

**2001 ACCESSORIES & EQUIPMENT****Headlights - Automatic Twilight Sentinel - Catera****DESCRIPTION**

Automatic twilight sentinel determines automatic on/off control of exterior lights, and holds exterior lights on for a period of time after ignition is turned off. Twilight sentinel system consists of the Body Control Module (BCM), heater-A/C control unit, headlight automatic control ambient light sensor and twilight sentinel delay rheostat and OFF switch (integral with headlight switch).

BCM controls twilight sentinel system and Daytime Running Lights (DRL) system (high beam headlights at half-intensity). Headlights will switch from DRL to low beam if conditions permit twilight sentinel to control headlights or windshield wipers are turned on. BCM is supplied input of ambient light condition by heater-A/C control unit which uses headlight automatic control ambient light sensor. A twilight delay switch is used to determine the twilight delay after ignition is turned off. Twilight delay can be adjusted from 10 seconds to 3 minutes in response to position of twilight delay setting.

**OPERATION**

System operates automatically whenever ignition switch is turned to RUN position, vehicle is not in park, headlights are off, and twilight sentinel OFF switch is not illuminated. When turned on, system automatically turns on exterior lights at dusk. At dawn, system will turn exterior lights off.

System provides a delay period before switching lights on or off. This prevents system from operating under sudden ambient lighting changes (such as passing through tunnels or exposure to bright lights at night). Delay period is 2 seconds when switching from day to night, and 40 seconds when switching from night to day.

**COMPONENT LOCATIONS****COMPONENT LOCATIONS**

<b>Component</b>	<b>Location</b>
Body Control Module	Lower Right Side "A" Pillar, Behind Trim Panel
Fuse Block	Under Instrument Panel, Lower Left Of Steering Wheel
Headlight Automatic Control Ambient Light Sensor	Top Center Of Instrument Panel
Heater-A/C Control Switch	Center Of Instrument Panel, Above Radio

**TROUBLE SHOOTING****PRELIMINARY INSPECTION**

1. Check fuses in instrument panel fuse block. If any fuse is open, check for short to ground in appropriate circuit. Ensure battery voltage exists at input side of each fuse. If battery voltage does not exist, repair power distribution circuit as necessary. See POWER DISTRIBUTION article in WIRING DIAGRAMS.
2. If one headlight is inoperative, check bulb, connections and related wiring. See HEADLIGHT SYSTEMS & DAYTIME RUNNING LIGHTS article. Ensure all ground connections are clean and tight.
3. Check for poor connections or broken wires inside of insulation which could cause headlights to work intermittently. Check for proper installation of aftermarket electronic equipment. If no problem is found, perform **LIGHTING SYSTEM DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.

**SELF-DIAGNOSTIC SYSTEM**

**LIGHTING SYSTEM DIAGNOSTIC SYSTEM CHECK**

1. Ensure battery condition, cold cranking amperage and reserve capacity meet specifications. Replace as necessary. Install scan tool to Data Link Connector (DLC). DLC is located under left side of instrument panel. If scan tool powers up, go to next step. If scan tool does not power up, go to SCAN TOOL DOES NOT POWER UP under SYSTEM TESTS in BODY CONTROL MODULES - CATERA article.
2. Turn ignition switch to RUN position. Using scan tool, attempt to establish communication with Body Control Module (BCM). If communication with BCM is established, go to next step. If communication with BCM is not established, go to SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 SERIAL DATA LINK under SYSTEM TESTS in BODY CONTROL MODULES - CATERA article.
3. Using scan tool, select DISPLAY DTC function for BCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, diagnose by symptom. See **SYMPTOM INDEX** table under SYSTEM TESTS.
4. If scan tool displays any DTCs that begin with "U" go to SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 SERIAL DATA LINK under SYSTEM TESTS in BODY CONTROL MODULES - CATERA article. If scan tool does not display any DTCs that begin with "U", go to next step.
5. If scan tool displays any other DTCs, perform appropriate test. See DIAGNOSTIC TROUBLE CODE DEFINITIONS in BODY CONTROL MODULES - CATERA.

**SYSTEM TESTS**

**WARNING:** Before servicing instrument panel components on vehicles with Supplemental Inflatable Restraint (SIR) system, disable SIR system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** in appropriate AIR BAG RESTRAINT SYSTEMS article.

