

HEADLIGHTS - AUTOMATIC TWILIGHT SENTINEL

1998 Pontiac Bonneville

1998 ACCESSORIES & EQUIPMENT

General Motors Corp. - Automatic Twilight Sentinel Headlights

Pontiac; Bonneville

DESCRIPTION

Automatic twilight sentinel determines automatic on/off control of exterior lights, and holds exterior lights on for a period of time after ignition switch is turned off. Lamp Control Module (LCM) monitors ambient light condition through the 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 a few seconds to 4 minutes in response to voltage level at twilight delay input. Twilight sentinel function does not affect the operation of the Daytime Running Lights (DRL).

OPERATION

System operates automatically whenever ignition is on, headlights are off, and twilight sentinel system is on. When turned on, system automatically turns on exterior lights at dusk. At dawn, system will turn exterior lights off.

System provides a non-adjustable 10-30 second delay before switching lights on or off, thus preventing system from operating under sudden ambient lighting changes (such as passing through tunnels or exposure to bright lights at night).

COMPONENT LOCATIONS

COMPONENT LOCATIONS TABLE

Application	Location
Adaptive Lamp Monitor Control Module	Behind Instrument Panel, On Right Side Of Steering Column Support
Ambient Light Sensor	Left Center Top Of Instrument Panel In Defroster Grille
Daytime Running Lights (DRL) Resistor	Left Front Of Engine Compartment Near Left Hand Horn
Instrument Panel Fuse Block	Under Right Instrument Panel, Near Rear Of Glove Box
Lamp Control Module (LCM)	Under Instrument Panel, Below Center Heater Outlets
LH Maxifuse Block	Center Rear Of Engine Compartment, Near Cowl
Park/Neutral Position (PNP) Switch	Left Of Transaxle, Below Exhaust Gas Recirculation Valve

Remote Function Actuator	Under Right Instrument Panel, Near Rear Of Glove Box
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HANDLING PRECAUTIONS

CAUTION: When handling Electrostatic Discharge (ESD) sensitive electronic parts (control modules), take special care to avoid damaging components.

1) Discharge personal static electricity by momentarily touching metal grounding point on vehicle before touching electronic components.

2) DO NOT touch terminals on components or connectors with fingers or metal tools. When disconnecting connectors, DO NOT let metal tool contact any exposed terminal.

3) Never jumper, ground, or use test probes on components or connectors unless specified in diagnosis. Always connect ground lead first.

4) DO NOT remove solid-state components from protective packaging until ready for installation. Touch packaging to ground before opening.

5) DO NOT bump or drop components. DO NOT put component on metal work bench, metal objects, or electrically operated components (such as radio, TV, or oscilloscope).

TROUBLE SHOOTING

1) Check PARK LPS/INT LPS fuse 6C (15-amp), T/SIG/BU/LPS BTSI fuse 1B (20-amp) or CHIME fuse 1D (15-amp) in instrument panel fuse block. Check LCM/HDLP circuit breaker (20-amp) in LH Maxifuse fuse block.

2) If one headlight does not work, check bulb, connections and related wiring. See WIRING DIAGRAMS. Ensure all ground connections are clean and tight.

3) Check for poor connections or partially broken wire inside of insulation which could cause an intermittent. Check for proper installation of aftermarket electronic equipment.

SYSTEM TESTS

* PLEASE READ THIS FIRST *

WARNING: Before servicing instrument panel components on vehicles with Supplemental Inflatable Restraint (SIR) system, disable SIR system. See DISABLING & ACTIVATING AIR BAG SYSTEM in AIR BAG RESTRAINT SYSTEM 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. To locate and identify terminals, see WIRING DIAGRAMS.

NOTE: Unless otherwise specified, make all measurements with a Digital Volt-Ohmmeter (DVOM) with a minimum input impedance of 10 megohms.

HEADLIGHTS SYSTEM CHECK

1) Turn ignition off. Turn twilight sentinel off. Turn headlights off. All exterior lights should be off. If headlights are not off, see HEADLIGHTS DO NOT TURN OFF procedure.

2) Turn parking lights on. All parking lights should be illuminated. If parking light(s) are not illuminated, locate and repair problem in exterior lighting system. See WIRING DIAGRAMS.

3) Turn low beam headlights on. Turn headlight dimmer switch to LOW beam position. Parking lights should remain lit. Both low beam headlights should be illuminated. If low beams do not operate as specified, see LOW BEAM HEADLIGHTS INOPERATIVE procedure.

4) Turn headlight dimmer switch to HIGH beam position. Parking lights should remain lit. Headlights should switch from low beam to high beam. If high beams do not operate as specified, see procedures in HIGH BEAM HEADLIGHTS INOPERATIVE procedure.

5) Turn headlight dimmer switch to LOW position. Turn headlights off. Turn ignition switch to RUN position. Apply parking brake. Put gearshift lever in Drive. Expose ambient light sensor to sunlight or bright incandescent light. Both low beam headlights should illuminate at reduced intensity. All other exterior lights should be off. If headlights do not operate as specified, see DAYTIME RUNNING LIGHTS (DRL) INOPERATIVE procedure.

6) Put gearshift lever in Park. Turn twilight sentinel on, with twilight sentinel delay in MIN position. Cover ambient light sensor. Both low beam headlights should illuminate at full intensity and all parking lights should turn on within 30 seconds. If headlights do not operate as specified, see DAYTIME RUNNING LIGHTS (DRL) INOPERATIVE procedure.

7) Put twilight sentinel delay in MAX position. Turn ignition off. All exterior lights should turn off after about 3 minutes. If exterior lights do not operate as specified, see TWILIGHT SENTINEL INOPERATIVE procedure.

HEADLIGHTS DO NOT TURN OFF

NOTE: Use illustrations to identify Lamp Control Module (LCM) connector terminals. See Figs. 1 and 2. LCM is located at center of instrument panel.

