

ACCESSORIES & EQUIPMENT

Lighting - Corvette

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Headlamp Bolt	2.5 N.m	22 lb in
High Mount Stop Lamp Bolt	2.5 N.m	22 lb in
Rear Fascia Lower Signal Lamp Bolt	2.5 N.m	22 lb in

SCHEMATIC WIRING DIAGRAMS

HEADLIGHTS/DAYTIME RUNNING LIGHTS (DRL) WIRING SCHEMATICS

Controls and Indicators Wiring Schematics

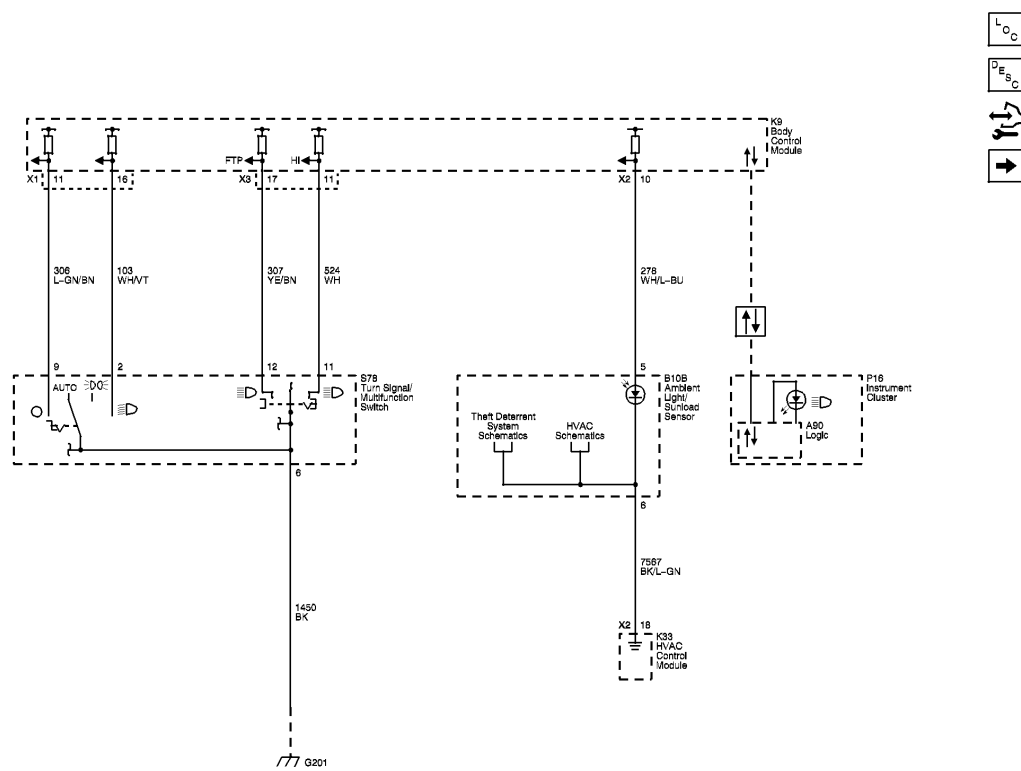


Fig. 1: Controls and Indicators Wiring Schematics

Courtesy of GENERAL MOTORS COMPANY

Headlights Wiring Schematics

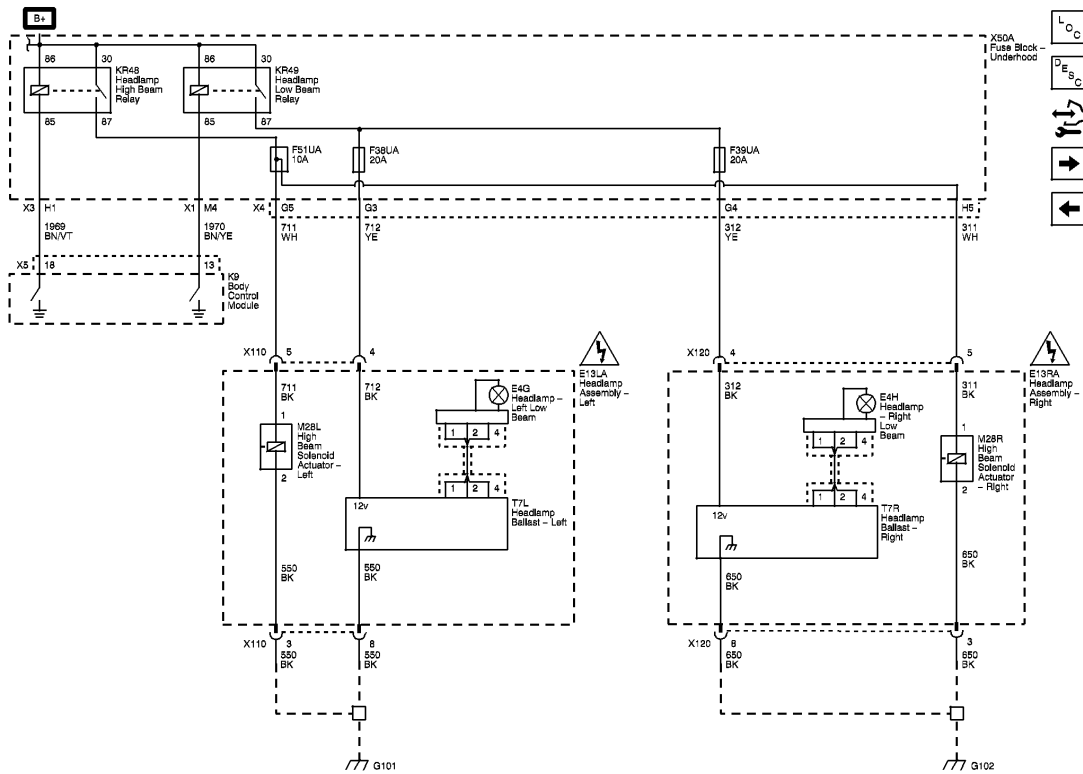


Fig. 2: Headlights Wiring Schematics
Courtesy of GENERAL MOTORS COMPANY

Daytime Running Lights Wiring Schematics

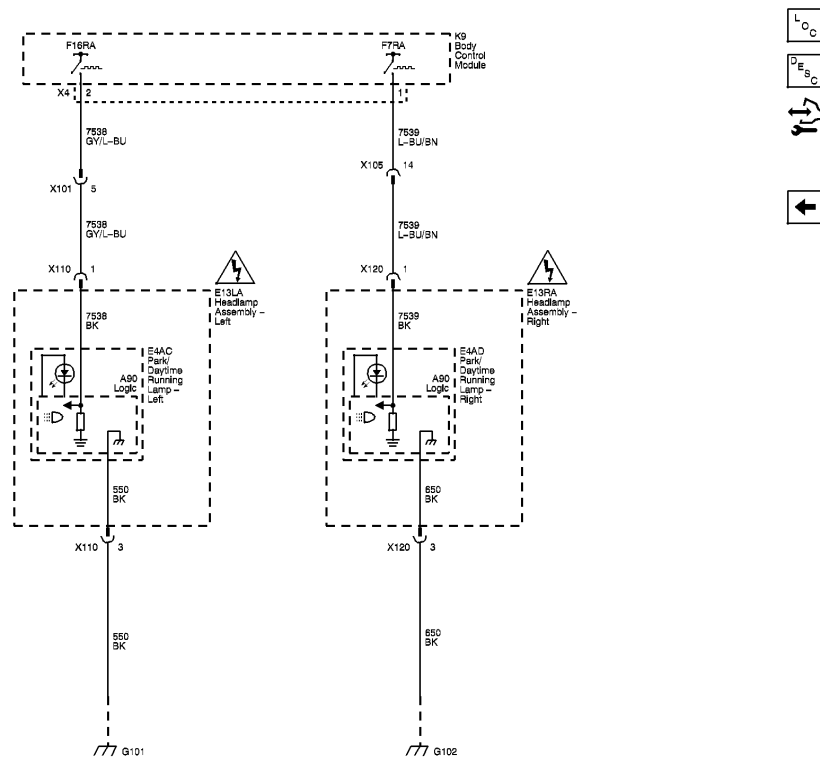


Fig. 3: Daytime Running Lights Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

FOG LIGHTS WIRING SCHEMATICS

Rear Fog Lamps (T79) Wiring Schematics

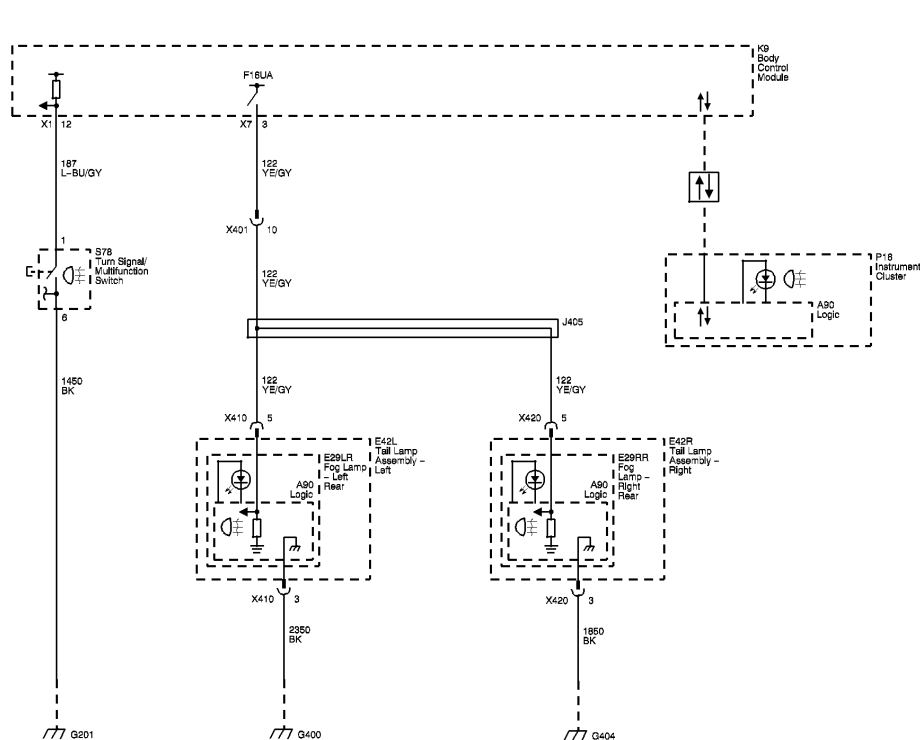


Fig. 4: Rear Fog Lamps (T79) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

EXTERIOR LIGHTS WIRING SCHEMATICS

Controls and Indicators Wiring Schematics

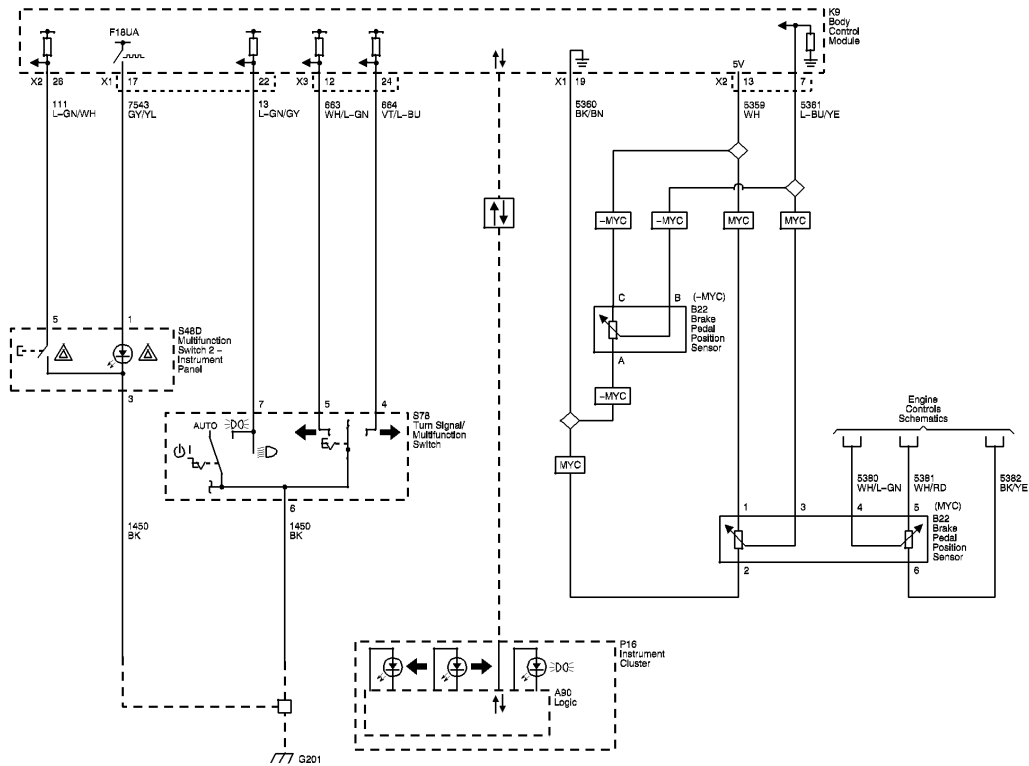


Fig. 5: Controls and Indicators Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Left Park/Tail Lamps Wiring Schematics