**CAUTION:** To prevent damage to terminals, Connector Test Adaptor Kit (J-35616-A) must be used whenever a diagnostic procedure requires checking or probing terminals.

**NOTE:** For twilight sentinel system wiring diagrams, see **HEADLIGHT SYSTEMS & DAYTIME RUNNING LIGHTS** article.

**SYMPTOM INDEX**

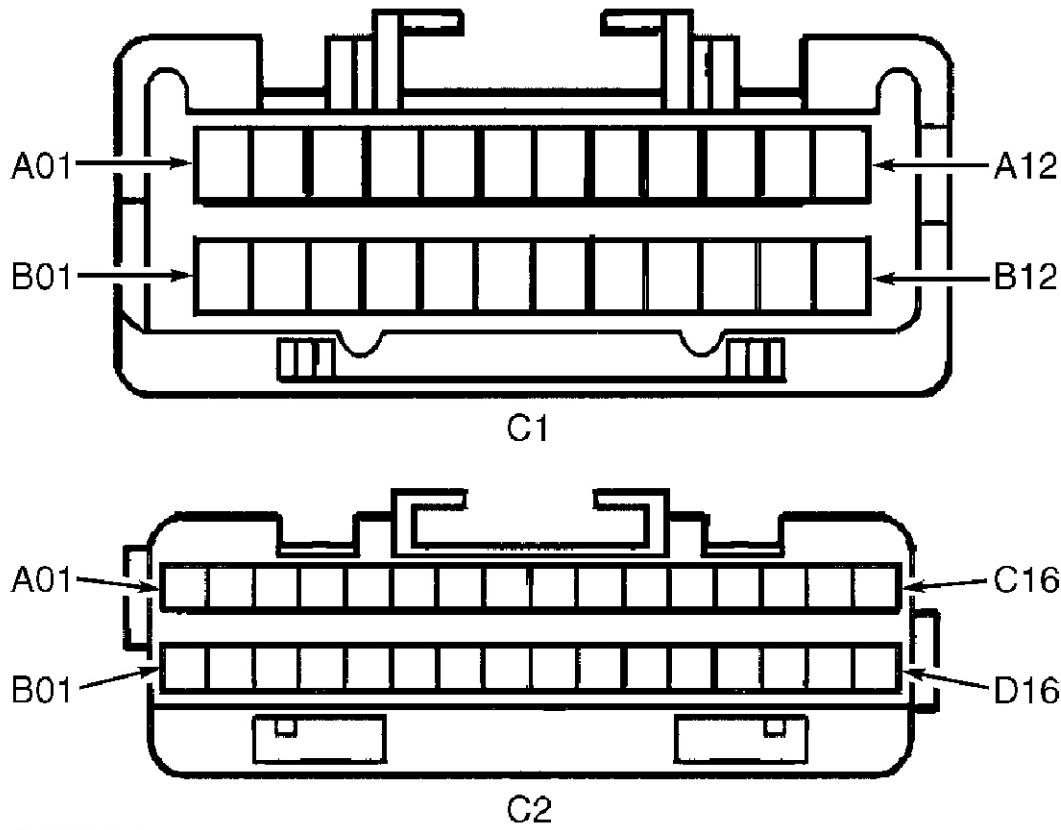
Symptom	Perform Test
Twilight Sentinel Inoperative	<u>A</u>
Twilight Sentinel Indicator Inoperative	<u>B</u>
Twilight Sentinel Indicator Always On	<u>C</u>

**TEST A: TWILIGHT SENTINEL INOPERATIVE**

1. If diagnostic system check has been performed on lighting system, go to next step. If lighting system diagnostic system check has not been performed, go to **LIGHTING SYSTEM DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Connect scan tool to Data Link Connector (DLC). DLC is located under left side of instrument panel. Cover headlight automatic control ambient light sensor. Go to BCM INPUTS on scan tool. Select TWILIGHT SENSOR VOLTAGE. Voltage should range between 4.5 volts in daylight to zero volts in darkness. If scan tool displays zero volts, go to next step. If scan tool does not show zero volts, go to step 4 .
3. Disconnect Body Control Module (BCM) 24-pin harness connector C1. BCM is located lower right side "A" pillar, behind trim panel. Depress switch labeled OFF under TWILIGHT on dashboard. OFF switch should not be illuminated. Measure resistance between ground and BCM 24-pin harness connector C1 terminal A7