1) Perform HEADLIGHTS SYSTEM CHECK. Go to next step.

2) Turn ignition switch to OFF position. Disconnect headlight switch connector. If headlights turn off, go to step 10). If headlights do not turn off, go to next step.

3) Disconnect Lamp Control Module (LCM) 6-pin connector C1 (Black). If headlights turn off, go to step 11). If headlights do not turn off, go to next step.

4) Disconnect headlight dimmer switch 48-pin connector C202 located at base of steering column. If headlights do not turn off, go to next step. If headlights turn off, go to step 12).

5) If vehicle is equipped with lamp monitoring, go to next step. If vehicle is not equipped with lamp monitoring, go to step 14).

6) Disconnect adaptive lamp monitor control module connectors C1 and C2. Adaptive lamp monitor control module is located behind instrument panel, on right side of steering column support. If headlights turn off, go to next step. If headlights do not turn off, go to step 9).

7) If low beams will not turn off, repair short to voltage in circuit No. 12 (Tan wire) between headlight dimmer switch and adaptive lamp monitor control module. If high beams will not turn off, repair short to voltage in circuit No. 11 (Light Green wire) between headlight dimmer switch and adaptive lamp monitor control module. If circuit is okay, go to next step. If circuit is not okay, go to step 16).

8) Replace adaptive lamp monitor control module. Perform

HEADLIGHTS SYSTEM CHECK.

9) If low beams will not turn off, repair short to voltage in circuit No. 1312 (Tan or Tan/White wire) between adaptive lamp monitor control module and low beam headlights. If high beams will not turn off, repair short to voltage in circuit No. 1311 (Light Green or Light Green/Black wire) between adaptive lamp monitor control module and high beam headlights. Perform HEADLIGHTS SYSTEM CHECK.

10) Replace headlight switch. Perform HEADLIGHTS SYSTEM CHECK.

11) Replace LCM. See LAMP CONTROL MODULE (LCM) under REMOVAL & INSTALLATION. Perform HEADLIGHTS SYSTEM CHECK.

12) Check for short to power in circuit No. 10 (Yellow wire) between headlight dimmer switch and LCM connector C1. If circuit is okay, go to next step. If circuit is not okay, go to step 15).

13) Replace headlight dimmer switch. See STEERING COLUMN SWITCHES article. Perform HEADLIGHTS SYSTEM CHECK.

14) If low beams will not turn off, repair short to voltage in circuit No. 12 (Tan wire) between headlight dimmer switch and low beam headlights. If high beams will not turn off, repair short to voltage in circuit No. 11 (Light Green wire) between headlight dimmer switch and high beam headlights. Perform HEADLIGHTS SYSTEM CHECK.

15) Repair short to voltage in appropriate circuit. Perform HEADLIGHTS SYSTEM CHECK.

LOW BEAM HEADLIGHTS INOPERATIVE

1) Perform HEADLIGHTS SYSTEM CHECK. Go to next step.

2) Disconnect Lamp Control Module (LCM) 6-pin connector C1 (Black). Using DVOM, check voltage between LCM connector C1, terminal "E" (Red wire) and ground. If 10-15 volts exists, go to next step. If 10-15 volts does not exist, go to step 9).

3) Connect test light between headlight switch harness connector terminal "A" (Red wire) and ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 10).

4) Disconnect headlight switch connector. Connect a fused jumper wire between headlight switch connector terminals "A" (Red wire) and "D" (Yellow wire). If low beam headlights turn on, go to next step. If low beam headlights do not turn on, go to step 11).

5) Leave jumper wire connected as specified in step 4). Using test light, backprobe between headlight dimmer switch harness connector C202, terminal C5 (Yellow wire) and ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 12).

6) If vehicle is equipped with lamp monitoring, go to next step. If vehicle is not equipped with lamp monitoring, go to step 13).

7) Turn low beam headlights on. Disconnect adaptive lamp monitor control module connectors C1 and C2. Adaptive lamp monitor control module is located behind instrument panel, on right side of steering column support. Connect a fused jumper wire between adaptive lamp monitor control module harness connectors C2, terminal "R" (Tan wire) and harness connector C1, terminal "A" (Tan wire). See Fig. 3. If low beams turn on, go to next step. If low beams do not turn on, go to step 15).

8) Replace adaptive lamp monitor control module. Perform HEADLIGHTS SYSTEM CHECK.

9) Repair open or short to ground in circuit No. 242 (Red wire) between LH Maxifuse block (located in right rear of engine compartment) and headlight switch or LCM connector C1. Perform HEADLIGHTS SYSTEM CHECK.

10) Repair open in circuit 242 (Red wire) between headlight switch and splice S201. Perform HEADLIGHTS SYSTEM CHECK.

11) Replace headlight switch. Perform HEADLIGHTS SYSTEM CHECK

12) Repair open or short to ground in circuit No. 10 (Yellow wire) between headlight switch, LCM connector C1 and headlight dimmer switch. Perform HEADLIGHTS SYSTEM CHECK.

13) Check for open or short to ground in circuit No. 12 (Tan wire) between headlight dimmer switch and splice S257. If circuit is okay, go to next step. If circuit is not okay, go to step 17).

14) Replace headlight dimmer switch. See STEERING COLUMN SWITCHES article. Perform HEADLIGHTS SYSTEM CHECK.

15) Check for open or short to ground in circuit No. 12 (Tan wire) between headlight dimmer switch and adaptive lamp monitor control module. If circuit is okay, go to next step. If circuit is not okay, go to step 17).

16) Check for open or short to ground in circuit No. 1312 (Tan wire) between adaptive lamp monitor control module and splice S258. If circuit is okay, go to next step. If circuit is not okay, go to next step.

17) Repair open or short to ground in appropriate wire. Perform HEADLIGHTS SYSTEM CHECK.

HIGH BEAM HEADLIGHTS INOPERATIVE

1) Perform HEADLIGHTS SYSTEM CHECK. Go to next step.