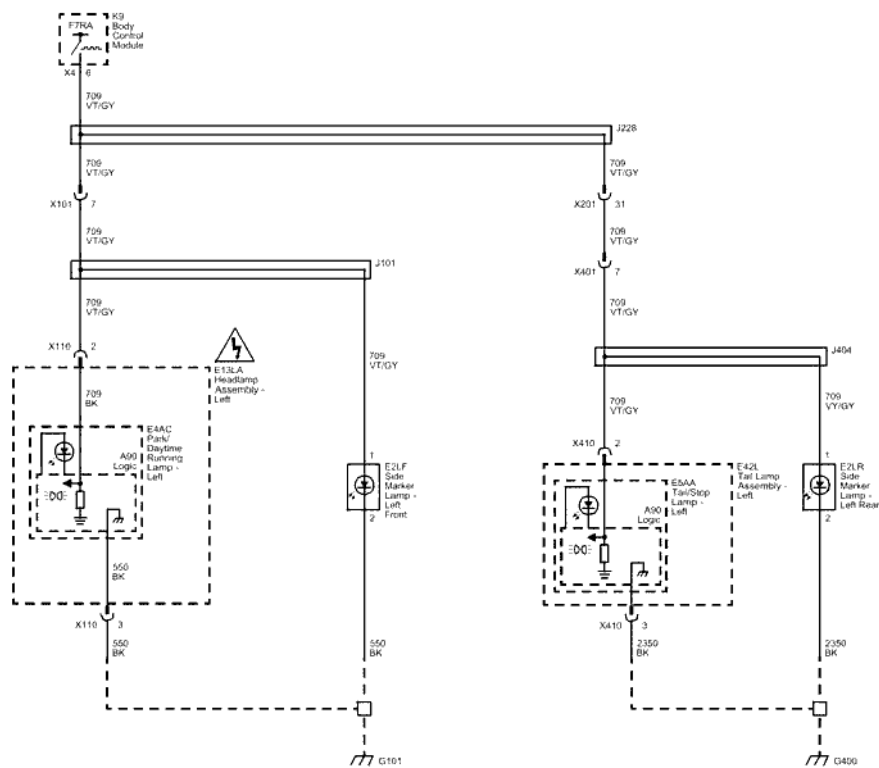


Fig. 6: Left Park/Tail Lamps Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Right Park/Tail Lamps Wiring Schematics

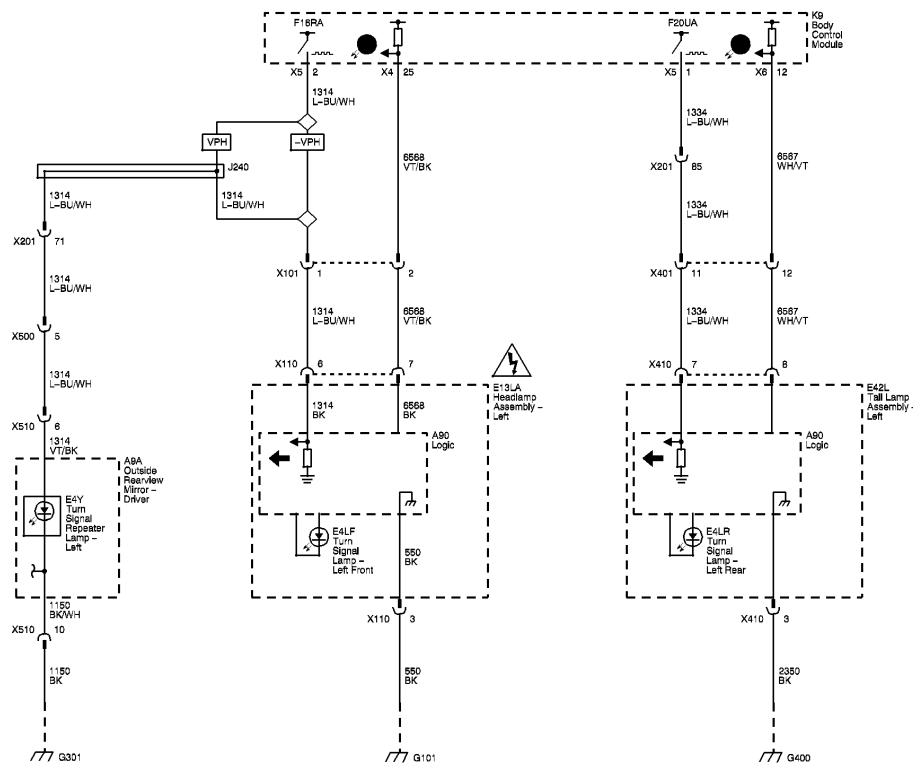


Fig. 8: Left Turn Signal Lamps Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Right Turn Signal Lamps Wiring Schematics

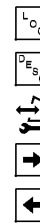
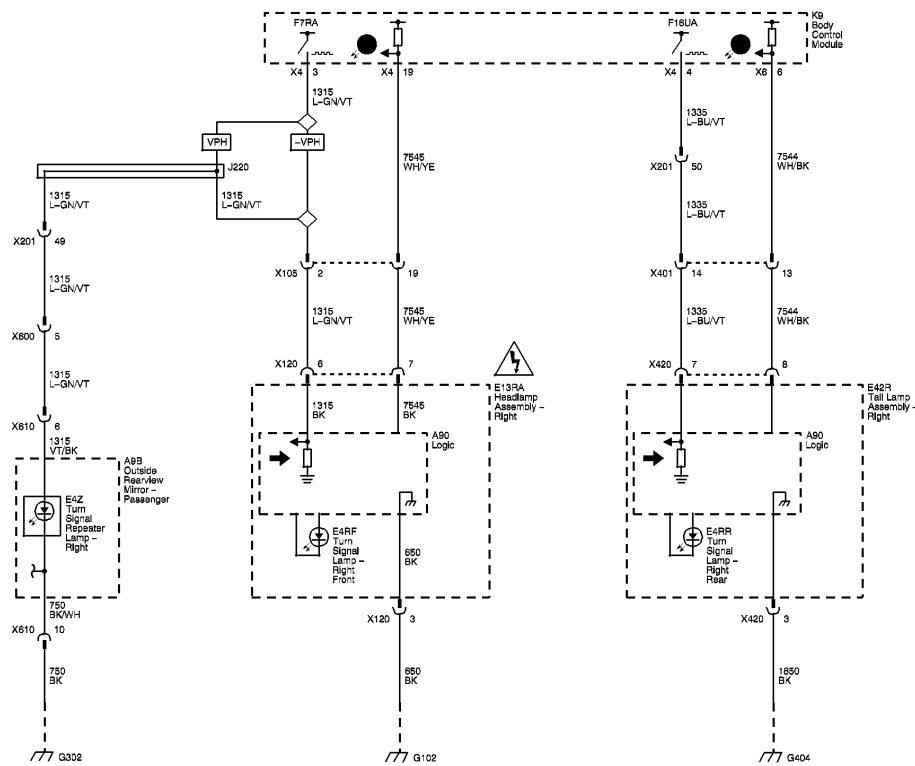


Fig. 9: Right Turn Signal Lamps Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Stop Lamps Wiring Schematics

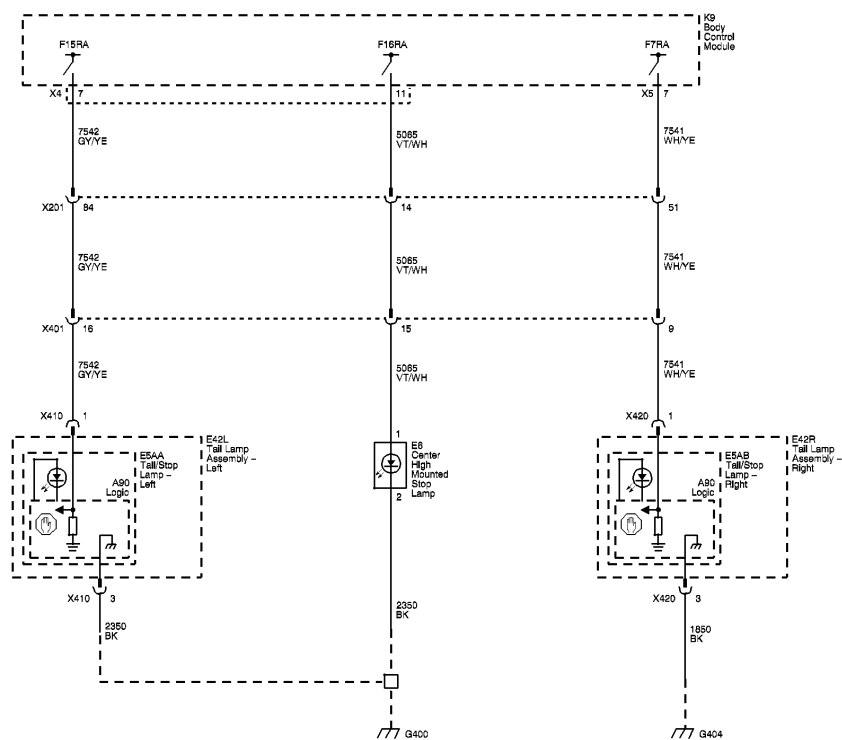


Fig. 10: Stop Lamps Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Backup and License Lamps Wiring Schematics

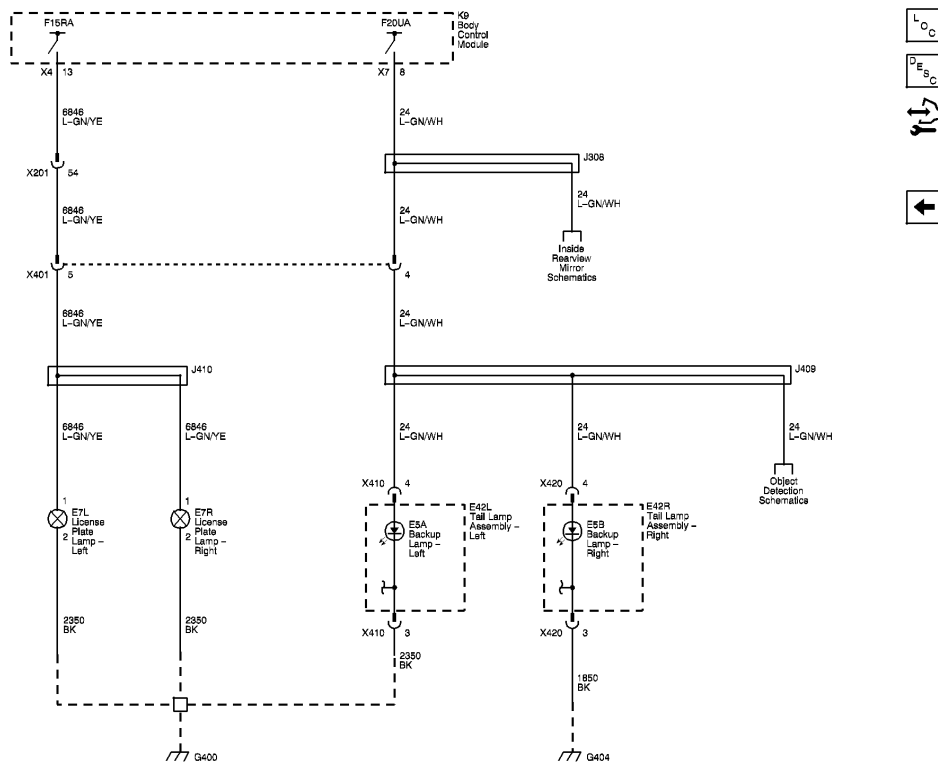


Fig. 11: Backup and License Lamps Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS WIRING SCHEMATICS

