repair circuit, if required.
	4. Radio faulty.	4. Exchange or replace radio, if required.
POOR RADIO RECEPTION	1. Antenna faulty.	1. See Antenna Diagnosis, in this group. Repair or replace antenna, if required.
	2. Ground faulty.	2. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair radio ground, if required.
	3. Radio faulty.	3. Exchange or replace radio, if required.
NO/POOR TAPE OPERATION	1. Faulty tape.	1. Insert known good tape and test operation.
	2. Foreign objects behind tape door.	2. Remove foreign objects and test operation.
	3. Faulty tape deck.	3. Exchange or replace radio, if required.

RADIO CONNECTIONS



1 — RIGHT REAR SPEAKER FEED
2 — RIGHT FRONT SPEAKER(S) FEED
3 — SWITCHED RADIO BATTERY FEED
4 — UNSWITCHED RADIO BATTERY FEED
5 — NOT USED
6 — LEFT REAR SPEAKER FEED
7 — LEFT FRONT SPEAKER(S) FEED
8 — LEFT REAR SPEAKER RETURN
9 — LEFT FRONT SPEAKER(S) RETURN
10 — CLOCK/RADIO DISPLAY FEED
11 — CONTROL PANEL DIMMER FEED
12 — RIGHT FRONT SPEAKER(S) RETURN
13 — RIGHT REAR SPEAKER RETURN

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RADIO ILLUMINATION RELAY

If the relay fails any one of Relay Tests, it is faulty and should be replaced. If the relay passes the Relay Tests, proceed to the Relay Circuit Tests.

On XJ models, the radio illumination relay is located in the relay center (Fig. 2), which is fastened to the lower instrument panel reinforcement behind the lower instrument panel near the steering column. On YJ models, the relay is taped to the instrument panel wiring harness above and to the right of the radio, near the glove box.

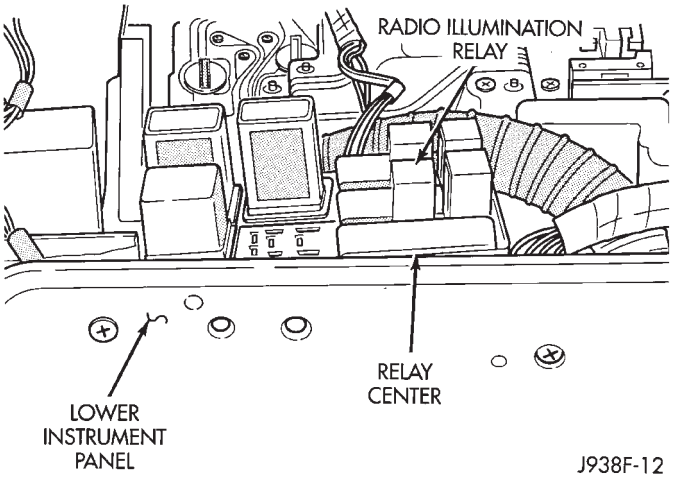


Fig. 2 Radio Illumination Relay - XJ

RELAY TESTS

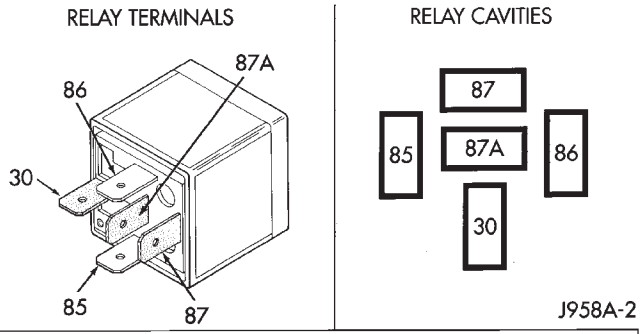
Remove relay to perform the following tests:

(1) A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30.

(2) Resistance value between terminals 85 and 86 (electromagnet) is 75±5 ohms.

(3) Connect a battery to terminals 85 and 86. There should now be continuity between terminals 30 and 87, and no continuity between terminals 87A and 30.

RADIO ILLUMINATION RELAY CONNECTIONS



TERMINAL LEGEND	
NUMBER	IDENTIFICATION
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

RELAY CIRCUIT TESTS

With relay still removed, perform the following tests:

(1) The common feed terminal (30) is connected to the radio display feed circuit. There should be continuity between cavity for relay terminal 30 and clock/radio display feed cavity of radio connector at all times. If not, repair circuit as required.

(2) The normally closed terminal (87A) is connected to terminal 30 in the de-energized position. This circuit provides ignition-switched battery voltage to the radio display when the headlamp switch is off. There should be battery voltage present at cavity for relay terminal 87A with the ignition switch in the ON position. If not, repair circuit to ignition switch as required.