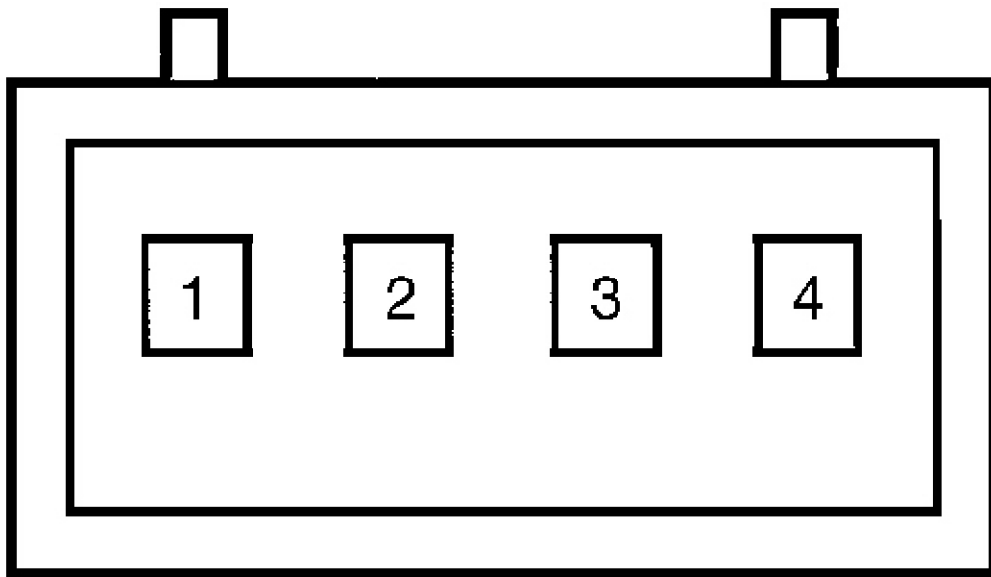
(Red/Yellow wire). See **Fig. 1** . If resistance is less than 2 ohms, go to step 13 . If resistance is 2 ohms or more, go to step 8 .

4. Disconnect harness connector for headlight automatic control ambient light sensor. Measure resistance between ground and ambient light sensor harness connector terminal No. 1 (Brown wire). See **Fig. 2** . If approximately 5 volts exists, go to next step. If approximately 5 volts does not exist, go to step 9 .
5. Check for open, high resistance, short to ground or short to voltage in Brown/Blue wire between BCM 24-pin harness connector C1 terminal A1 and heater-A/C control unit 22-pin harness connector C1 terminal No. 4. See **Fig. 1** and **Fig. 3** . If no problem was found, go to next step. If problem was found and repaired, go to step 14 .
6. Disconnect headlight automatic control ambient light sensor harness connector. Connect scan tool and observe twilight sensor voltage. If no voltage exists, go to next step. If voltage exists, go to step 12 .
7. Check for a short to battery voltage in Red/Yellow wire between BCM 24-pin harness connector C1 terminal A7 and headlight switch harness connector terminal No. 9. See **Fig. 1** and **Fig. 4** . If no problem was found, go to step 11 . If a problem was found and corrected, go to step 14 .
8. Check for an open or high resistance in Red/Yellow wire between BCM 24-pin harness connector C1 terminal A7 and headlight switch harness connector terminal No. 9. See **Fig. 1** and **Fig. 4** . If no problem was found, go to step 10 . If a problem was found and corrected, go to step 14 .
9. Check for an open, high resistance, short to ground or short to voltage in Brown wire between ambient light sensor harness connector terminal No. 1 and heater-A/C control unit 22-pin harness connector C1 terminal No. 7. See **Fig. 2** and **Fig. 3** . If no problem was found, go to step 11 . If a problem was found and corrected, go to step 14 .
10. Replace headlight switch. See **HEADLIGHT SWITCH** under REMOVAL & INSTALLATION. Go to step 14 .
11. Replace heater-A/C control unit. See **HEATER-A/C CONTROL UNIT** under REMOVAL & INSTALLATION. Go to step 14 .
12. Replace headlight automatic control ambient light sensor. See **HEADLIGHT AUTOMATIC CONTROL AMBIENT LIGHT SENSOR** under REMOVAL & INSTALLATION. Go to step 14 .
13. Replace Body Control Module. See **BODY CONTROL MODULE** under REMOVAL & INSTALLATION in **BODY CONTROL MODULES - CATERA** article. Go to next step.
14. Reconnect all harness connectors to all components which were previously disconnected. Operate twilight sentinel system to verify correct operation. If twilight sentinel system operates correctly, system is okay. If twilight sentinel does not operate correctly, return to step 2 .