Controls and Rear Courtesy Lamps Wiring Schematics

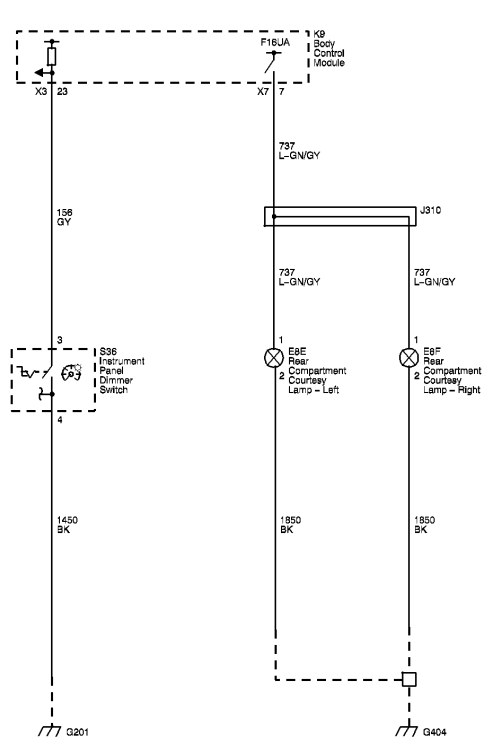


Fig. 12: Controls and Rear Courtesy Lamps Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Courtesy and Overhead Lamps Wiring Schematics

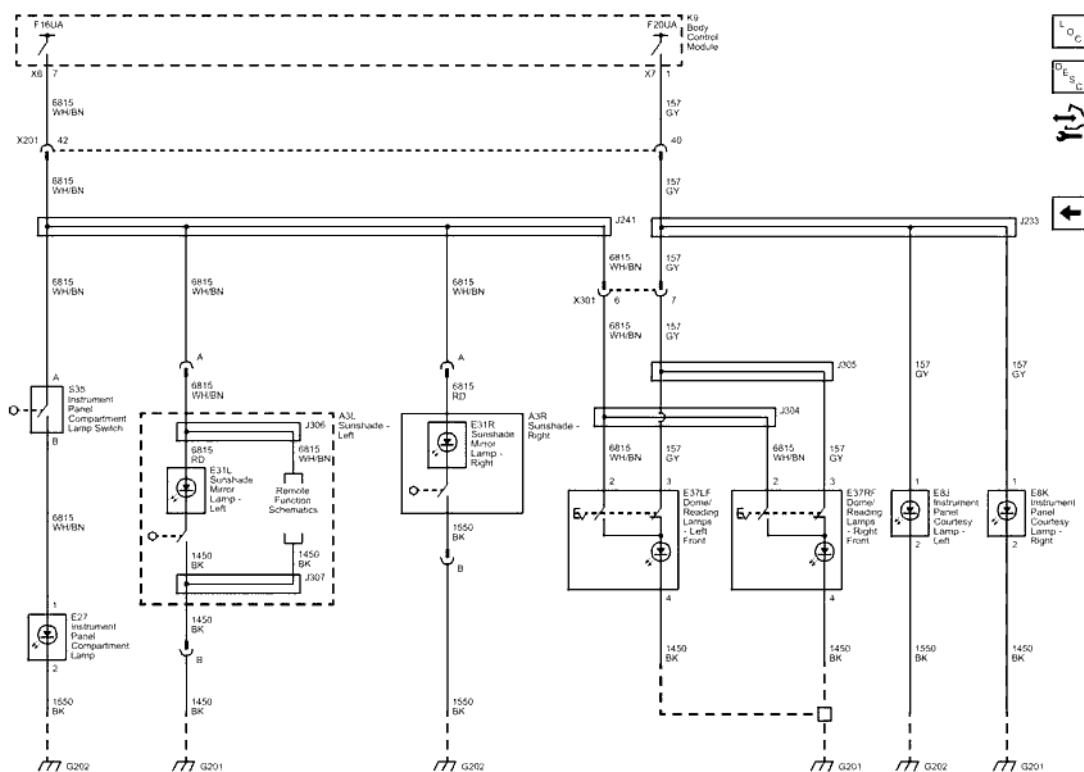


Fig. 13: Courtesy and Overhead Lamps Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

INTERIOR LIGHTS DIMMING WIRING SCHEMATICS

Controls and Instrument Panel Switches Wiring Schematics

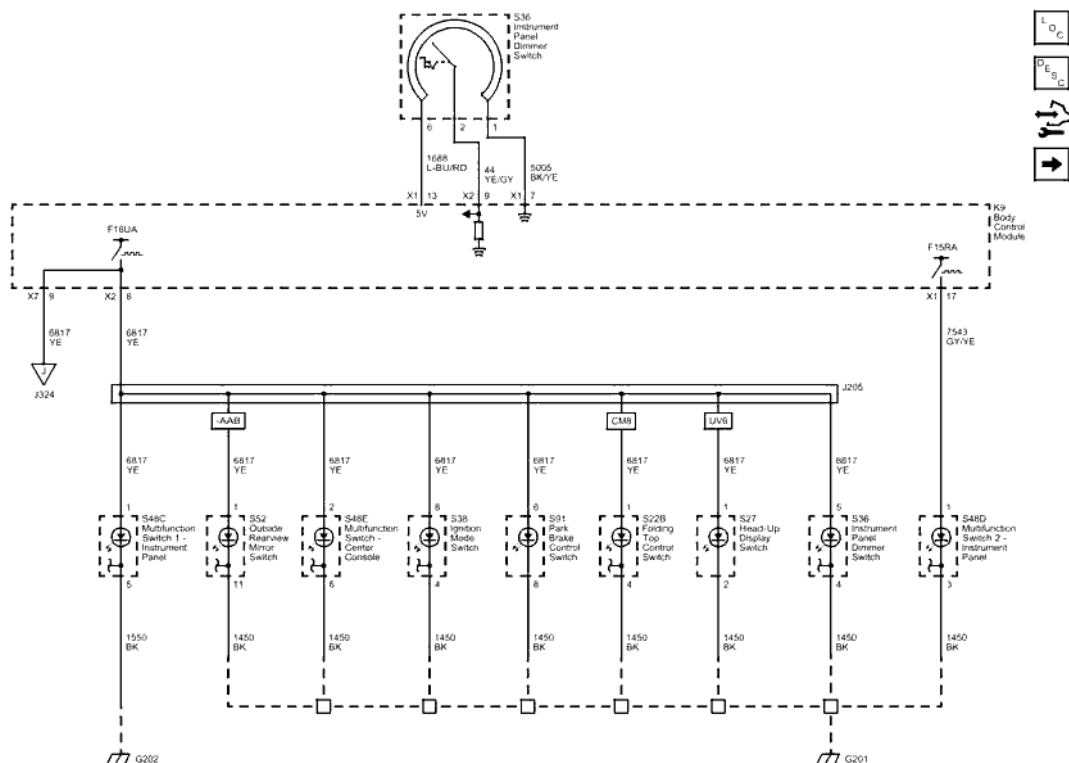


Fig. 14: Controls and Instrument Panel Switches Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Door Switches Wiring Schematics

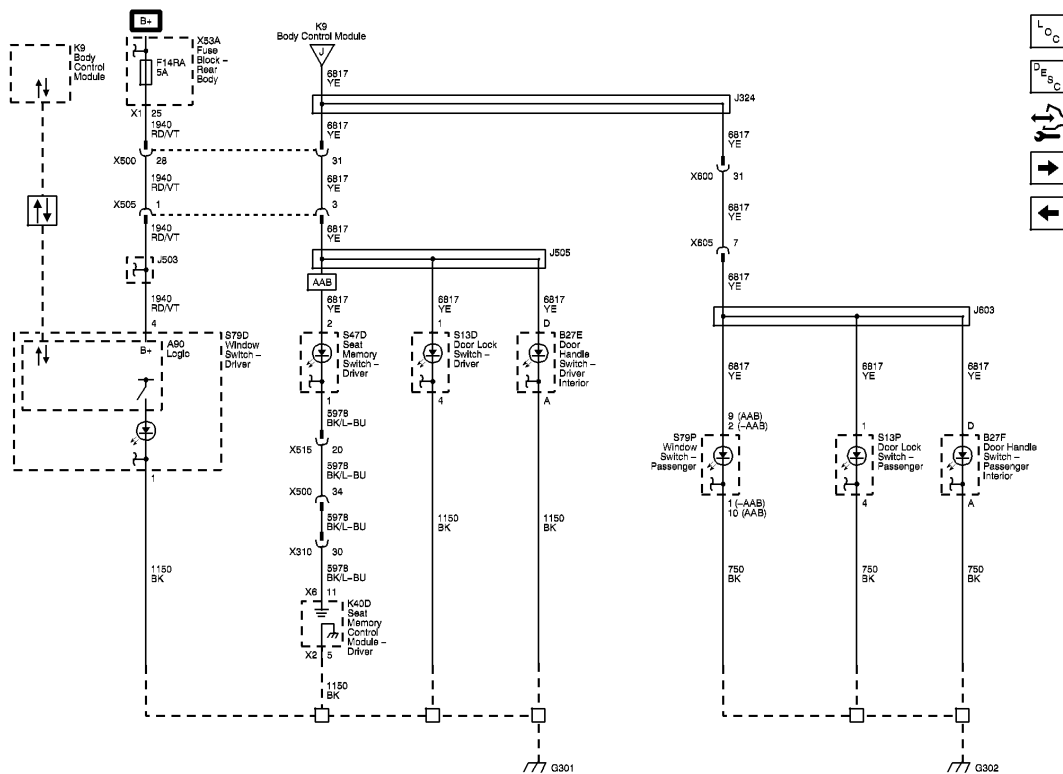


Fig. 15: Door Switches Wiring Schematic
Courtesy of GENERAL MOTORS COMPANY

Steering Wheel Switches Wiring Schematics

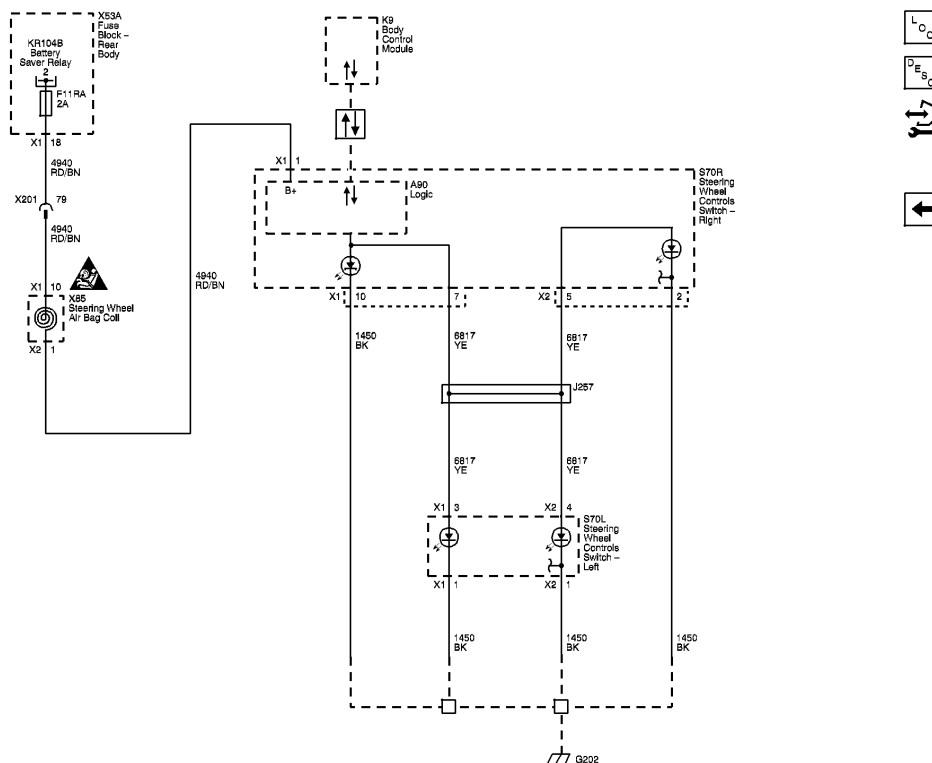


Fig. 16: Steering Wheel Switches Wiring Schematic
 Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
<u>DTC B1395</u>	DTC B1395 03 Control Module Voltage Reference Output 1 Circuit Low Voltage DTC B1395 07 Control Module Voltage Reference Output 1 Circuit High Voltage
<u>DTC B1480</u>	DTC B1480 02 Battery Rundown Protection Circuit Short to Ground
<u>DTC B2540</u>	DTC B2540 02 Rear Fog Lamps Control Circuit Short to Ground DTC B2540 04 Rear Fog Lamps Control Circuit Open
<u>DTC B2545</u>	DTC B2545 01 Backup Lamps Circuit Short to Battery DTC B2545 02 Backup Lamps Circuit Short to