(3) The normally open terminal (87) is connected to terminal 30 in the energized position. This circuit provides instrument panel dimmer controlled feed to the radio display when the headlamp switch is on. There should be voltage present at cavity for relay terminal 87 when the headlamp switch is on. Also, the voltage reading should vary as the panel dimmer switch is rotated. If not, repair circuit or panel dimmer switch as required.

(4) The coil battery terminal (86) connected to the electromagnet in the relay. Check as follows:

(a) On YJ models, it is energized when the headlamp switch is on. There should be battery voltage at cavity for relay terminal 86 with the headlamp switch on. If not, repair circuit to headlamp switch as required.

(b) On XJ models, it is grounded at all times. There should be continuity to ground at cavity for relay terminal 86 at all times. If not, repair circuit to ground as required.

(5) The coil ground terminal (85) is connected to the electromagnet in the relay. Check as follows:

(a) On YJ models, it is grounded at all times. There should be continuity to ground at cavity for relay terminal 85 at all times. If not, repair circuit to ground as required.

(b) On XJ models, it is energized when the headlamp switch is on. There should be battery voltage at cavity for relay terminal 85 with the headlamp switch on. If not, repair circuit to headlamp switch as required.

ANTENNA

The following four tests are used to diagnose the antenna with an ohmmeter:

- mast to ground test (Test 1)
- tip-of-mast to tip-of-conductor test (Test 2)
- body ground to battery ground test (Test 3)
- body ground to coaxial shield test (Test 4).

Ohmmeter test lead connections for each test are shown in Figure 3.

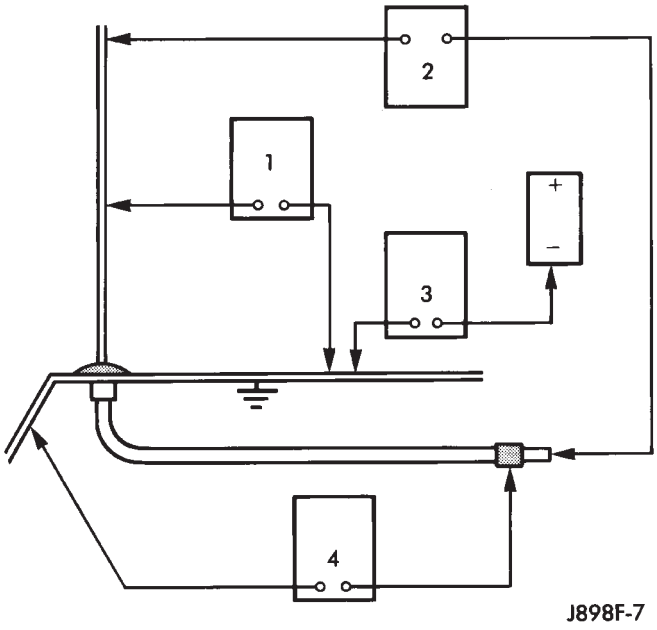


Fig. 3 Antenna Tests

TEST 1

Test 1 determines if the antenna mast is insulated from the base. Proceed as follows:

(1) Disconnect antenna cable lead from radio chassis and isolate.

(2) Connect one ohmmeter lead to tip of antenna mast and the other lead to the antenna base. Check for continuity.

(3) There should be no continuity. If continuity is found, replace defective or damaged antenna base and cable assembly.

TEST 2

Test 2 checks the antenna for an open circuit as follows:

(1) Disconnect the antenna cable lead from the radio chassis.

(2) Connect one ohmmeter test lead to tip of antenna mast. Connect remaining lead to tip of antenna cable lead (the part inserted into the radio).

(3) Continuity should exist (ohmmeter should only register a fraction of an ohm). High or infinite resistance indicates damage to the base and cable assembly. Replace if required.

TEST 3

Test 3 checks condition of the vehicle body ground connection as follows:

(1) Connect one ohmmeter test lead to the vehicle fender and the other lead to the battery negative post.

(2) Resistance should be less than one ohm.

(3) If resistance is more than one ohm, check the braided ground strap connected to the engine and vehicle body for being loose, corroded, or damaged. Repair as necessary.

TEST 4

Test 4 checks condition of the ground between the antenna base and vehicle body as follows:

(1) Connect one ohmmeter test lead to the fender and the other lead to the crimp on the coaxial antenna cable shield.

(2) Resistance should be less then one ohm.

(3) If resistance is more then one ohm:

(a) On YJ models, replace the antenna base attaching screws with new cadmium plated screws.

(b) On XJ models, clean and/or tighten antenna base to fender mounting hardware.

RADIO FREQUENCY INTERFERENCE

Inspect ground connections at:

- blower motor
- electric fuel pump
- generator
- ignition module
- wiper motor
- antenna coaxial ground
- radio ground
- body-to-engine ground strap (braided).

Clean, tighten or repair as required.

Also inspect the following secondary ignition system components:

- spark plug wire routing and condition
- distributor cap and rotor
- ignition coil
- spark plugs.

Reroute spark plug wires or replace components as required.