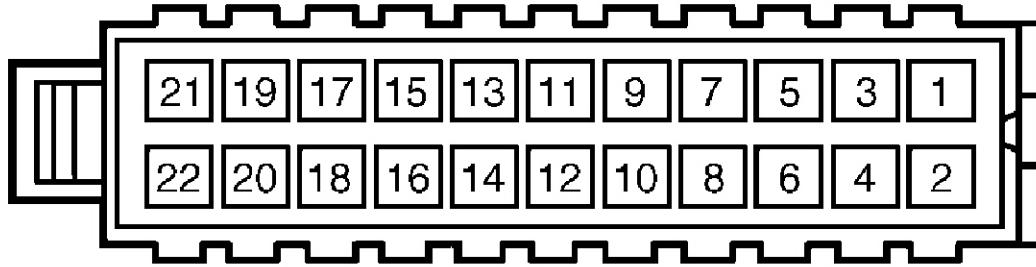
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**Fig. 1: Identifying Body Control Module Harness Connector Terminals**  
Courtesy of GENERAL MOTORS CORP.



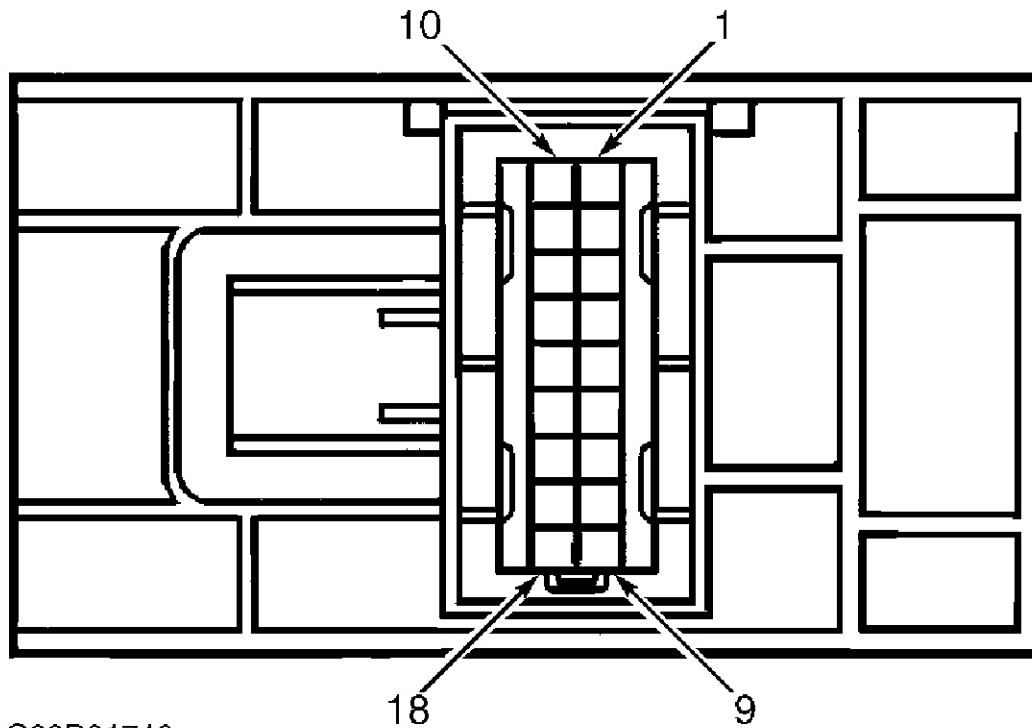
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**Fig. 2: Identifying Headlight Automatic Control Ambient Light Sensor Harness Connector Terminals**  
Courtesy of GENERAL MOTORS CORP.



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**Fig. 3: Identifying Heater-A/C Control Switch Harness Connector C1 Terminals**  
 Courtesy of GENERAL MOTORS CORP.



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**Fig. 4: Identifying Headlight Switch Harness Connector Terminals**  
 Courtesy of GENERAL MOTORS CORP.