	DTC B2545 04 Backup Lamps Circuit Open
<u>DTC B2570</u>	DTC B2570 02 Trunk Lamp Control Circuit Short to Ground DTC B2570 04 Trunk Lamp Control Circuit Open
<u>DTC B257A</u>	DTC B257A 00 Headlamp Switch Input Signals Correlation Malfunction
<u>DTC B2580</u>	DTC B2580 01 Headlamp High Beam Control Circuit Short to Battery DTC B2580 02 Headlamp High Beam Control Circuit Short to Ground DTC B2580 04 Headlamp High Beam Control Circuit Open
<u>DTC B2585 or B3867</u>	DTC B2585 01 Left Park Lamps Control Circuit Short to Battery DTC B2585 02 Left Park Lamps Control Circuit Short to Ground DTC B2585 04 Left Park Lamps Control Circuit Open DTC B3867 01 Right Park Lamps Control Circuit Short to Battery DTC B3867 02 Right Park Lamps Control Circuit Short to Ground DTC B3867 04 Right Park Lamps Control Circuit Open
<u>DTC B258A</u>	DTC B258A 01 Low Beam Control Circuit Short to Battery DTC B258A 02 Low Beam Control Circuit Short to Ground DTC B258A 04 Low Beam Control Circuit Open
<u>DTC B2600 or B2605</u>	DTC B2600 01 Left Daytime Running Lamps Control Circuit short to Battery DTC B2600 02 Left Daytime Running Lamps Control Circuit Short to Ground DTC B2600 04 Left Daytime Running Lamps Control Circuit Open DTC B2605 01 Right Daytime Running Lamps Control Circuit short to Battery DTC B2605 02 Right Daytime Running Lamps Control Circuit Short to Ground DTC B2605 04 Right Daytime Running Lamps Control Circuit Open
<u>DTC B2610</u>	DTC B2610 02 Passenger Compartment Dimming 1 Circuit Short to Ground DTC B2610 04 Passenger Compartment Dimming 1 Circuit Open

<u>DTC B2615</u>	Dimming 2 Circuit Short to Ground DTC B2615 04 Passenger Compartment Dimming 2 Circuit Open
<u>DTC B2625</u>	DTC B2625 01 Display Dimming Pulse Width Modulation Output Circuit Short to Battery DTC B2625 02 Display Dimming Pulse Width Modulation Output Circuit Short to Ground DTC B2625 04 Display Dimming Pulse Width Modulation Output Circuit Open
<u>DTC B2645</u>	DTC B2645 03 Ambient Light Sensor Circuit Low Voltage DTC B2645 07 Ambient Light Sensor Circuit High Voltage
<u>DTC B3588</u>	DTC B3588 00 Rear Fog Lamp Switch Circuit Malfunction
<u>DTC B3596</u>	DTC B3596 00 Hazard Lamps Request Circuit Malfunction
<u>DTC B3600</u>	DTC B3600 03 Control Module Voltage Reference Output 1 Circuit Low Voltage DTC B3600 07 Control Module Voltage Reference Output 1 Circuit High Voltage
<u>DTC B3650</u>	DTC B3650 08 High Beam Request Signal Circuit Performance - Signal Invalid
<u>DTC B3806</u>	DTC B3806 00 High Beam and Headlamp Flash Select Circuit Malfunction
<u>DTC B3881 or B3882</u>	DTC B3881 02 Tail Lamp Circuit Short to Ground DTC B3882 02 Right Tail Lamp Circuit Short to Ground
<u>DTC B3883</u>	DTC B3883 01 License Plate Lamp Circuit Short to Battery DTC B3883 02 License Plate Lamp Circuit Short to Ground DTC B3883 04 License Plate Lamp Circuit Open
<u>DTC B3884</u>	DTC B3884 02 Center High Mounted Brake Lamp Circuit Short to Ground
<u>DTC B3948 or B3949</u>	DTC B3948 01 Left Front Turn Signal Circuit Short to Battery DTC B3948 02 Left Front Turn Signal Circuit Short to Ground DTC B3948 04 Left Front Turn Signal Circuit Open DTC B3949 01 Right Front Turn Signal Circuit Short to Battery DTC B3949 02 Right Front Turn Signal Circuit Short to Ground

	Open
<u>DTC B3950 or B3951</u>	DTC B3950 01 Left Rear Turn Signal Circuit Short to Battery DTC B3950 02 Left Rear Turn Signal Circuit Short to Ground DTC B3950 04 Left Rear Turn Signal Circuit Open DTC B3951 01 Right Rear Turn Signal Circuit Short to Battery DTC B3951 02 Right Rear Turn Signal Circuit Short to Ground DTC B3951 04 Right Rear Turn Signal Circuit Open
<u>DTC C0277 or C0890</u>	DTC C0277 06 Brake Pedal Position Sensor Circuit Low Voltage/Open DTC C0277 07 Brake Pedal Position Sensor Circuit High Voltage DTC C0277 09 Brake Pedal Position Sensor Circuit Too Fast Transitions DTC C0277 4B Brake Pedal Position Sensor Circuit Calibration Not Learned DTC C0890 03 Control Module Voltage Reference Output 3 Circuit Low Voltage DTC C0890 07 Control Module Voltage Reference Output 3 Circuit High Voltage
<u>DTC C0297</u>	DTC C0297 02 Brake Applied Output Circuit Short to Ground

DTC B1395: CONTROL MODULE VOLTAGE REFERENCE

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B1395 03

Control Module Voltage Reference Output 1 Circuit Low Voltage

DTC B1395 07

Control Module Voltage Reference Output 1 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+ Reference	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Signal	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	1	-
LED Backlight Dimming Control Terminal 9 X7	1	1	1	-
Switch Indicator LED Backlight Dimming Control Terminal 17 X1	B2625 02	B2625 04	B2625 01	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal and B+ voltage reference to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming 1 and dimming 2 control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park Lamps ON.

Conditions for Setting the DTC

DTC B1395 03

The BCM detects a short to ground or an open/high resistance in the instrument panel dimmer switch B+ reference circuit.

DTC B1395 07

The BCM detects a short to voltage in the instrument panel dimmer switch B+ reference circuit.

Actions Taken When the DTC Sets

The BCM will not dim any interior backlighting. All interior backlighting will default to the level selected prior to the fault being present.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S36 Instrument Panel Dimmer Switch, ignition ON.
2. Test for B+ between the B+ circuit terminal 6 and ground.
 - **If less than B+**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 -

3. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If B+**
3. Verify a test lamp illuminates between the B+ circuit terminal 6 and the low reference circuit terminal 1.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the low reference circuit terminal 1 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
 - 4. Verify a test lamp does not illuminate between the B+ circuit terminal 6 and the signal circuit terminal 2.
 - **If the test lamp illuminates**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp does not illuminate**
 - 5. Test for B+ between the B+ circuit terminal 6 and the signal circuit terminal 2.
 - **If less than B+**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 2 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If B+**
 - 6. Test or replace the S36 Instrument Panel Dimmer Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Dimmer Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B1480: BATTERY RUNDOWN PROTECTION CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1480 02

Battery Rundown Protection Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Courtesy Lamps Control - Terminal 7 X6	B1480 02	1	1	-
Dome Lamps Control - Terminal 1 X7	B2615 02	B2615 04	2	-
Dome/Reading Lamps - Left Front Ground	-	1, 2	-	-
Dome/Reading Lamps - Right Front Ground	-	1, 2	-	-
Instrument Panel Compartment Lamp Ground	-	1	-	-
Instrument Panel Courtesy Lamp - Left Ground	-	2	-	-
Instrument Panel Courtesy Lamp - Right Ground	-	2	-	-
Sunshade Mirror Lamp - Left Ground	-	1	-	-
Sunshade Mirror Lamp - Right Ground	-	1	-	-
1. Courtesy Lamps Malfunction 2. Dome Lamps Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to the reading lamps, left and right sunshade lamps and instrument panel compartment lamp via the courtesy lamp control circuit. When the instrument panel compartment or a sunshade mirror is opened, the switch contacts close allowing battery voltage to flow illuminating the respective lamps. The reading lamps are controlled by individual switches that are activated by the occupants when additional cabin lighting is required. In the event that any of these courtesy lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the courtesy lamps control circuit terminal 7 X6.

Actions Taken When the DTC Sets

The BCM will disable the circuit and all lamps controlled by the courtesy lamps control circuit will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Interior Lights Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connectors at the components listed below.
 - E27 Instrument Panel Compartment Lamp
 - A3L Sunshade - Left
 - A3R Sunshade - Right
 - E37LF Dome/Reading Lamps - Left Front
 - E37RF Dome/Reading Lamps - Right Front
2. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - E27 Instrument Panel Compartment Lamp - terminal 1
 - A3L Sunshade - Left terminal A
 - A3R Sunshade - Right terminal A
 - E37LF Dome/Reading Lamps - Left Front terminal 2
 - E37RF Dome/Reading Lamps - Right Front terminal 2
3. Verify the test lamp turns ON and OFF when commanding the Inadvertent Load ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
4. Test or replace the appropriate courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Sunshade Replacement**
- **Instrument Panel Compartment Lamp Replacement**
- **Center Reading and Courtesy Lamp Lens Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2540: REAR FOG LAMPS CONTROL CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2540 02

Rear Fog Lamps Control Circuit Short to Ground

DTC B2540 04

Rear Fog Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamps Switch Signal	B3588 00	1	1	-
Rear Fog Lamps Control	B2540 02	B2540 04	1	-
Fog Lamp - Left Rear Ground	-	1	-	-
Fog Lamp - Right Rear Ground	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Rear Fog Lamp Malfunction				

Circuit/System Description

The rear fog lamp switch signal circuit is grounded momentarily by pressing the rear fog lamp switch. The body control module (BCM) responds to the rear fog lamp request by applying voltage to the rear fog lamps control circuit which illuminates the rear fog lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Rear fog lamps ON.

Conditions for Setting the DTC

DTC B2540 02

The BCM detects a short to ground in the rear fog lamps control circuit.

DTC B2540 04

The BCM detects an open/high resistance in the rear fog lamps control circuit.