SERVICE PROCEDURES

RADIO REMOVE/INSTALL - XJ

(1) Disconnect battery negative cable.

(2) Remove upper and lower steering column shrouds and steering column to instrument panel bezel gap hider. If equipped with tilt steering, apply tape to tilt mechanism on top of steering column to protect instrument panel bezel from damage during removal.

(3) Remove 4 instrument panel bezel attaching screws (Fig. 4) and remove the bezel.

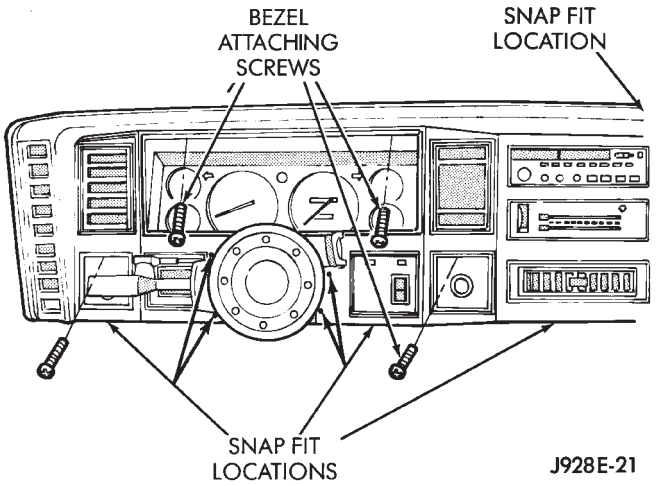


Fig. 4 Instrument Bezel Remove/Install - XJ

(4) Remove 2 radio attaching screws (Fig. 5).

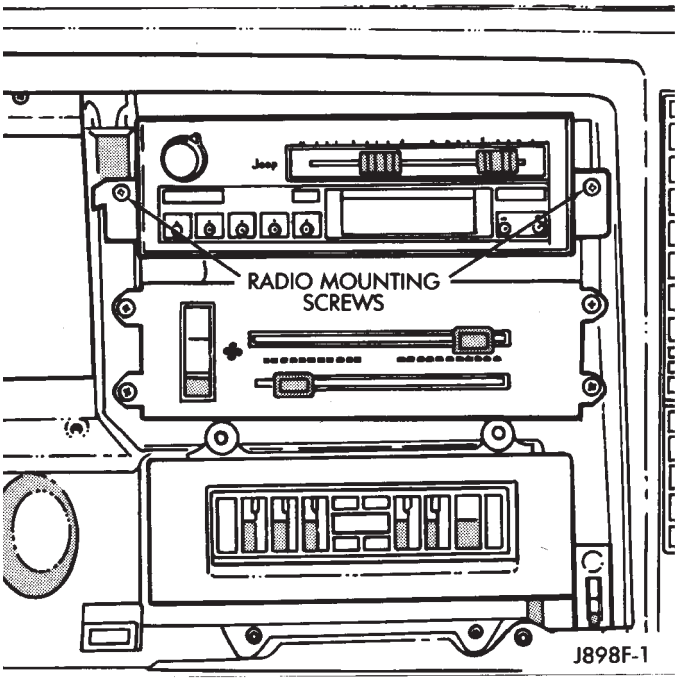


Fig. 5 Radio Mounting Screws Remove/Install - XJ

(5) Slide radio chassis out of instrument panel far enough to disconnect radio electrical connector, ground lead and antenna lead (Fig. 6). Remove radio from instrument panel.

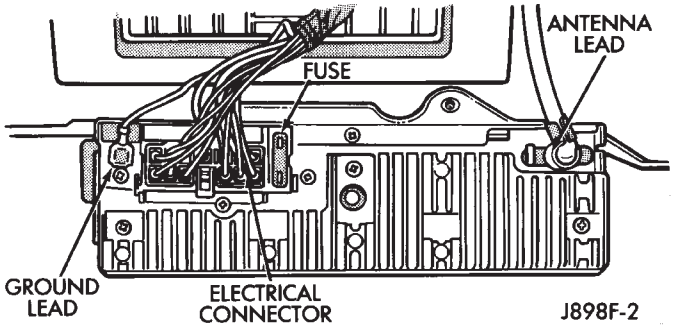


Fig. 6 Radio Wiring Remove/Install - XJ

(6) To install radio, route harness above and to the right of the radio cavity. Make radio harness, ground and antenna connections.

(7) While installing the radio, make sure that clip on top of radio (Fig. 7) is installed in mating slot of instrument panel.