2) Using test light, backprobe between headlight dimmer switch 48-pin connector C202, terminal C4 (Red wire) and ground. Connector C202 is located at base of steering column. If test light does not illuminate, go to step 6). If test light illuminates, go to next step.

3) If vehicle is equipped with lamp monitoring, go to next step. If vehicle is not equipped with lamp monitoring, go to step 7).

4) Disconnect adaptive lamp monitor control module connectors C1 and C2. Connect a fused jumper wire between adaptive lamp monitor control module harness connectors C2, terminal "A" (Light Green wire) and connector C1, terminal "R" (Light Green wire). Turn high beams on. If high beams turn on, go to next step. See Fig. 3. If high beams do not turn on, go to step 9).

5) Replace adaptive lamp monitor control module. Perform HEADLIGHTS SYSTEM CHECK.

6) Repair open or short to ground in circuit No. 242 (Red wire) between headlight dimmer switch and splice S201. Perform HEADLIGHTS SYSTEM CHECK.

7) Check for open or short to ground in circuit No. 11 (Light Green wire) between headlight dimmer switch and splice S245. If circuit is okay, go to next step. If circuit is not okay, go to step 11).

8) Replace headlight dimmer switch. See STEERING COLUMN SWITCHES article. Perform DIAGNOSTIC SYSTEM CHECK.

9) Check for open or short to ground in circuit No. 11 (Light Green wire) between headlight dimmer switch and adaptive lamp monitor control module. If circuit is okay, go to next step. If circuit is not okay, go to step 11).

10) Check for open or short to ground in circuit No. 1311 (Light Green wire) between adaptive lamp monitor control module and splice S259. If circuit is okay, go to step 8). If circuit is not okay, go to next step.

11) Repair open or short to ground in appropriate wire. Perform HEADLIGHTS SYSTEM CHECK.

DAYTIME RUNNING LIGHTS (DRL) INOPERATIVE

1) Perform HEADLIGHTS SYSTEM CHECK. Go to next step.

2) Disconnect Lamp Control Module (LCM) 16-pin connector C2 (Black). Cover ambient light sensor. Using DVOM, measure resistance

between LCM harness connector C2, terminal A2 (White wire) and ground. If resistance is greater than 31 k/ohms, go to next step. If resistance is less than 31 k/ohms, go to step 11).

3) Expose ambient light sensor to a bright incandescent light. Check resistance between LCM harness connector C2, terminal A2 (White wire) and ground. If resistance is less than 23 k/ohms, go to next step. If resistance is greater than 23 k/ohms, go to step 11).

4) Disconnect LCM 6-pin harness connector C1 (Black). Using DVOM, check voltage between LCM harness connector C1, terminal "C" (Pink wire) and ground. If 10-15 volts exists, go to step 3). If 10-15 volts does not exist, go to step 14).

5) Apply parking brake. Turn ignition on. Put gearshift selector in Drive. Check voltage between LCM connector C2, terminal A7 (Light Green wire) and ground. If 10-15 volts exists, go to step 15). If 10-15 volts does not exist, go to next step.

6) Connect a fused jumper wire between LCM harness connector C1, terminals "E" (Red wire) and "G" (Gray wire). If low beam headlights turn on at reduced intensity, go to step 10). If low beam headlights do not turn on at reduced intensity, go to next step.

7) Check for open or short to ground in circuit No. 589 (Gray wire) between LCM connector C1 and DRL resistor (located in left front corner of engine compartment). If circuit is okay, go to next step. If circuit is not okay, go to step 18).

8) Check for open in circuit No. 12 (Tan wire) between DRL resistor and adaptive lamp monitor control module (if equipped) and low beam headlights. If circuit is okay, go to next step. If circuit is not okay, go to step 18).

9) Replace DRL resistor. Perform HEADLIGHTS SYSTEM CHECK.

10) Replace LCM. See LAMP CONTROL MODULE (LCM) under REMOVAL & INSTALLATION. Perform HEADLIGHTS SYSTEM CHECK.

11) Check for short to ground or open in circuit No. 278 (White wire) between LCM connector C2 and ambient light sensor. If circuit is okay, go to next step. If circuit is not okay, go to step 18).

12) Check for open in circuit No. 251 (Black/White wire) between ambient light sensor and ground. If circuit is okay, go to next step. If circuit is not okay, go to step 18).

13) Replace ambient light sensor. See AMBIENT LIGHT SENSOR under REMOVAL & INSTALLATION. Perform HEADLIGHTS SYSTEM CHECK.

14) Repair open or short to ground in circuit No. 3 (Pink wire) between LCM connector C1 and splice S205. Perform HEADLIGHTS SYSTEM CHECK.

15) Disconnect Park/Neutral Position (PNP) switch from top left side of transaxle. If DRL turn on, go to step 17). If DRL do not turn on, go to next step.

16) Repair short to power in circuit No. 275 (Light Green wire) between LCM connector C2 and PNP switch. Perform HEADLIGHTS SYSTEM CHECK.

17) Replace PNP switch. Perform HEADLIGHTS SYSTEM CHECK.

18) Repair open or short to ground in appropriate circuit. Perform HEADLIGHTS SYSTEM CHECK.

TWILIGHT SENTINEL INOPERATIVE

1) Perform HEADLIGHTS SYSTEM CHECK. Go to next step.

2) Disconnect Lamp Control Module (LCM) 6-pin harness connector C1 (Black). Using DVOM, check voltage between LCM harness connector C1, terminal "C" (Pink wire) and ground. Turn ignition switch to RUN position. If 10-15 volts exists, go to next step. If 10-15 volts does not exist, go to step 8).

3) Turn ignition switch to OFF position. Disconnect LCM 16-pin connector C2 (Black). Turn twilight sentinel on. Using DVOM, check resistance between LCM harness connector C2, terminals B8

(Yellow/Black wire) and ground. If resistance is less than 5 ohms, go to next step. If resistance is greater than 5 ohms, go to step 9).