Actions Taken When the DTC Sets

The rear fog lamps will not operate when the park lamps are ON and the rear fog lamp switch is active.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connectors at the components listed below.
 - E42L Tail Lamp Assembly - Left
 - E42R Tail Lamp Assembly - Right
2. Test for less than 5 ohms between each ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the each control circuit terminal 5 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Rear Fog Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2545: BACKUP LAMPS CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2545 01

Backup Lamps Circuit Short to Battery

DTC B2545 02

Backup Lamps Circuit Short to Ground

DTC B2545 04

Backup Lamps Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backup Lamps Control	B2545 02	B2545 01, B2545 04	1	-
Backup Lamp Ground - Left	-	1	-	-
Backup Lamp Ground - Right	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

Automatic Transmission

With the engine running and the transmission in the reverse position, the transmission control module (TCM) sends a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM applies battery voltage to the backup lamps control circuit illuminating the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the TCM via serial data requesting the BCM to remove battery

operate.

Manual Transmission

The engine control module (ECM) provides a signal circuit to the backup lamp switch which is permanently grounded. With the engine running and the transmission in the reverse position, the backup lamp switch signal circuit is pulled low and the ECM responds by sending a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM applies battery voltage to the backup lamps control circuit illuminating the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the ECM via serial data requesting the BCM to remove battery voltage from the backup lamps control circuit. The engine must be running for the backup lamps to operate.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Engine RUNNING.
- Transmission placed in REVERSE gear.

Conditions for Setting the DTC

DTC B2545 01 and B2545 04

The BCM detects an open/high resistance in the backup lamps control circuit.

DTC B2545 02

The BCM detects a short to ground in the backup lamps control circuit.

Actions Taken When the DTC Sets

The backup lamps will not operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- Exterior Lights Schematics
- Body Control System Schematics

Connector End View Reference

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E42 Tail Lamp Assembly.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 4 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module,

ignition ON.

2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2570: TRUNK LAMP CONTROL CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2570 02

Trunk Lamp Control Circuit Short to Ground

DTC B2570 04

Trunk Lamp Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Compartment Courtesy Lamp Control	B2570 02	B2570 04	1	-
Rear Compartment Courtesy Lamp - Left Ground	-	1	-	-
Rear Compartment Courtesy Lamp - Right Ground	-	1	-	-
1. Rear Compartment Lamp Malfunction				

The body control module (BCM) applies battery voltage to the rear compartment courtesy lamps through the rear compartment lamp control circuit. When the BCM receives a rear compartment lid open input from the rear compartment lid latch, the BCM applies battery voltage to the rear compartment lamp control circuit illuminating the rear compartment courtesy lamps. In the event that the rear compartment lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position and no doors opened, the BCM will deactivate the rear compartment lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Rear compartment OPEN.

Conditions for Setting the DTC

DTC B2570 02

The BCM detects a short to ground in the rear compartment courtesy lamp control circuit.

DTC B2570 04

The BCM detects an open/high resistance in the rear compartment courtesy lamp control circuit.

Actions Taken When the DTC Sets

The rear compartment lamps are inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Schematics

Connector End View Reference

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, trunk latch latched, disconnect the harness connectors at the E8E Rear Compartment Courtesy Lamp - Left and E8F Rear Compartment Courtesy Lamp - Right. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between each ground circuit terminal 2 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between each control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Trunk Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E8 rear compartment courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear Compartment Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B257A: HEADLAMP SWITCH INPUT SIGNALS CORRELATION MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B257A 00

Headlamp Switch Input Signals Correlation Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal/Multifunction Switch Park Lamps ON Signal	2	B257A 00	2	-
Turn Signal/Multifunction Switch Headlamps OFF Signal	B257A 00	1	1	-
Turn Signal/Multifunction Switch Headlamps ON Signal	B257A 00	1	1	-
Turn Signal/Multifunction Switch Ground	-	1, 2	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

For headlamp operation, the body control module (BCM) monitors three signal circuits from the turn signal/multifunction switch. When the turn signal/multifunction switch is in the AUTO position, the three signal circuits are unaffected and the BCM relies on the ambient light sensor input to turn the headlamps and daytime running lamps (DRLs) ON and OFF. When the turn signal/multifunction switch is placed in the OFF position, the turn signal/multifunction switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the turn signal/multifunction switch in the PARK LAMPS position, the turn signal/multifunction switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the

turn signal/multifunction switch is in the HEADLAMP position, both the turn signal/multifunction switch park lamps ON signal circuit and the turn signal/multifunction switch headlamps ON signal circuit are grounded. The BCM responds by commanding the park lamps and headlamps ON.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

- The BCM detects an open/high resistance in the turn signal/multifunction switch park lamps ON signal circuit.
- The BCM detects a short to ground in the turn signal/multifunction switch headlamps ON signal circuit.
- The BCM detects a short to ground in the turn signal/multifunction switch headlamps OFF signal circuit.

Actions Taken When the DTC Sets

- When DTC B257A 00 is present on the turn signal/multifunction switch headlamps OFF signal circuit, the low beam headlamps are always ON in the AUTO position. The headlamp switch operates in all positions other than AUTO. The AUTO headlamp defeat is inoperative.
- When DTC B257A 00 is present on the turn signal/multifunction switch headlamps ON signal circuit, the low beam headlamps are always ON. The BCM disregards all turn signal/multifunction switch inputs.
- When DTC B257A 00 is present on the turn signal/multifunction switch park lamps ON signal circuit, the park lamps and low beam headlamps are inoperative in the PARK and HEAD positions. Headlamps and park lamps operate in AUTO position.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal 6 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 9 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 9 and the ground circuit terminal 6.
6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 9 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.

- If less than 1 V
- 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
- **If Active**
- 7. Verify the scan tool Park Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 7 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
- 8. Install a 3 A fused jumper wire between the signal circuit terminal 7 and the ground circuit terminal 6.
- 9. Verify the scan tool Park Lamps Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 7 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
- 10. Verify the scan tool Headlamps On Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 2 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
- 11. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the ground circuit terminal 6.
- 12. Verify the scan tool Headlamps On Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

2. Test for less than 1 V between the signal circuit terminal 2 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**

13. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2580: HEADLAMP HIGH BEAM CONTROL CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2580 01

Headlamp High Beam Control Circuit Short to Battery

DTC B2580 02

Headlamp High Beam Control Circuit Short to Ground

DTC B2580 04

Headlamp High Beam Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp High Beam Relay Control	B2580 02, B2580 04	B2580 02, B2580 04	B2580 01	-

High Beam Headlamp Control - Left	1	1	1	-
High Beam Headlamp Control - Right	1	1	1	-
Headlamp Ground - Left	-	1	-	-
Headlamp Ground - Right	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

The high beam and flash to pass functions are contained within the turn signal/multifunction switch. The BCM provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the flash to pass signal circuit. When the low beam headlamps are ON and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the BCM through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the high beam fuses to the high beam control circuits illuminating the high beam headlamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- High beam headlamps ON.

Conditions for Setting the DTC

DTC B2580 01

The BCM detects a short to voltage in the headlamp high beam relay control circuit.

DTC B2580 02

The BCM detects a short to ground in the headlamp high beam relay control circuit.

DTC B2580 04

The BCM detects an open in the headlamp high beam relay control circuit.

Actions Taken When the DTC Sets

The high beam headlamps and flash to pass will not operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 18 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the X50A Fuse Block - Underhood.
 - **If the test lamp illuminates**
 - 3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground.
 - 4. Verify the high beam headlamps illuminate.
 - **If the high beam headlamps do not illuminate**
 1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood,

2. Test for less than 1 V between the control circuit terminal 18 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the X50A Fuse Block - Underhood.

○ **If the high beam headlamps illuminate**

5. Test or replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Compartment Fuse Block Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2585 OR B3867: PARK LAMPS CONTROL CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2585 01

Left Park Lamps Control Circuit Short to Battery

DTC B2585 02

Left Park Lamps Control Circuit Short to Ground

DTC B2585 04

Left Park Lamps Control Circuit Open

DTC B3867 01

Right Park Lamps Control Circuit Short to Battery

DTC B3867 02

Right Park Lamps Control Circuit Short to Ground

DTC B3867 04

Right Park Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal/Multifunction Switch Park Lamps ON Signal	2	B257A 00	2	-
License Plate Lamps Control	1	1	1	-
Park Lamps Control - Left	1	1	1	-
Park Lamps Control - Right	1	1	1	-
Turn Signal/Multifunction Switch Ground	-	2	-	-
License Plate Lamp Ground - Left	-	1	-	-
License Plate Lamp Ground - Right	-	1	-	-
Park Lamp Ground - Left Front	-	1	-	-
Park Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Left Front	-	1	-	-
Side Marker Lamp Ground - Left Rear	-	1	-	-
Side Marker Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Right Rear	-	1	-	-
Tail Lamp Ground - Left	-	1	-	-
Tail Lamp Ground - Right	-	1	-	-
1. Park, License, and/or Tail Lamps Malfunction 2. Park Lamps Switch Malfunction				

Circuit/System Description

When the headlamp switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the body control module (BCM). The BCM responds by applying voltage to the park lamps, tail lamps and license lamps control circuits illuminating the park, tail and license lamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

DTC B2585 01 and B2585 04

The BCM detects a short to voltage or an open/high resistance in the left park lamps control circuit.

DTC B2585 02

The BCM detects a short to ground in the left park lamps control circuit.

DTC B3867 01 and B3867 04

The BCM detects a short to voltage or an open/high resistance in the right park lamps control circuit.

DTC B3867 02

The BCM detects a short to ground in the right park lamps control circuit.

Actions Taken When the DTC Sets

DTC B2585 01

The left park lamps are always ON.

DTC B2585 02 and B2585 04

The left park lamps are always OFF.

DTC B3867 01

The right park lamps are always ON.

DTC B3867 02 and B3867 04

The right park lamps are always OFF.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B2585

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate left park lamp.
2. Test for less than 15 ohms between the appropriate ground circuit terminal listed below and ground.
 - E13LA Headlamp Assembly - Left terminal 3
 - E2LF Side Marker Lamp - Left Front terminal 2
 - E42L Tail Lamp Assembly - Left terminal 3
 - E2LR Side Marker Lamp - Left Rear terminal 2
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - E13LA Headlamp Assembly - Left terminal 2
 - E2LF Side Marker Lamp - Left Front terminal 1
 - E42L Tail Lamp Assembly - Left terminal 2
 - E2LR Side Marker Lamp - Left Rear terminal 1
4. Verify the test lamp turns ON and OFF when commanding the Left Park Lamps ON and OFF

with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the appropriate left park lamp.

DTC B3867

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate right park lamp.
2. Test for less than 15 ohms between the appropriate ground circuit terminal listed below and ground.
 - E13RA Headlamp Assembly - Right terminal 3
 - E2RF Side Marker Lamp - Right Front terminal 2
 - E42R Tail Lamp Assembly - Right terminal 3
 - E2RR Side Marker Lamp - Right Rear terminal 2
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - E13RA Headlamp Assembly - Right terminal 2
 - E2RF Side Marker Lamp - Right Front terminal 1
 - E42R Tail Lamp Assembly - Right terminal 2

- E2RR Side Marker Lamp - Right Rear terminal 1
4. Verify the test lamp turns ON and OFF when commanding the Right Park Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
 5. Test or replace the appropriate right park lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement**
- **Front Side Marker Lamp Replacement**
- **Rear Fascia Auxiliary Signal Lamp Replacement**
- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B258A: LOW BEAM CONTROL CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B258A 01

Low Beam Control Circuit Short to Battery

DTC B258A 02

Low Beam Control Circuit Short to Ground

DTC B258A 04

Low Beam Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Low Beam Relay Control	B258A 02, B258A 04	B258A 02, B258A 04	B258A 01	-
Low Beam Headlamp Control - Left	1	1	1	-
Low Beam Headlamp Control - Right	1	1	1	-
Headlamp Ground - Left	-	1	-	-
Headlamp Ground - Right	-	1	-	-
1. Headlamps Malfunction				

Circuit/System Description

With the headlamp switch in the ON position, the headlamp switch headlamp ON signal circuit is grounded through the headlamp switch. The body control module (BCM) responds by applying ground to the low beam relay control circuit which energizes the low beam relay. With the low beam relay energized, the switch contacts close allowing battery voltage to flow through the low beam fuses to the low beam control circuits illuminating the low beam headlamps.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Low beam headlamps ON.