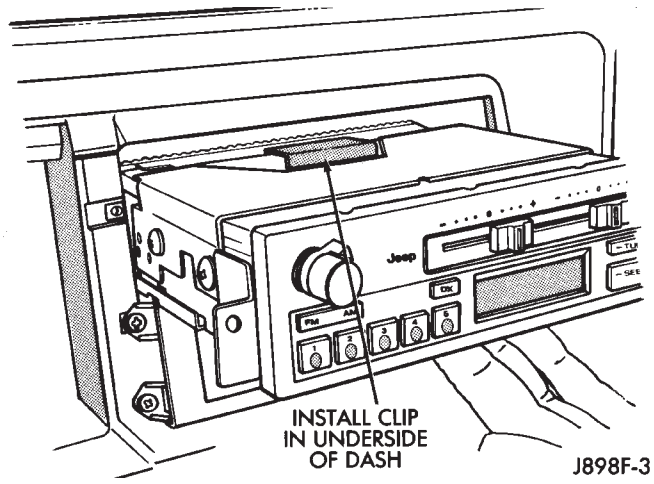


Fig. 7 Radio Clip Install - XJ

(8) Reverse removal procedures to complete installation.

SPEAKERS REMOVE/INSTALL - XJ

INSTRUMENT PANEL

(1) Remove parking brake retaining screw from lower instrument panel (Fig. 8).

(2) Remove retaining screws and the lower instrument panel (Fig. 9).

(3) Unplug wire harness connector.

(4) Remove speaker screws and speaker from lower instrument panel (Fig. 10).

(5) Reverse removal procedures to install.

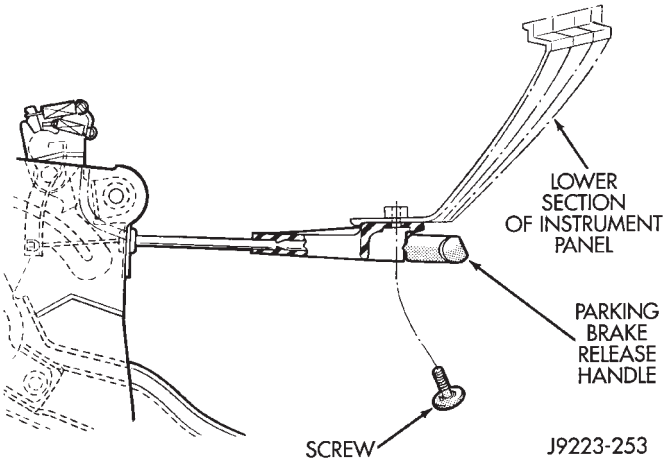


Fig. 8 Parking Brake Remove/Install - XJ

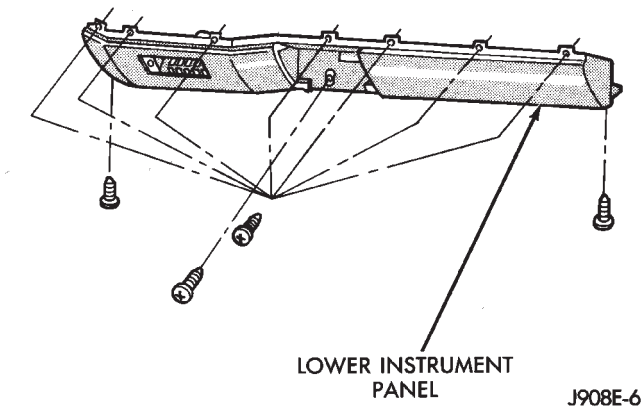


Fig. 9 Lower Instrument Panel Remove/Install - XJ

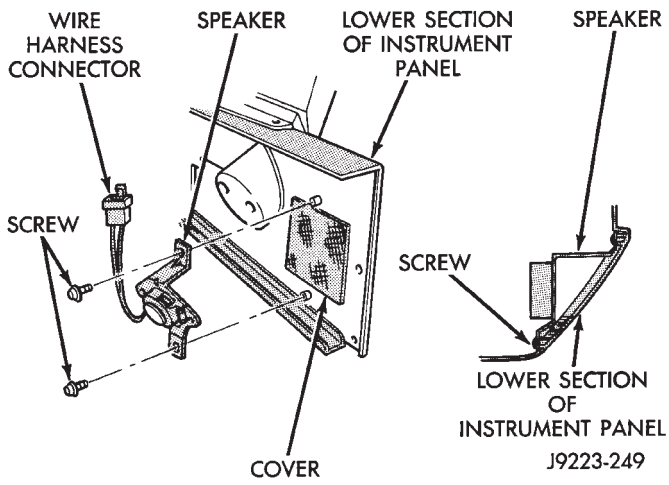


Fig. 10 Instrument Panel Speaker Remove/Install - XJ

FRONT DOOR

(1) Remove interior door latch release assembly and control panel retaining screws (Fig. 11).

(2) Disconnect control linkage and wire harness connector.