#### TEST B: TWILIGHT SENTINEL INDICATOR INOPERATIVE

1. If lighting system diagnostic system check has been performed, go to next step. If lighting system diagnostic system check has not been performed, go to **LIGHTING SYSTEM DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Verify twilight sentinel features operate correctly. If twilight sentinel features operate correctly, go to next step. If twilight sentinel does not operate correctly, see **TEST A: TWILIGHT SENTINEL INOPERATIVE**.
3. Turn ignition switch to RUN position. Depress twilight sentinel OFF button to OFF position and button should illuminate. Connect a test light to battery voltage and probe headlight switch harness connector terminal No. 16 (Brown/Black wire). See **Fig. 4**. If test light does not illuminate, go to next step. If test light illuminates, go to step 5.
4. Repair open or high resistance in Brown/Black wire between Body Control Module (BCM) 32-pin harness

connector C2 terminal C14 and headlight switch harness connector terminal No. 16. Go to step 6 .

5. Replace headlight switch. See **HEADLIGHT SWITCH** under REMOVAL & INSTALLATION. Go to next step.
6. Reconnect all harness connectors to all components which were previously disconnected. Operate twilight sentinel system to verify correct operation. If twilight sentinel system operates correctly, system is okay. If twilight sentinel does not operate correctly, return to step 2 .

#### TEST C: TWILIGHT SENTINEL INDICATOR ALWAYS ON

1. If lighting system diagnostic system check has been performed, go to next step. If lighting system diagnostic system check has not been performed, go to **LIGHTING SYSTEM DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Verify twilight sentinel features operate correctly. If twilight sentinel features operate correctly, go to next step. If twilight sentinel does not operate correctly, see **TEST A: TWILIGHT SENTINEL INOPERATIVE** .
3. Check for short to ground in Brown/Black wire between Body Control Module (BCM) 32-pin harness connector C2 terminal C14 and headlight switch harness connector terminal No. 16. See **Fig. 4** . If no problem was found, go to next step. If a problem was found and corrected, go to step 5 .
4. Replace headlight switch. See **HEADLIGHT SWITCH** under REMOVAL & INSTALLATION.
5. Reconnect all harness connectors to all components which were previously disconnected. Operate twilight sentinel system to verify correct operation. If twilight sentinel system operates correctly, system is okay. If twilight sentinel does not operate correctly, return to step 2 .

#### REMOVAL & INSTALLATION

**WARNING:** Before servicing instrument panel components on vehicles with Supplemental Inflatable Restraint (SIR) system, disable SIR system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** in appropriate **AIR BAG RESTRAINT SYSTEMS** article.

**CAUTION:** When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** before disconnecting battery.

#### HEADLIGHT AUTOMATIC CONTROL AMBIENT LIGHT SENSOR

##### Removal & Installation

Headlight automatic control ambient light sensor is mounted in defroster grille. Using small flat-bladed screwdriver, pry sensor from instrument panel. Disconnect harness connector. To install, reverse removal procedure.

#### HEADLIGHT SWITCH

**CAUTION:** To prevent damage to instrument panel trim, place a shop towel behind prying tool when removing headlight switch.

##### Removal & Installation

Using a suitable prying tool, pry left side of headlight switch toward rear. Disconnect harness connector. Remove headlight switch. To install, reverse removal procedure.