Conditions for Setting the DTC

DTC B258A 01

The BCM detects a short to voltage in the headlamp low beam relay control circuit.

DTC B258A 02

The BCM detects a short to ground in the headlamp low beam relay control circuit.

DTC B258A 04

The BCM detects an open in the headlamp low beam relay control circuit.

Actions Taken When the DTC Sets

DTC B258A 01 or B258A 04

The low beam headlamps will not operate.

DTC B258A 02

The low beam headlamps will always be ON.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the KR49 Headlamp Low Beam Relay.
2. Connect a test lamp between the control circuit terminal 85 and B+, ignition ON.
3. Verify the test lamp turns ON and OFF when commanding the Low Beams ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Ignition OFF.
 4. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
4. Test or replace the KR49 Headlamp Low Beam Relay.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Relay Replacement (Within an Electrical Center)** , **Relay Replacement (Attached to Wire Harness)**
- **Control Module References** for BCM replacement, programming and setup

DTC B2600 OR B2605: DAYTIME RUNNING LAMPS CONTROL CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2600 01

Left Daytime Running Lamps Control Circuit short to Battery

DTC B2600 02

Left Daytime Running Lamps Control Circuit Short to Ground

DTC B2600 04

Left Daytime Running Lamps Control Circuit Open

DTC B2605 01

Right Daytime Running Lamps Control Circuit short to Battery

DTC B2605 02

Right Daytime Running Lamps Control Circuit Short to Ground

DTC B2605 04

Right Daytime Running Lamps Control Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light/Sunload Sensor Signal	B2645 03	B2645 07	B2645 07	-
Daytime Running Lamp Control - Left	B2600 02	B2600 04	B2600 01	-
Daytime Running Lamp Control - Right	B2605 02	B2605 04	B2605 01	-
Ambient Light/Sunload Sensor Low Reference	1	B2645 07, B0163 05, B0183 05,	1	-
Daytime Running Lamp Ground - Left	-	1	-	-
Daytime Running Lamp Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 volts depending on outside lighting conditions. The body control module (BCM) provides a 5-volt reference signal to the ambient light

sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lights (DRL) or automatic lamp control (ALC) when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the DRLs ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel DRL operation.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Headlamp switch in AUTO position.

Conditions for Setting the DTC

DTC B2600 01

The BCM detects a short to voltage in the left DRL control circuit.

DTC B2600 02

The BCM detects a short to ground in the left DRL control circuit.

DTC B2600 04

The BCM detects an open/high resistance in the left DRL control circuit.

DTC B2605 01

The BCM detects a short to voltage in the right DRL control circuit.

DTC B2605 02

The BCM detects a short to ground in the right DRL control circuit.

DTC B2605 04

The BCM detects an open/high resistance in the right DRL control circuit.

Actions Taken When the DTC Sets

- When DTC B2600 sets, the left DRL will be inoperative.
- When DTC B2605 sets, the right DRL will be inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- Connector Repairs
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- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E13 Headlamp Assembly.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Dedicated Daytime Running Lamp Command ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance
- 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
- 5. Test or replace the appropriate E13 Headlamp Assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2610: PASSENGER COMPARTMENT DIMMING 1 CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2610 02

Passenger Compartment Dimming 1 Circuit Short to Ground

DTC B2610 04

Passenger Compartment Dimming 1 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-

Instrument Panel Dimmer Switch Signal	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	1	-
LED Backlight Dimming Control Terminal 9 X7	B2610 02	B2610 04	1	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
Door Handle Switch - Driver Interior Ground	-	1	-	-
Door Handle Switch - Passenger Interior Ground	-	1	-	-
Door Lock Switch - Driver Ground	-	1	-	-
Door Lock Switch - Passenger Ground	-	1	-	-
Folding Top Control Switch Ground	-	1	-	-
Heads - Up Display Switch Ground	-	1	-	-
Ignition Mode Switch Ground	-	1	-	-
Instrument Panel Dimmer Switch Ground	-	1	-	-
Multifunction Switch - Center Console Ground	-	1	-	-
Multifunction Switch 1 - Instrument Panel Ground	-	1	-	-
Multifunction Switch 2 - Instrument Panel Ground	-	1	-	-
Outside Rearview Mirror Switch Ground	-	1	-	-
Park Brake Control Switch Ground	-	1	-	-
Seat Memory Switch - Driver Ground	-	1	-	-
Steering Wheel Controls Switch - Left Upper Ground	-	1	-	-
Steering Wheel Controls Switch - Left Lower Ground	-	1	-	-
Steering Wheel Controls Switch - Right Upper Ground	-	1	-	-
Steering Wheel Controls Switch - Right Lower Ground	-	1	-	-

Ground	-	1	-	-
Window Switch - Passenger Ground	-	1	-	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal and B+ voltage reference circuits to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

DTC B2610 02

The BCM detects a short to ground in the LED backlight dimming control 1 circuit terminal 8 X2 or LED backlight dimming control 2 circuit terminal 9 X7.

DTC B2610 04

The BCM detects an open/high resistance in the LED backlight dimming control 1 circuit terminal 8 X2 or LED backlight dimming control 2 circuit terminal 9 X7.

Actions Taken When the DTC Sets

The BCM will disable the LED backlight dimming control circuits.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

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- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each component with backlighting may need to be disconnected to isolate a short to voltage or short to ground. Use the schematics to identify the following:

- Backlighting components the vehicle is equipped with
 - Each component's control and ground circuit terminals
 - Component locations on the backlighting control circuit
1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connector at the component with inoperative backlighting. It may take up to 2 minutes for all vehicle systems to power down.
 2. Test for less than 15 ohms between the appropriate ground circuit terminal and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
 3. Connect a test lamp between the appropriate control circuit terminal and ground.
 4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and

OFF with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X2 terminal 8
 - X7 terminal 9
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
 - X2 terminal 8
 - X7 terminal 9
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the component with inoperative backlighting.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Side Door Window Switch Replacement**
- **Dimmer Switch Replacement**
- **Ignition and Start Switch Replacement**
- **Door Latch Release Switch Replacement - Passenger Side**
- **Door Lock Switch Replacement - Driver Side**
- **Door Lock Switch Replacement - Passenger Front**
- **Driver Seat Adjuster Memory Switch Replacement**
- **Head-Up Display Dimmer Switch Replacement**
- **Parking Brake Actuator Switch Replacement**
- **Front Side Door Window Control Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2615 02

Passenger Compartment Dimming 2 Circuit Short to Ground

DTC B2615 04

Passenger Compartment Dimming 2 Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Courtesy Lamps Control - Terminal 7 X6	B1480 02	1	1	-
Dome Lamps Control - Terminal 1 X7	B2615 02	B2615 04	2	-
Dome/Reading Lamps - Left Front Ground	-	1, 2	-	-
Dome/Reading Lamps - Right Front Ground	-	1, 2	-	-
Instrument Panel Courtesy Lamp - Left Ground	-	2	-	-
Instrument Panel Courtesy Lamp - Right Ground	-	2	-	-
1. Courtesy Lamps Malfunction 2. Dome Lamps Malfunction				

Circuit/System Description

The body control module (BCM) applies battery voltage to the dome/reading lamps through the dome/reading lamp control circuit. When any door is opened, the jam switch contacts close and the BCM receives a door-ajar input. If the BCM receives a door lock or unlock input or a rear hatch open input, the BCM will activate the dome/reading lamp control circuit, providing battery voltage to dome/reading lamps. In the event that any of these courtesy lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the dome/courtesy lamps control circuit terminal 1 X7.

Actions Taken When the DTC Sets

The BCM will disable the dome/courtesy lamps control circuit.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Schematics

Connector End View Reference

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Interior Lighting Systems Description and Operation

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Each component may need to be disconnected to isolate a short to voltage, short to ground or an open/high resistance. Use the schematics to identify the following:

- **Courtesy lamps the vehicle is equipped with**
- **Each component's control and ground circuit terminals**
- **Component locations on the exterior courtesy lamps control circuit**

1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connectors at the components listed below. It may take up to 2 minutes for all vehicle systems to power down.
 - E8J Instrument Panel Courtesy Lamp - Left
 - E8K Instrument Panel Courtesy Lamp - Right
 - E37LF Dome/Reading Lamps - Left Front
 - E37RF Dome/Reading Lamps - Right Front
2. Test for less than 10 ohms between the appropriate ground circuit terminal listed below and ground.
 - E8J Instrument Panel Courtesy Lamp - Left terminal 2
 - E8K Instrument Panel Courtesy Lamp - Right terminal 2
 - E37LF Dome/Reading Lamps - Left Front terminal 4
 - E37RF Dome/Reading Lamps - Right Front terminal 4
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - E8J Instrument Panel Courtesy Lamp - Left terminal 1
 - E8K Instrument Panel Courtesy Lamp - Right terminal 1
 - E37LF Dome/Reading Lamps - Left Front terminal 3
 - E37RF Dome/Reading Lamps - Right Front terminal 3
4. Verify the test lamp turns ON and OFF when commanding the Courtesy Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**

1. Ignition OFF, disconnect the X7 harness connectors at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate dome/reading/courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Floor Flood Lamp Replacement (Left Side), Front Floor Flood Lamp Replacement (Right Side)**
- **Center Reading and Courtesy Lamp Lens Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2625: DISPLAY DIMMING PULSE WIDTH MODULATION OUTPUT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2625 01

Display Dimming Pulse Width Modulation Output Circuit Short to Battery

DTC B2625 02

Display Dimming Pulse Width Modulation Output Circuit Short to Ground

DTC B2625 04

Display Dimming Pulse Width Modulation Output Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

Backlight Dimming Control Terminal 17 X1	B2625 02	B2625 04	B2625 01	-
Multifunction Switch 2 - Instrument Panel Ground	-	1	-	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal and B+ voltage reference circuits to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED backlight dimming control circuit illuminating the LED backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Park lamps ON.

Conditions for Setting the DTC

The BCM detects a short to ground in the LED backlight dimming control circuit terminal 17 X1.

Actions Taken When the DTC Sets

The LED backlight dimming control circuit driver is shut down.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

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Electrical Information Reference

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- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connector at the S48D Multifunction Switch 2 - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the ground circuit terminal 3 and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground.
4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.

- If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**

5. Test or replace the appropriate S48D Multifunction Switch 2 - Instrument Panel.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Instrument Panel Accessory Switch Trim Panel Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B2645: AMBIENT LIGHT SENSOR CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2645 03

Ambient Light Sensor Circuit Low Voltage

DTC B2645 07

Ambient Light Sensor Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light/Sunload Sensor Signal	B2645 03	B2645 07	B2645 07	-
Daytime Running Lamp Control - Left	B2600 02	B2600 04	B2600 01	-
Daytime Running Lamp Control - Right	B2605 02	B2605 04	B2605 01	-
Ambient Light/Sunload Sensor Low Reference	1	B2645 07, B0163 05, B0183 05,	1	-
Daytime Running Lamp Ground - Left	-	1	-	-

Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 volts depending on outside lighting conditions. The body control module (BCM) provides a 5-volt reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lights (DRL) or automatic lamp control (ALC) when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the DRLs ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel DRL operation.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B2645 03

The BCM detects a short to ground in the ambient light sensor signal circuit.

DTC B2645 07

- The BCM detects a short to voltage or an open/high resistance in the ambient light sensor signal circuit.
- The BCM detects an open/high resistance in the ambient light sensor low reference circuit.

Actions Taken When the DTC Sets

- Automatic headlamp system and daytime running lamps are inoperative.
- The BCM defaults to low light status and commands the low beam headlamps ON.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the B10B Ambient Light/Sunload Sensor. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the low reference circuit terminal 6 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.
 2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K33 HVAC Control Module.
 - **If less than 10 ohms**
3. Ignition ON.
4. Verify the scan tool Ambient Light Sensor parameter is greater than 4.65 V.
 - **If 4.65 V or less**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If greater than 4.65 V**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6.
6. Verify the scan tool Ambient Light Sensor parameter is less than 0.196 V.