4) While varying twilight delay control from MIN to MAX, check resistance between LCM harness connector C2, terminals A1 (Purple wire) and ground. If resistance is 3.5-200 k/ohms, go to next step. If resistance is not 3.5-200 k/ohms, go to step 10).

5) Cover ambient light sensor. Check resistance between LCM harness connector C2, terminal A2 (White wire) and ground. If resistance is greater than 31 k/ohms, go to next step. If resistance is less than 31 k/ohms, go to step 13).

6) Expose ambient light sensor to a bright incandescent light. Check resistance between LCM harness connector C2, terminal A2 (White wire) and ground. If resistance is less than 23 k/ohms, go to next step. If resistance is greater than 23 k/ohms, go to step 13).

7) Replace LCM. See LAMP CONTROL MODULE (LCM) under REMOVAL & INSTALLATION. Perform HEADLIGHTS SYSTEM CHECK.

8) Repair open or short to ground in circuit No. 3 (Pink wire) between LCM connector C1 and splice S205. Perform procedures in HEADLIGHTS SYSTEM CHECK.

9) Check for open in circuit No. 1784 (Yellow/Black wire) between LCM connector C2 and headlight switch. If circuit is okay, go to step 11). If circuit is not okay, go to step 16).

10) Check for open in circuit No. 1783 (Purple wire) between LCM connector C2 and headlight switch. If circuit is okay, go to next step. If circuit is not okay, go to step 16).

11) Check for open in circuit No. 251 (Black/White or Black wire) between headlight switch and ground. If circuit is okay, go to next step. If circuit is not okay, go to step 16).

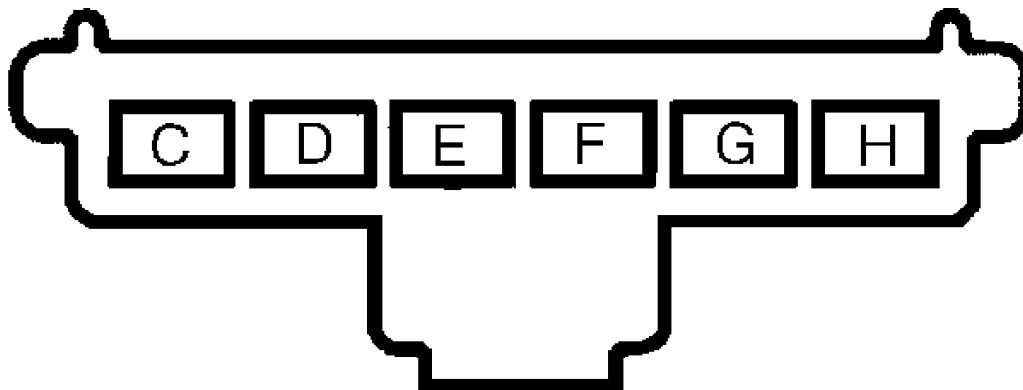
12) Replace headlight switch. Perform HEADLIGHTS SYSTEM CHECK

13) Check for open or short to ground in circuit No. 278 (White wire) between LCM connector C2 and ambient light sensor. If circuit is okay, go to next step. If circuit is not okay, go to step 16).

14) Check for open in circuit No. 251 (Black/White or Black wire) between ambient light sensor and ground. If circuit is okay, go to next step. If circuit is not okay, go to step 16).

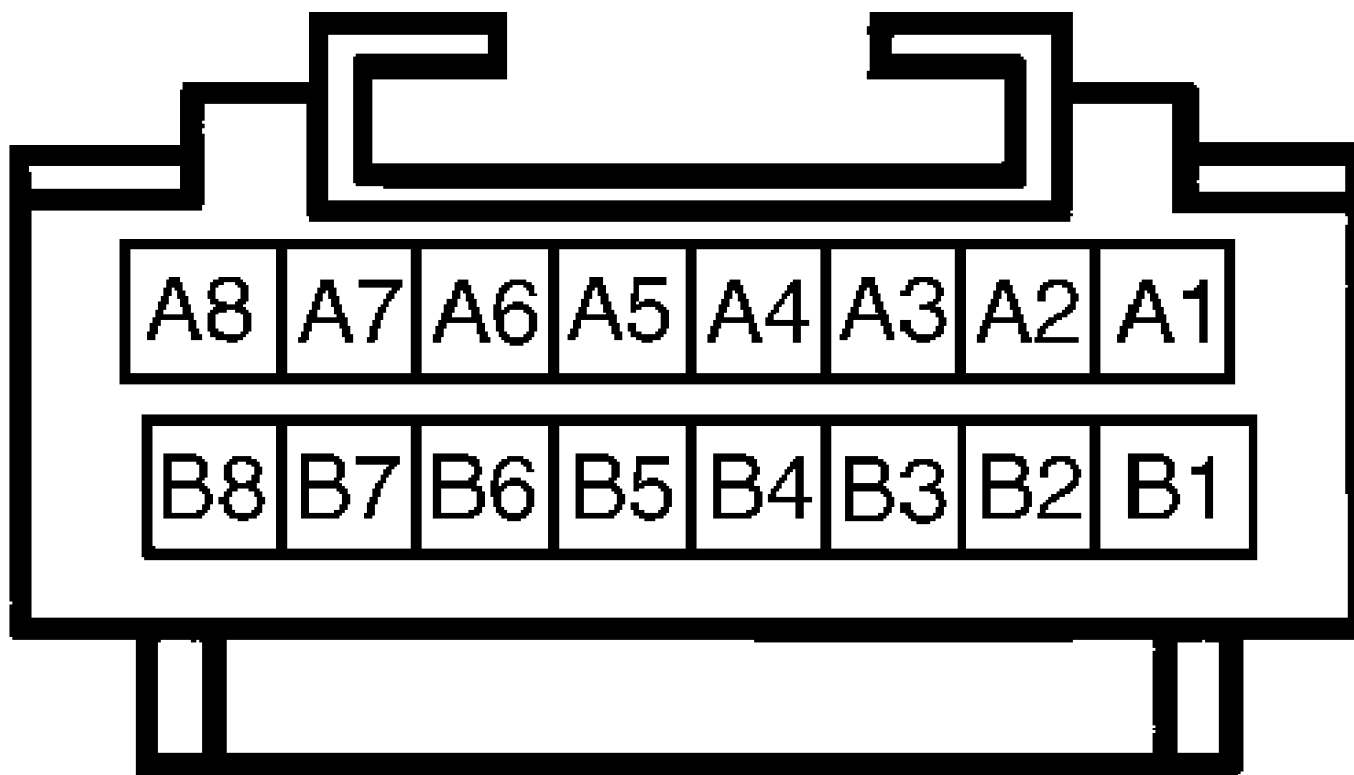
15) Replace ambient light sensor. See AMBIENT LIGHT SENSOR under REMOVAL & INSTALLATION. Perform HEADLIGHTS SYSTEM CHECK.