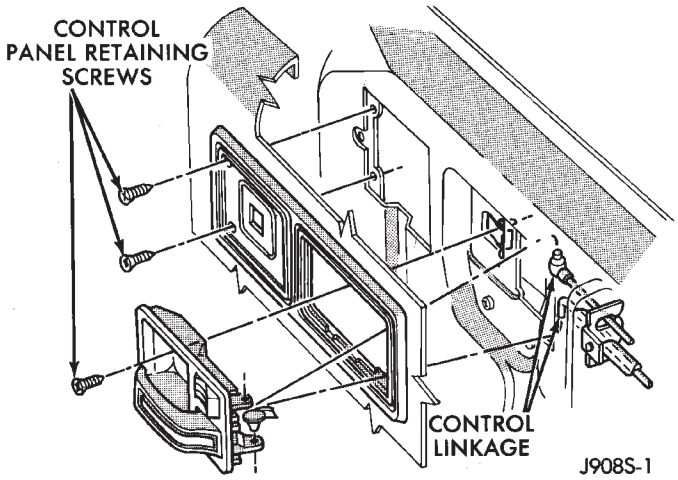


Fig. 11 Control Panel Remove/Install - XJ

(3) Remove latch release and control panel assembly.

(4) Remove armrest lower retaining screws.

(5) Swing armrest downward to a vertical position. This is necessary to disconnect armrest from upper retainer clip (Fig. 12).

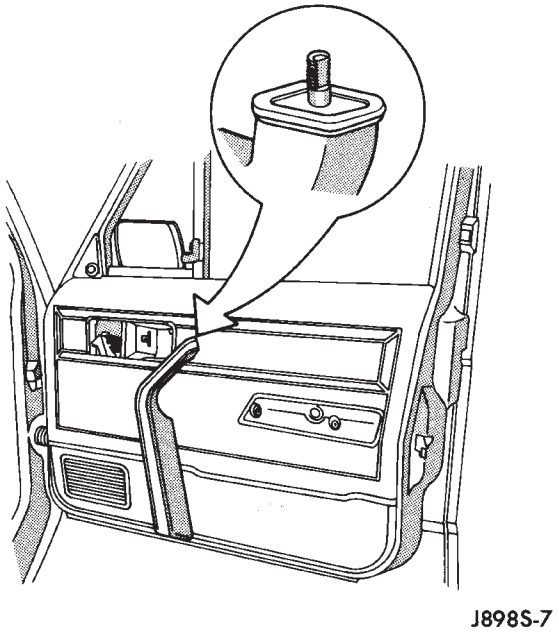


Fig. 12 Armrest Retainer Clip - XJ

(6) Pull armrest straight out from trim panel.

(7) Remove trim panel with a wide, flat-bladed tool (Fig. 13).

To aid in removal of trim panel, start at the bottom of the panel.

(8) Remove speaker attaching screws and disconnect speaker at wire harness.

(9) Reverse removal procedures to install.

SOUND BAR

(1) Disconnect battery negative cable.

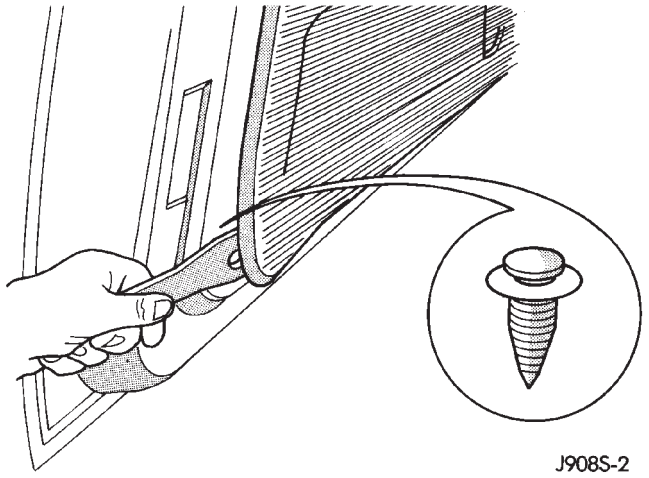


Fig. 13 Trim Panel Remove - XJ

(2) Carefully remove grille from speaker by placing fingertips on outer circumference of grille and gently prying straight down to disengage 4 mounting tabs.

(3) Drill out rivets securing speaker to sound bar.

(4) Lower speaker far enough to unplug wiring from connector.

(5) Reverse removal procedures to install. Use new rivets to secure speaker. Be certain that tabs on speaker grille are inserted through slots in sound bar.

SOUND BAR REMOVE/INSTALL - XJ

(1) Disconnect battery negative cable.

(2) Remove lens from cargo lamp housing.

(3) Remove screws securing left and right rear side roof rail garnish moldings.

(4) Remove left and right rear side roof rail garnish moldings.

(5) Remove 2 push-on retainers from pins inside cargo lamp housing securing sound bar to rear roof bow.

(6) Lower sound bar from roof area and remove from vehicle.

(7) Reverse removal procedures to install. Use 2 new push-on retainers.

ANTENNA REMOVE/INSTALL - XJ

(1) Remove the fender inner splash panel mounting nuts (Fig. 14) and move the panel aside to gain access to the antenna base and cable.

The splash panel screws may be covered with undercoating.

(2) Remove the antenna mast, nut and antenna pad from the top of the fender (Fig. 15).