- **If 0.196 V or greater**

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 5 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If less than 0.196 V**

7. Test or replace the B10B Ambient Light/Sunload Sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor Replacement**
- **Control Module References** for BCM or HVAC Control Module replacement, programming and setup

DTC B3588: REAR FOG LAMP SWITCH CIRCUIT MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3588 00

Rear Fog Lamp Switch Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp Switch Signal	B3588 00	1	1	-
Rear Fog Lamps Control	B2540 02	B2540 04	1	-
Fog Lamp - Left Rear Ground	-	1	-	-
Fog Lamp - Right Rear Ground	-	1	-	-

Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Rear Fog Lamp Malfunction				

Circuit/System Description

The rear fog lamp switch signal circuit is grounded momentarily by pressing the rear fog lamp switch. The body control module (BCM) responds to the rear fog lamp request by applying voltage to the rear fog lamps control circuit which illuminates the rear fog lamps.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the turn signal/multifunction switch rear fog lamp signal circuit.

Actions Taken When the DTC Sets

The rear fog lamp indicator on the instrument cluster is always ON.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

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- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections

- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the ground circuit terminal 6 and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Ignition ON.
4. Verify the scan tool Rear Fog Lamp Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 1 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and the ground circuit terminal 6.
6. Verify the scan tool Rear Fog Lamp Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 1 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B3596: HAZARD LAMPS REQUEST CIRCUIT MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3596 00

Hazard Lamps Request Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Hazard Warning Switch Signal	1	1	1	B3596 00
Hazard Warning Switch LED Backlighting Control	2	2	2	-
Hazard Warning Switch Ground	-	1, 2	-	-
1. Hazard Lamps Malfunction 2. Hazard Warning Switch Backlighting Malfunction				

Circuit/System Description

The hazard flashers may be activated in any power mode. The hazard warning switch signal circuit is momentarily grounded when the hazard warning switch is pressed. The body control module (BCM) responds to the hazard warning switch signal input by supplying battery voltage to all four turn signal lamps in an ON and OFF duty cycle. When the hazard warning switch is activated, the BCM sends a serial data message to the instrument cluster requesting both turn signal indicators to be cycled ON and OFF.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.

- Hazard lamps ON.

Conditions for Setting the DTC

The hazard warning switch input is Active for longer than 60 seconds.

Actions Taken When the DTC Sets

The hazard lamps are inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the around circuit terminal 3 and around.

- **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
- 3. Ignition ON.
- 4. Verify the scan tool Hazard Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
- 5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and ground.
- 6. Verify the scan tool Hazard Lamps Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
- 7. Test or replace the S48A Multifunction Switch - Instrument Panel.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for BCM replacement, programming and setup

DTC B3600: CONTROL MODULE VOLTAGE REFERENCE OUTPUT 1

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3600 03

Control Module Voltage Reference Output 1 Circuit Low Voltage

DTC B3600 07

Control Module Voltage Reference Output 1 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+ Reference	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Signal	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	1	-
LED Backlight Dimming Control Terminal 9 X7	1	1	1	-
Switch Indicator LED Backlight Dimming Control Terminal 17 X1	B2625 02	B2625 04	B2625 01	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
1. Interior Backlighting Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal and B+ voltage reference to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming 1 and dimming 2 control circuits illuminating the interior backlighting to the requested level of brightness.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.

- Park Lamps ON.

Conditions for Setting the DTC

DTC B3600 03

The BCM detects a short to ground or an open/high resistance in the instrument panel dimmer switch signal circuit.

DTC B3600 07

The BCM detects a short to voltage in the instrument panel dimmer switch signal circuit.

Actions Taken When the DTC Sets

The BCM will not dim any interior backlighting. All interior backlighting will default to the level selected prior to the fault being present.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

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Interior Lighting Systems Description and Operation

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- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S36 Instrument Panel Dimmer Switch, ignition ON.
2. Test for B+ between the B+ circuit terminal 6 and ground.
 - **If less than B+**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If B+**
3. Verify a test lamp illuminates between the B+ circuit terminal 6 and the low reference circuit terminal 1.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the low reference circuit terminal 1 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
4. Verify a test lamp does not illuminate between the B+ circuit terminal 6 and the signal circuit terminal 2.
 - **If the test lamp illuminates**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp does not illuminate**
5. Test for B+ between the B+ circuit terminal 6 and the signal circuit terminal 2.
 - **If less than B+**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module,

2. Test for less than 1 V between the signal circuit terminal 2 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If B+**
6. Test or replace the S36 Instrument Panel Dimmer Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Dimmer Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B3650: HIGH BEAM REQUEST SIGNAL CIRCUIT PERFORMANC

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3650 08

High Beam Request Signal Circuit Performance - Signal Invalid

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal/Multifunction Switch Headlamps OFF Signal	B257A 00	1	1	-
Turn Signal/Multifunction Switch Headlamps ON Signal	B257A 00	1	1	-
Turn Signal/Multifunction Switch Park Lamps ON Signal	2	B257A 00	2	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	1	1	-
Turn Signal/Multifunction Switch	B3650 08	1	1	-

Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

When the low beam headlamps are on and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the body control module (BCM) through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the high beam fuses to the high beam control circuits illuminating the high beam headlamps.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the turn signal/multifunction switch high beam signal circuit.

Actions Taken When the DTC Sets

The high beam headlamps will not operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal 6 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool High Beam Select Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 11 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 11 and ground.
6. Verify the scan tool High Beam Select Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 11 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.

○ **If Active**

7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B3806: HIGH BEAM AND HEADLAMP FLASH SELECT CIRCUIT MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B3806 00

High Beam and Headlamp Flash Select Circuit Malfunction

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal/Multifunction Switch Headlamps OFF Signal	B257A 00	1	1	-
Turn Signal/Multifunction Switch Headlamps ON Signal	B257A 00	1	1	-
Turn Signal/Multifunction Switch Park Lamps ON Signal	2	B257A 00	2	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	1	1	-
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	1	1	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Headlamps Malfunction 2. Park, License, and/or Tail Lamps Malfunction				

Circuit/System Description

When the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the body control module (BCM) through the flash to pass signal circuit. The BCM responds to the flash to pass request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the high beam fuses to the high beam control circuits illuminating the high beam headlamps. The high beam headlamps will only illuminate for as long as the flash to pass switch is activated.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the turn signal/multifunction switch flash to pass signal circuit.

Actions Taken When the DTC Sets

The high beam lamps and the high beam indicator on the instrument cluster are always ON.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal 6 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool Headlamps Flash Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 12 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 12 and the ground circuit terminal 6.
6. Verify the scan tool Headlamps Flash Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 12 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Turn Signal Multifunction Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B3881 OR B3882: TAIL LAMP CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3881 02

Tail Lamp Circuit Short to Ground

DTC B3882 02

Right Tail Lamp Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Stop Lamp Control - Left	B3881 02	1	1	-
Stop Lamp Control - Right	B3882 02	1	1	-
Tail Lamp Ground - Left	-	1	-	-
Tail Lamp Ground - Right	-	1	-	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position (BPP) sensor is used to sense the action of the driver application of the brake pedal. The BPP sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5-volt reference voltage to the BPP sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the left and right stop lamp control circuits as well as the center high mounted stop lamp (CHMSL) control circuit illuminating the left and right stop lamps and the CHMSL.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

DTC B3881 02

The BCM detects a short to ground in the left stop lamp control circuit.

DTC B3882 02

The BCM detects a short to ground in the right stop lamp control circuit.

Actions Taken When the DTC Sets

The appropriate stop lamp will not operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3881

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the E42L Tail Lamp Assembly - Left.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Left Stop Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module. ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E42L Tail Lamp Assembly - Left.

DTC B3882

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the E42R Tail Lamp Assembly - Right.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.

- If less than 2 ohms, repair the open/high resistance in the ground connection.
- **If less than 5 ohms**
- 3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
- 4. Verify the test lamp turns ON and OFF when commanding the Right Stop Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
- 5. Test or replace the E42R Tail Lamp Assembly - Right.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC B3883: LICENSE PLATE LAMP CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3883 01

DTC B3883 02

License Plate Lamp Circuit Short to Ground

DTC B3883 04

License Plate Lamp Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
License Plate Lamp Control	B3883 02	B3883 01, B3883 04	B3883 01	-
License Plate Lamp Ground - Right	-	B3883 01, B3883 04	-	-
License Plate Lamp Ground - Left	-	B3883 01, B3883 04	-	-

Circuit/System Description

When the turn signal/multifunction switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the body control module (BCM). The BCM responds by applying voltage to the park lamps, tail lamps and license lamps control circuits illuminating the park, tail and license lamps.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

DTC B3883 01

Turn signal/multifunction switch in OFF position.

DTC B3883 02 or B3883 04

Turn signal/multifunction switch in AUTO, PARK or ON positions.

Conditions for Setting the DTC

DTC B3883 01 and DTC B3883 04

- The BCM detects a short to voltage or an open/high resistance in the license lamps control circuit.
- The BCM detects an open/high resistance in the license lamps ground circuit.

The BCM detects a short to ground in the license lamps control circuit.

Actions Taken When the DTC Sets

DTC B3883 01

License lamps always ON.

DTC B3883 02 or B3883 04

License lamps inoperative.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Body Control System Schematics**

Connector End View Reference

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, remove both E7 License Plate Lamp bulbs.

2. Test for less than 5 ohms between each ground circuit terminal 2 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the E7L License Plate Lamp - Left control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Ignition OFF.
6. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal 1 and ground, ignition ON.
7. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.

- If the test lamp turns ON and OFF

8. Test or replace the appropriate E7 License Plate Lamp bulb.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Rear License Plate Lamp Replacement
- Control Module References for BCM replacement, programming and setup

DTC B3884: CENTER HIGH MOUNTED BRAKE LAMP

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptor

DTC B3884 02

Center High Mounted Brake Lamp Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Center High Mounted Stop Lamp Control	B3884 02	1	1	-
Center High Mounted Stop Lamp Ground	-	1	-	-
1. Stop Lamps Malfunction				

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the right and left stop lamp control circuits, engine control module (ECM) and center high mounted stop lamp control circuit.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

DTC B3884 01

The BCM detects a short to voltage in the center high mounted stop lamp control circuit.

DTC B3884 02

The BCM detects a short to ground in the center high mounted stop lamp control circuit.

DTC B3884 04

The BCM detects an open/high resistance in the center high mounted stop lamp control circuit.

Actions Taken When the DTC Sets

The BCM will not illuminate the center high mounted stop lamp.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Reference Information

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, rear hatch latch latched, disconnect the harness connector at the E6 Center High Mounted Stop Lamp.
2. Test for less than 5 ohms between the ground circuit terminal 2 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Center Brake Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E6 Center High Mounted Stop Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **High Mount Stop Lamp Replacement**

DTC B3948 OR B3949: FRONT TURN SIGNAL

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B3948 01

Left Front Turn Signal Circuit Short to Battery

DTC B3948 02

Left Front Turn Signal Circuit Short to Ground

DTC B3948 04

Left Front Turn Signal Circuit Open

DTC B3949 01

Right Front Turn Signal Circuit Short to Battery

DTC B3949 02

Right Front Turn Signal Circuit Short to Ground

DTC B3949 04

Right Front Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal Switch Signal - Left	1	1	1	-
Turn Signal Switch Signal - Right	1	1	1	-
Turn Signal Control - Left Front	B3948 02	B3948 01, B3948 04	1	-
Turn Signal Control - Left Rear	B3950 02	B3950 01, B3950 04	1	-

Turn Signal Control - Right Front	B3949 02	B3949 04	1	-
Turn Signal Control - Right Rear	B3951 02	B3951 01, B3951 04	1	-
Outside Rearview Mirror Ground - Driver	-	1	-	-
Outside Rearview Mirror Ground - Passenger	-	1	-	-
Turn Signal Lamp Ground - Left Front	-	1	-	-
Turn Signal Lamp Ground - Right Front	-	1	-	-
Turn Signal Lamp Ground - Left Rear	-	1	-	-
Turn Signal Lamp Ground - Right Rear	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Turn Signal Lamps and/or Indicators Malfunction				

Circuit/System Description

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the turn right or turn left position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3948 01 and B3948 04

- The BCM detects an open/high resistance in the left front turn signal control circuit.
- The BCM detects an open/high resistance in the left front turn signal ground circuit.