16) Repair open or short to ground in appropriate circuit. Perform HEADLIGHTS SYSTEM CHECK.



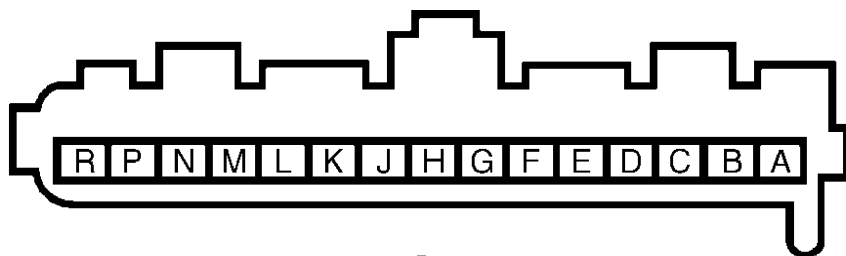
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Fig. 1: Identifying Lamp Control Module Connector C1
Courtesy of General Motors Corp.

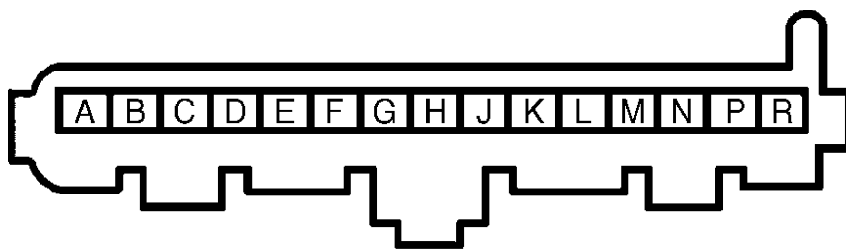


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Fig. 2: Identifying Lamp Control Module Connector C2
 Courtesy of General Motors Corp.



C1



C2

98B01745

Fig. 3: Identifying Adaptive Lamp Monitor Control Module Connectors
 C1 & C2
 Courtesy of General Motors Corp.

REMOVAL & INSTALLATION

*** PLEASE READ THIS FIRST ***

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

LAMP CONTROL MODULE (LCM)

Removal & Installation

Disconnect negative battery cable. Remove left and right sound insulators. While pressing down on lock tab, slide LCM left from retainer. Disconnect electrical connectors. Remove LCM from vehicle. To install, reverse removal procedure.

AMBIENT LIGHT SENSOR

Removal & Installation

Ambient light sensor is mounted in defroster grille. Unsnap defroster grille. Twist photocell counterclockwise to disengage photocell and socket. Disconnect electrical connector. To install, reverse removal procedure.