(3) Remove the passenger side kick panel.

(4) Disconnect the antenna lead (Fig. 16) by pulling apart while twisting the metal connectors. DO NOT PULL ON THE COAXIAL CABLE.

(5) Pull the rubber grommet out of the kick panel.

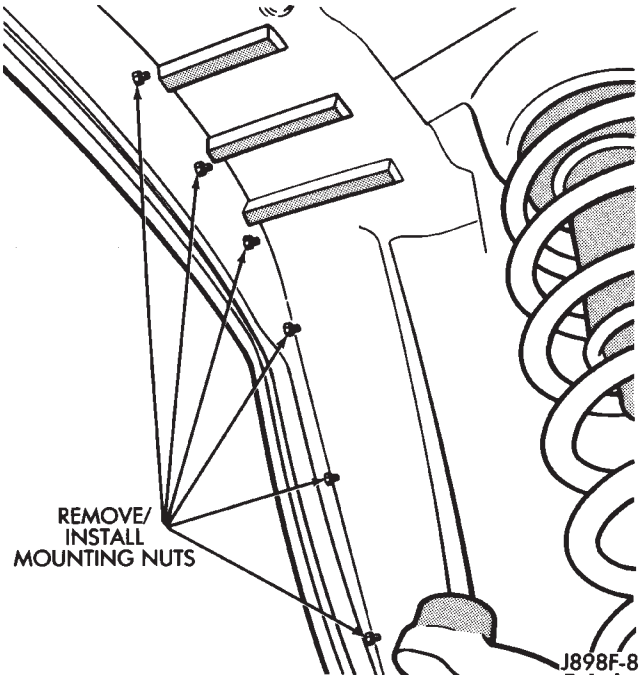


Fig. 14 Fender Inner Splash Panel Remove/Install - XJ

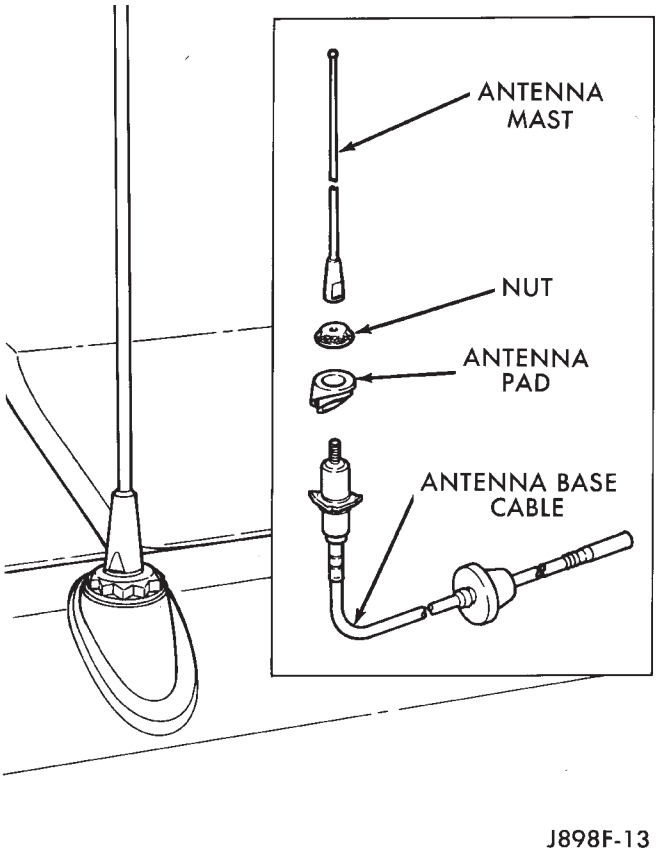


Fig. 15 Nut and Antenna Pad Remove/Install - XJ

(6) Remove the antenna assembly from inside the wheel well.

(7) Reverse removal procedures to install.

(8) Verify antenna and radio operation.

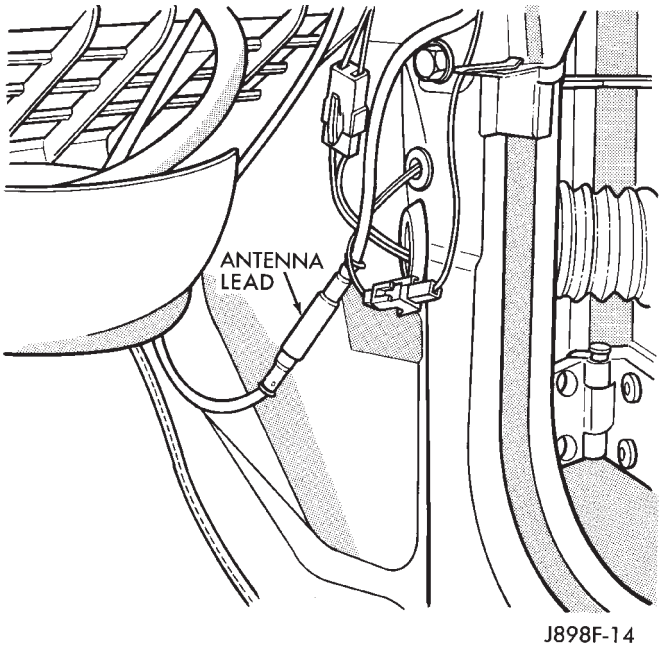


Fig. 16 Disconnect Antenna Lead - XJ

(9) Apply a rubberized undercoating material to the splash panel screws.