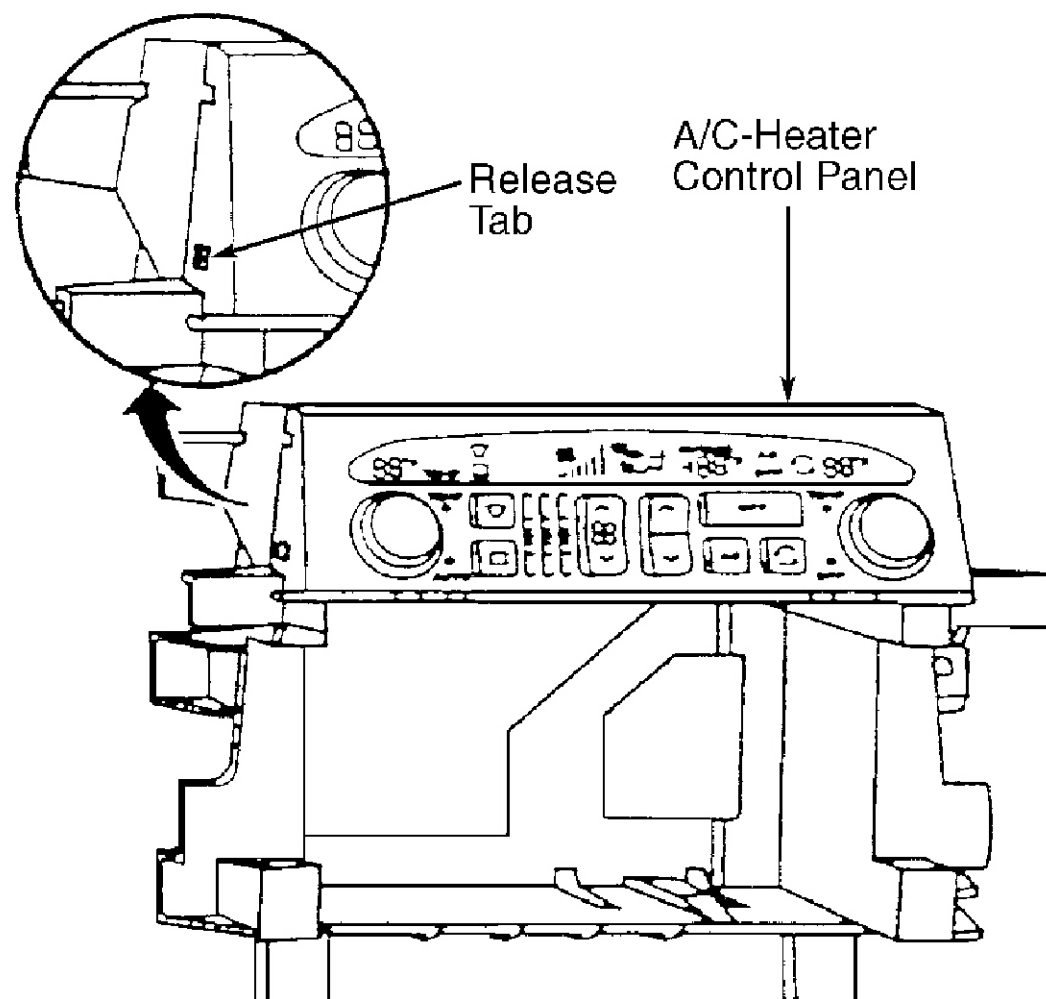
## HEATER-A/C CONTROL UNIT

### Removal & Installation

1. Remove console rear vent housing. Remove gearshift lever boot by pulling up on front of boot. Remove shift indicator by reaching through console opening near gearshift lever. Disconnect shift indicator harness connector. Remove winter mode switch by reaching through console opening near gearshift lever.
2. Remove console trim plate screws. Move console trim plate forward to access front console bolts. Remove front console bolts. Remove parking brake boot by carefully prying on sides of boot. Remove screw from center of parking brake trim panel. Remove rear console bolts. Remove console.
3. Open ashtray. Release outer ashtray cover from right side of assembly. Remove ashtray cover. Remove screw from rear of ashtray. Remove ashtray. Remove passenger's heated seat switch, traction control switch, trunk release switch, driver's heated seat switch, hazard switch and fuel door switch.

**NOTE:** Note position of fasteners before removing radio trim bezel for correct reassembly.

4. Remove radio bezel screw covers and screws. Slide traction control and hazard switch harness connectors out of bezel. Remove trunk, fuel door, and heated seat switch harness connectors from bezel. Remove ashtray harness connector from bezel. Remove radio bezel from instrument panel.
5. Remove screws holding radio to instrument panel center support bracket. Pull radio out center support bracket enough to access radio harness connectors. Disconnect harness and coaxial cable connectors from radio. Remove radio. Remove heater-A/C control screws. Disconnect heater-A/C control harness connectors.
6. Depress release tabs on side of control face to release heater-A/C control panel from bracket. To install, reverse removal procedure. Using scan tool, program heater-A/C control unit by selecting PROGRAMMING from AIR CONDITIONING SPECIAL FUNCTIONS menu. Follow instructions on scan tool display.



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**Fig. 5: Removing A/C-Heater Control Panel**  
Courtesy of GENERAL MOTORS CORP.

## WIRING DIAGRAMS

**NOTE:** For twilight sentinel system wiring diagrams, see HEADLIGHT SYSTEMS & DAYTIME RUNNING LIGHTS article.



**2001 Cadillac Catera**

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