WIRING DIAGRAMS

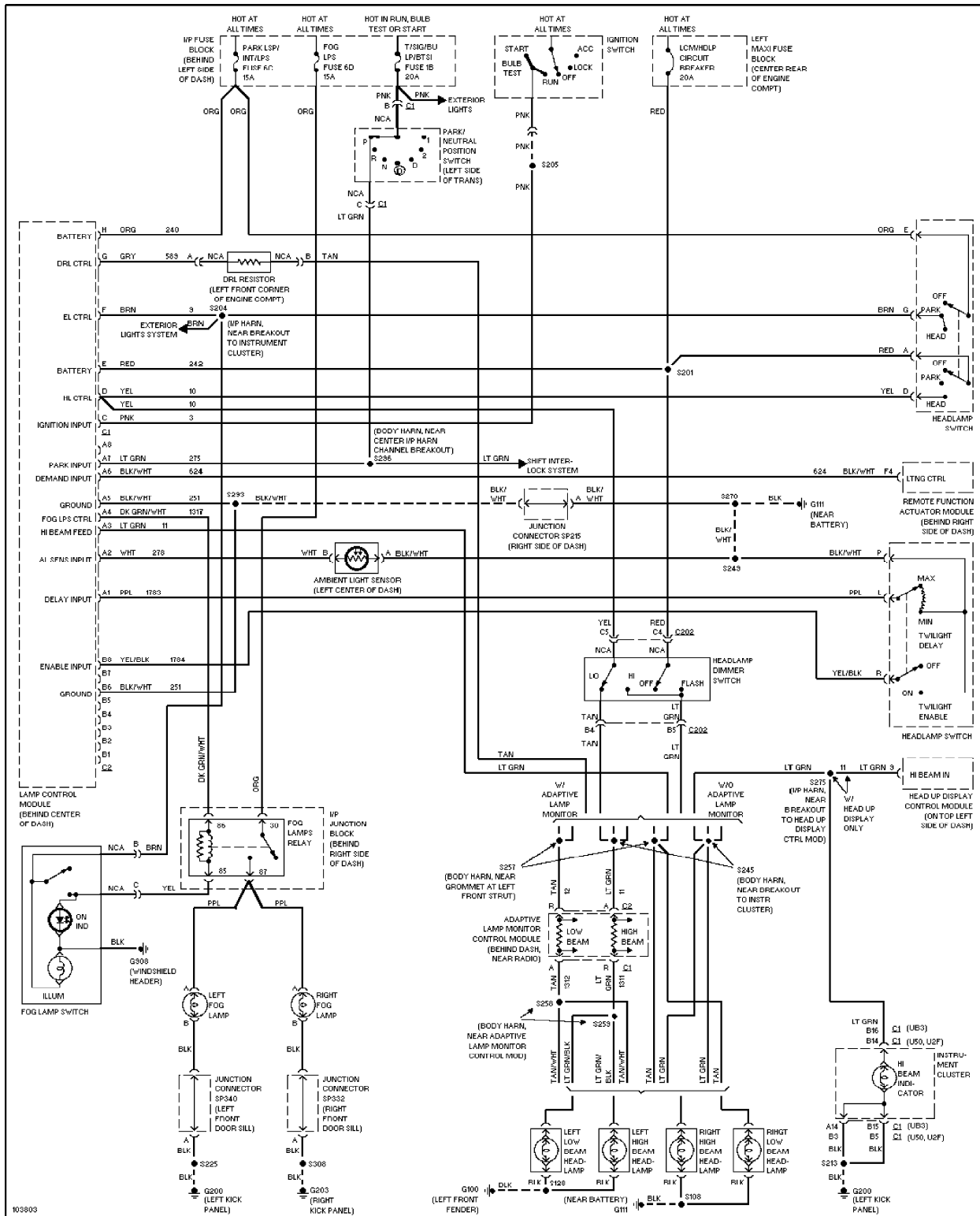


Fig. 4: Headlight System And Daytime Running Lights Wiring Diagram

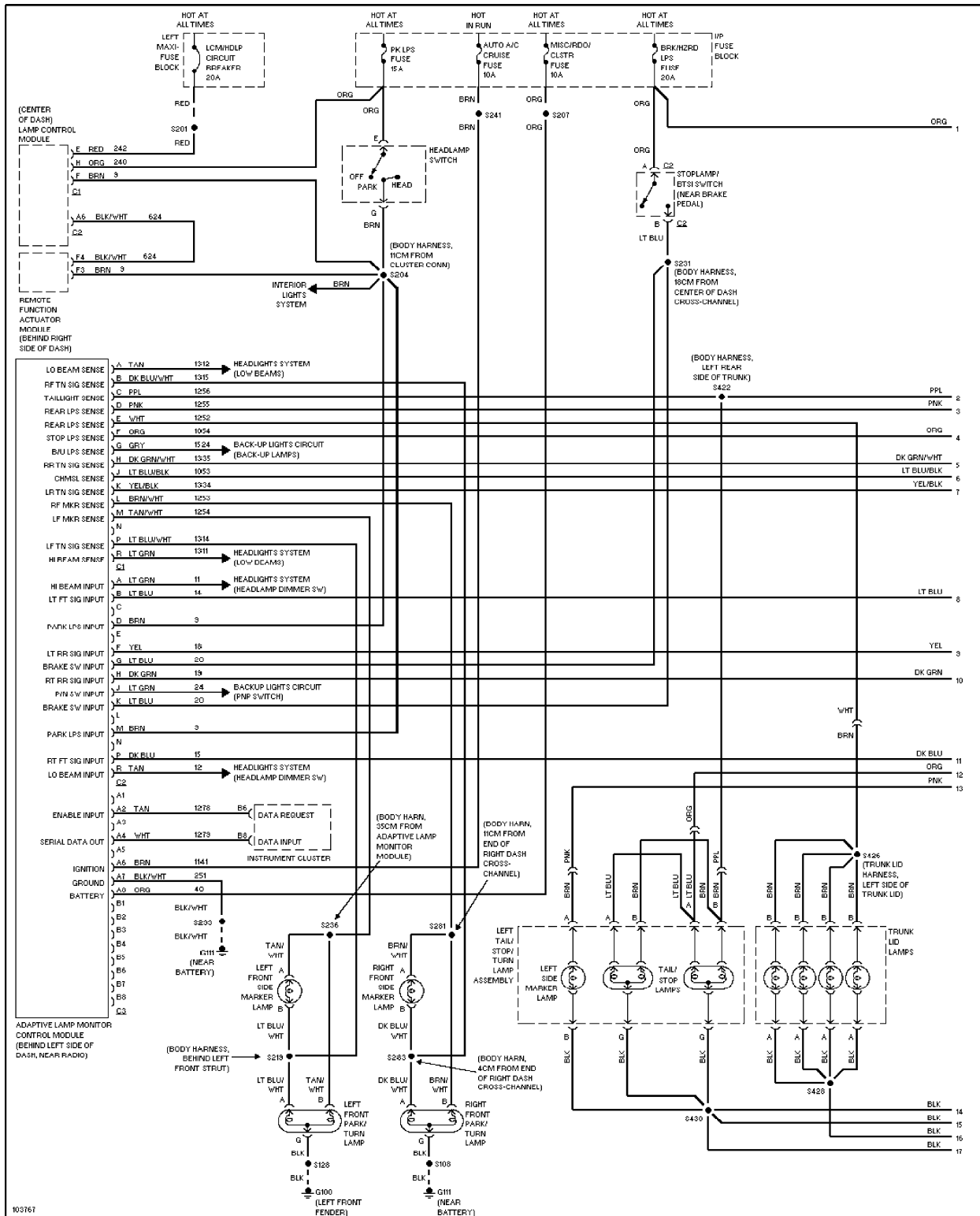


Fig. 5: Exterior Lights Wiring Diagram (With Lamp Monitor - 1 Of 2)