RADIO REMOVE/INSTALL - YJ

(1) Disconnect battery negative cable.

(2) Remove center cluster bezel attaching screws (Fig. 17).

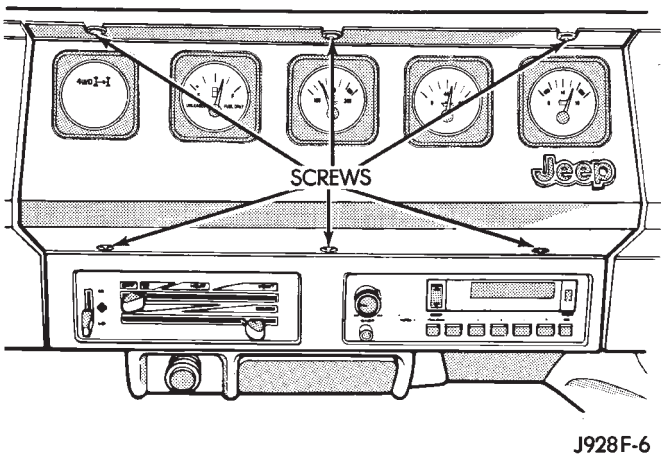


Fig. 17 Center Cluster Bezel Remove/Install - YJ

(3) Remove radio bezel.

(4) Remove radio attaching screws.

(5) Disconnect radio antenna cable.

(6) Disconnect radio wire harness.

(7) Remove radio.

(8) Reverse removal procedures to install.

SPEAKERS REMOVE/INSTALL - YJ

INSTRUMENT PANEL - YJ

RIGHT SIDE

The speaker is located behind grille panel at right end of the instrument panel.

(1) Reach up behind instrument panel and remove 4 stamped nuts holding the speaker in place.

(2) Disconnect speaker electrical connector and remove speaker.

LEFT SIDE

The speaker is located behind grille panel at left end of the dash panel.

(1) Remove nuts that attach the park brake assembly mounting studs to the dash panel. The nuts are accessible from the engine compartment (Fig. 18).

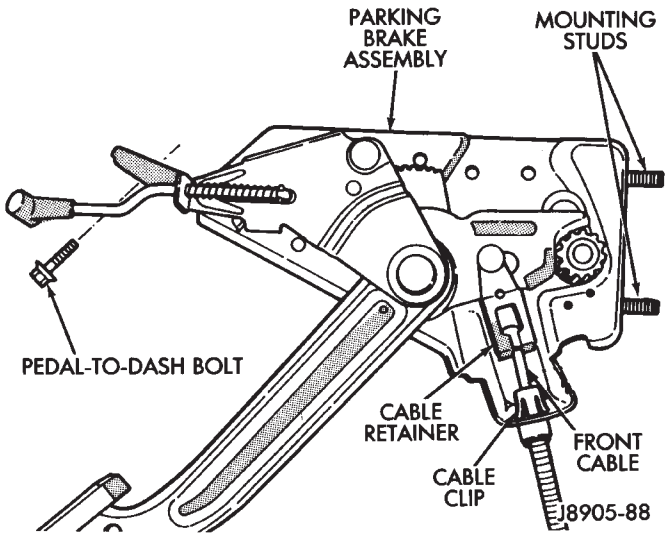


Fig. 18 Park Brake Assembly - YJ

CAUTION: If vehicle is equipped with a rear window wiper, there is a ground wire attached to top of bolt that attaches the park brake assembly to the instrument panel.

(2) Remove bolt that attaches the park brake assembly to the instrument panel and allow assembly to fall out of the way.

(3) Reach up behind instrument panel and remove 4 stamped nuts holding speaker in place.

(4) Disconnect speaker electrical connector and remove speaker.

(5) Reverse removal procedures to install.

SOUND BAR - YJ

(1) Pull sound bar padding away from bar on the passenger side (Fig. 19).

(2) Disconnect speaker harness connector located on the passenger side at the sound bar.

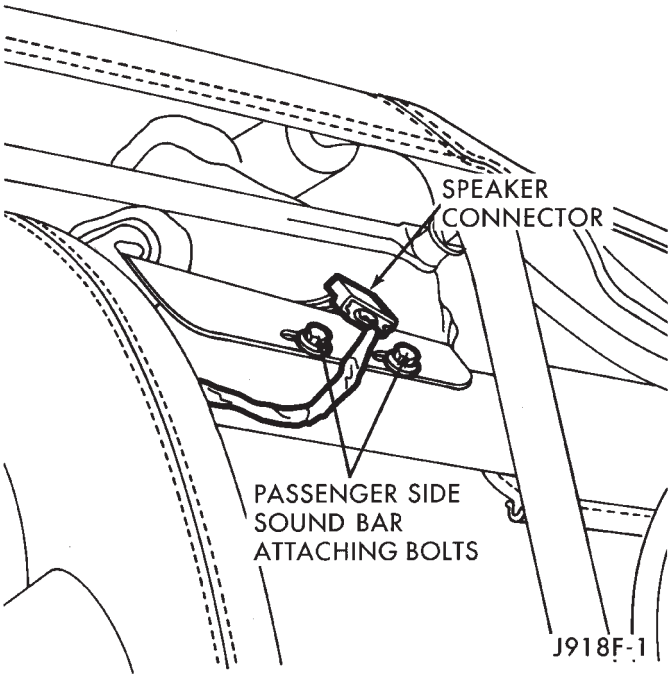


Fig. 19 Sound Bar Speaker Connector - YJ

(3) Remove screws holding speaker grille and speaker to bar.

(4) Disconnect wires from speaker and remove speaker.

(5) Reverse removal procedures to install.

SOUND BAR REMOVE/INSTALL - YJ

(1) Disconnect speaker harness connector located on the passenger side at the sound bar (Fig. 19)

(2) Remove bolts attaching the sound bar side flanges to the right and left side bars.

(3) Open zipper on sport bar cover.

(4) Remove bolts attaching the sound bar brackets to the sport bar (located on the rear of the sport bar) (Fig. 20). Slip brackets through the sport bar cover.

(5) Reverse removal procedures to install.

ANTENNA REMOVE/INSTALL - YJ

(1) Remove the radio. See Radio Remove/Install, in this group for procedures.

(2) Remove three screws holding the antenna base and pad to the body (Fig. 21).

(3) Pull the antenna and cable out of the vehicle.

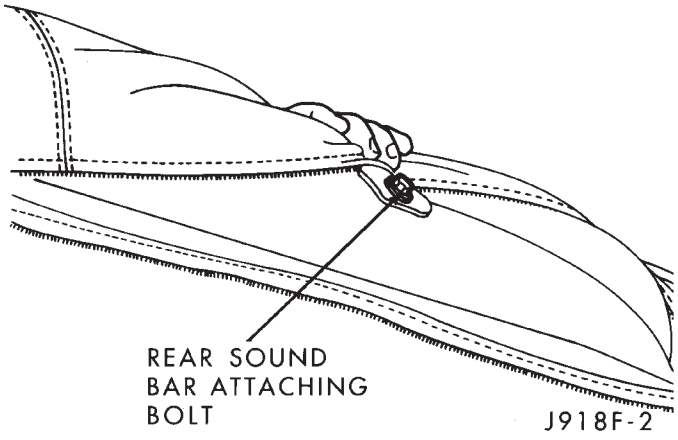


Fig. 20 Sound Bar Attaching Bolt - YJ

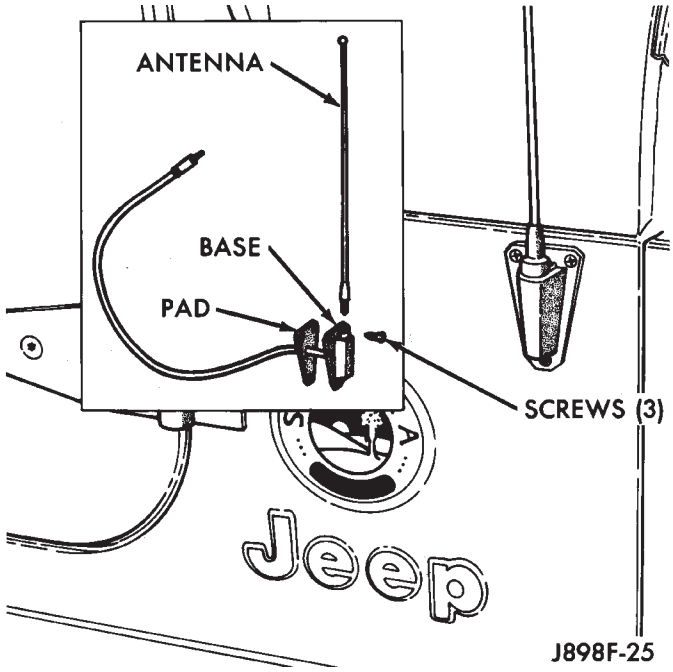


Fig. 21 Antenna Remove/Install - YJ

(4) To install the antenna, make sure the antenna pad is placed over the cable and guide the cable under the instrument panel.

(5) Secure the antenna base and pad with three screws.

(6) Install the antenna lead into the radio and install the radio.