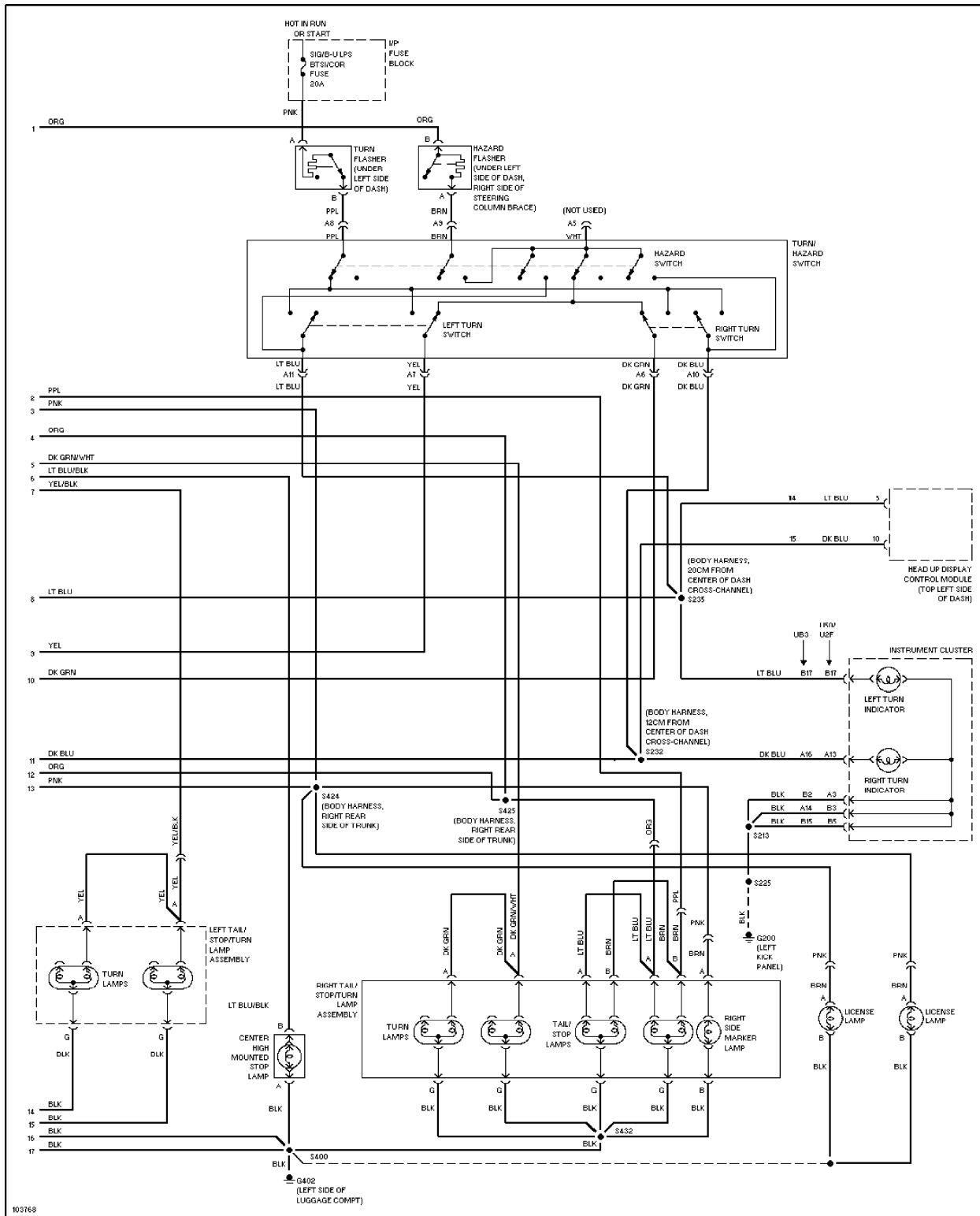


Fig. 6: Exterior Lights Wiring Diagram (With Lamp Monitor - 2 Of 2)

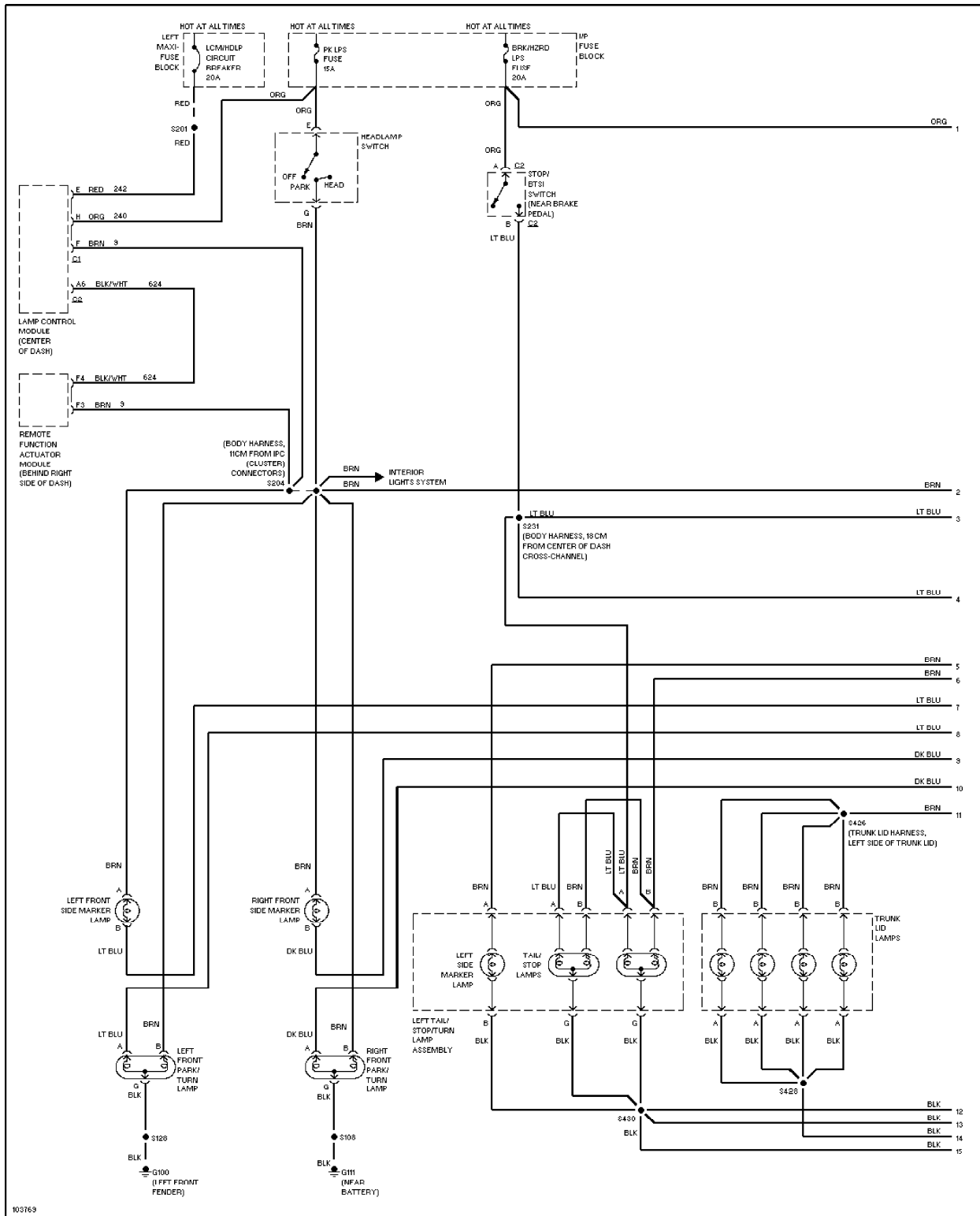


Fig. 7: Exterior Lights Wiring Diagram (W/out Lamp Monitor - 1 Of 2)

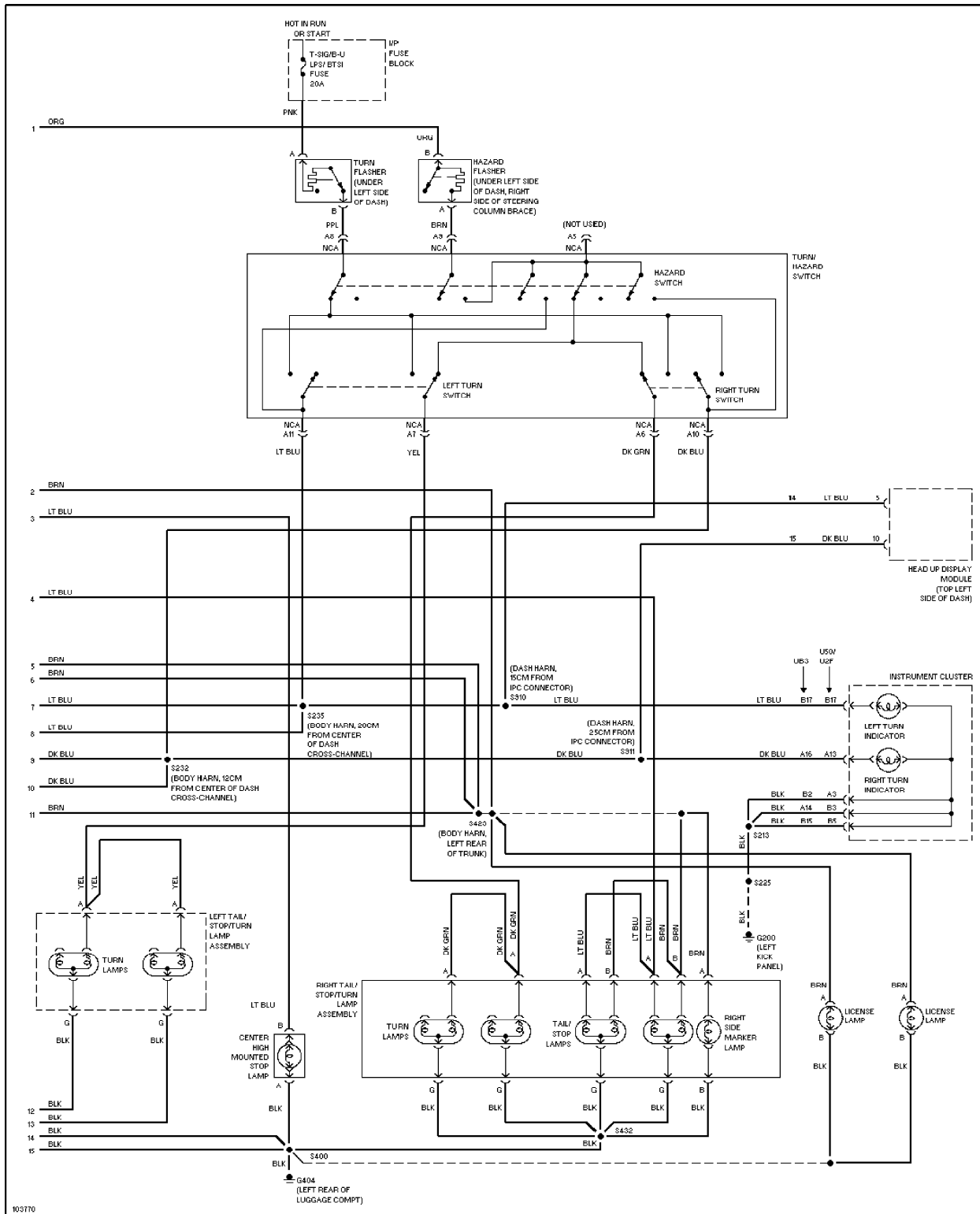


Fig. 8: Exterior Lights Wiring Diagram (W/out Lamp Monitor - 2 Of 2)