DTC B3948 02

The BCM detects a short to ground in the left front turn signal control circuit.

- The BCM detects an open/high resistance in the right front turn signal control circuit.
- The BCM detects an open/high resistance in the right front turn signal ground circuit.

DTC B3949 02

The BCM detects a short to ground in the right front turn signal control circuit.

Actions Taken When the DTC Sets

DTC B3948

- The left front turn signal is inoperative.
- The left turn signal indicator on the instrument cluster flashes rapidly.

DTC B3949

- The right front turn signal is inoperative.
- The right turn signal indicator on the instrument cluster flashes rapidly.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3948

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate turn signal lamp - left front.
2. Test for less than 15 ohms between the appropriate ground circuit terminal listed below and ground.
 - A9A Outside Rearview Mirror - Driver terminal 10
 - E13LA Headlamp Assembly - Left terminal 3
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - A9A Outside Rearview Mirror - Driver terminal 6
 - E13LA Headlamp Assembly - Left terminal 6
4. Verify the test lamp turns ON and OFF when commanding the Left Front Turn Signal Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the appropriate turn signal lamp - left front.

DTC B3949

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate turn signal lamp - right front.
2. Test for less than 15 ohms between the appropriate ground circuit terminal listed below and ground.
 - A9B Outside Rearview Mirror - Passenger terminal 10
 - E13RA Headlamp Assembly - Right terminal 3
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - A9B Outside Rearview Mirror - Passenger terminal 6
 - E13RA Headlamp Assembly - Right terminal 6
4. Verify the test lamp turns ON and OFF when commanding the Right Front Turn Signal Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate turn signal lamp - right front.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Headlamp Replacement
- Outside Rearview Mirror Replacement
- Control Module References for BCM replacement, programming and setup

DTC B3950 OR B3951: REAR TURN SIGNAL

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DTC Descriptors

DTC B3950 01

Left Rear Turn Signal Circuit Short to Battery

DTC B3950 02

Left Rear Turn Signal Circuit Short to Ground

DTC B3950 04

Left Rear Turn Signal Circuit Open

DTC B3951 01

Right Rear Turn Signal Circuit Short to Battery

DTC B3951 02

Right Rear Turn Signal Circuit Short to Ground

DTC B3951 04

Right Rear Turn Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Turn Signal Switch Signal - Left	1	1	1	-
Turn Signal Switch Signal - Right	1	1	1	-
Turn Signal Control - Left Front	B3948 02	B3948 01, B3948 04	1	-
Turn Signal Control - Left Rear	B3950 02	B3950 01, B3950 04	1	-
Turn Signal Control - Right Front	B3949 02	B3949 01, B3949 04	1	-
Turn Signal Control - Right Rear	B3951 02	B3951 01, B3951 04	1	-
Outside Rearview Mirror Ground - Driver	-	1	-	-
Outside Rearview Mirror Ground - Passenger	-	1	-	-
Turn Signal Lamp Ground - Left Front	-	1	-	-
Turn Signal Lamp Ground - Right Front	-	1	-	-
Turn Signal Lamp Ground - Left Rear	-	1	-	-
Turn Signal Lamp Ground - Right Rear	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	1	-	-
1. Turn Signal Lamps and/or Indicators Malfunction				

Circuit/System Description

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the turn right or turn left position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Conditions for Running the DTC

Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

DTC B3950 01 and B3950 04

- The BCM detects an open/high resistance in the left rear turn signal control circuit.
- The BCM detects an open/high resistance in the left rear turn signal ground circuit.

DTC B3950 02

The BCM detects a short to ground in the left rear turn signal control circuit.

DTC B3951 01 and B3951 04

- The BCM detects an open/high resistance in the right rear turn signal control circuit.
- The BCM detects an open/high resistance in the right rear turn signal ground circuit.

DTC B3951 02

The BCM detects a short to ground in the right rear turn signal control circuit.

Actions Taken When the DTC Sets

DTC B3950

- The left rear turn signal is inoperative.
- The "Check Left Rear Turn Signal Lamp" message is displayed on the driver information center (DIC) display.
- The left turn signal indicator on the instrument panel flashes rapidly.

DTC B3951

- The right rear turn signal is inoperative.
- The "Check Right Rear Turn Signal Lamp" message is displayed on the driver information center (DIC) display.
- The right turn signal indicator on the instrument panel flashes rapidly.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 100 consecutive malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC B3950

1. Ignition OFF, exterior lamps OFF, disconnect the E42L Tail Lamp Assembly - Left.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 7 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Left Rear Turn Signal Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E42L Tail Lamp Assembly - Left.

DTC B3951

1. Ignition OFF, exterior lamps OFF, remove the E42R Tail Lamp Assembly - Right.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 7 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Right Rear Turn Signal Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the E42R Tail Lamp Assembly - Right.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC C0277 OR C0890: BRAKE PEDAL POSITION SENSOR

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC C0277 06

Brake Pedal Position Sensor Circuit Low Voltage/Open

DTC C0277 07

Brake Pedal Position Sensor Circuit High Voltage

DTC C0277 09

Brake Pedal Position Sensor Circuit Too Fast Transitions

DTC C0277 4B

Brake Pedal Position Sensor Circuit Calibration Not Learned

DTC C0890 03

Control Module Voltage Reference Output 3 Circuit Low Voltage

DTC C0890 07

Control Module Voltage Reference Output 3 Circuit High Voltage

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0140 71	C0277 06, U0140 71	C0277 07, C0890 07, U0140 71	-

Brake Pedal Position Sensor Signal	C0277 06, U0140 71	C0277 06, U0140 71	C0277 07, C0890 07, U0140 71	C0277 09
Center High Mounted Stop Lamp Control	B3884 02	B3884 04	B3884 01	-
Stop Lamp Control - Left	1	1	1	-
Stop Lamp Control - Right	1	1	1	-
Brake Pedal Position Sensor Low Reference	-	C0277 07, U0140 71	1	-
Center High Mounted Stop Lamp Ground	-	2	-	-
Tail/Stop Lamp Ground - Left	-	1	-	-
Tail/Stop Lamp Ground - Right	-	1	-	-
1. Stop Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction				

Circuit/System Description

The brake pedal position (BPP) sensor is used to sense the action of the driver application of the brake pedal. The BPP sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5-volt reference voltage to the BPP sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the left and right stop lamp control circuits as well as the center high mounted stop lamp (CHMSL) control circuit illuminating the left and right stop lamps and the CHMSL.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

DTC C0277 06

- The BCM detects a short to ground or an open/high resistance in the BPP sensor 5 V reference circuit.
- The BCM detects a short to ground or an open/high resistance in the BPP sensor signal circuit.

DTC C0277 07

- The BCM detects a short to voltage in the BPP sensor 5 V reference circuit.
- The BCM detects a short to voltage in the BPP sensor signal circuit.

- The BCM detects an open/high resistance in the BPP sensor low reference circuit.

DTC C0277 09

The BCM detects the BPP sensor signal is changing faster than possible under normal operating conditions.

DTC C0277 4B

The DTC will set when the BPP sensor home position is not learned.

DTC C0890 03

The BCM detects a short to ground in the BPP sensor 5 V reference circuit.

DTC C0890 07

- The BCM detects a short to voltage in the BPP sensor 5 V reference circuit.
- The BCM detects a short to voltage in the BPP sensor low reference circuit.

Actions Taken When the DTC Sets

- The Traction Control indicator is commanded ON.
- For DTC C0277 4B, the stop lamps may not activate at the expected brake pedal positions.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- For DTC C0277 07 the ignition must be cycled before the code can be cleared.
- For DTC C0277 4B a successful brake pedal position sensor calibration has been performed.
- A history DTC will clear once 50 malfunction-free ignition cycles have occurred.
- A DTC will not clear the current status until the next ignition cycle.

Reference Information

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

DTC C0277 06, C0277 07, C0890 03 and C0890 07

1. Ignition OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, ignition ON.
2. Verify a test lamp illuminates between the appropriate low reference circuit terminal listed below and B+.
 - Terminal A - without MYC
 - Terminal 2 - with MYC
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
3. Ignition ON.
4. Test for 4.8-5.2 V between the appropriate 5 V reference circuit terminal listed below and ground.
 - Terminal C - without MYC
 - Terminal 1 - with MYC
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the 5 V reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.

- If less than 2 ohms, replace the K9 Body Control Module.
- **If greater than 5.2 V**
- 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
- 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If between 4.8-5.2 V**
- 5. Verify the scan tool Brake Pedal Applied parameter is Inactive.
 - **If not Inactive**
 - 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 - 2. Test for less than 1 V between the appropriate signal circuit terminal listed below and ground.
 - Terminal B - without MYC
 - Terminal 3 - with MYC
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If Inactive**
- 6. Install a 3 A fused jumper wire between the appropriate 5-volt reference and signal circuit terminals listed below.
 - 5-volt reference terminal C and signal terminal B - without MYC
 - 5-volt reference terminal 1 and signal terminal 3 - with MYC
- 7. Verify the scan tool Brake Pedal Applied parameter is Active.
 - **If not Active**
 - 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 - 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 - 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
- 8. Test or replace the B22 Brake Pedal Position Sensor.

DTC C0277 4B

1. Verify DTC C0277 4B is not set.
 - **If DTC C0277 4B is set**

1. Ignition ON
2. Perform the BPP sensor recalibration procedure for the K9 Body Control Module. Refer to **Brake Pedal Position Sensor Calibration**.
3. Verify the DTC does not reset while operating the vehicle under the conditions for running the DTC.
 - If the DTC resets, replace the B22 Brake Pedal Position Sensor.
 - If the DTC does not reset
4. All OK.
 - **If DTC C0277 4B is not set**
2. All OK.

DTC C0277 09

1. Verify DTC C0277 09 is not set.
 - **If DTC C0277 09 is set**
 1. Replace the B22 Brake Pedal Position Sensor.
 2. Perform the BPP sensor recalibration procedure for the K9 Body Control Module. Refer to **Brake Pedal Position Sensor Calibration**.
 3. Verify the DTC does not reset while operating the vehicle under the conditions for running the DTC.
 - If the DTC resets, replace the K9 Body Control Module.
 - If the DTC does not reset
 4. All OK.
 - **If DTC C0277 09 is not set**
2. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Brake Pedal Position Sensor Calibration**
- **Brake Pedal Position Sensor Replacement**
- **Control Module References** for BCM replacement, programming and setup

DTC C0297: BRAKE APPLIED OUTPUT CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC C0297 02

Brake Applied Output Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Applied Signal	C0297 02	C0297 02	1	-
1. Cruise Control Malfunction				

Circuit/System Description

The brake pedal position sensor is used to sense the action of the driver application of the brake pedal. The brake pedal position sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5 V reference voltage to the brake pedal position sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the right and left stop lamp control circuits, engine control module (ECM) and center high mounted stop lamp control circuit.

Conditions for Running the DTC

- Battery voltage must be between 9-16 V.
- Brakes APPLIED.

Conditions for Setting the DTC

The BCM detects a short to ground or an open/high resistance in the brake applied signal circuit.

Actions Taken When the DTC Sets

The cruise control system is disabled.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 50 consecutive malfunction-free ignition cycles have occurred.

Diagnostic Aids

Verify that the brake pedal position sensor is properly calibrated.

Reference Information

Schematic Reference

- **Cruise Control Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the K20 Engine Control Module.
2. Connect a test lamp between the signal circuit terminal 57 and ground, ignition ON.
3. Verify the test lamp turns ON and OFF while pressing and releasing the brake pedal.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.

- If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
4. Replace the K20 Engine Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Brake Pedal Position Sensor Calibration**
- **Control Module References** for BCM or ECM replacement, programming and setup

SYMPTOMS - LIGHTING

NOTE: **The following steps must be completed before using a symptom table.**

- Perform the **Diagnostic System Check - Vehicle** before using a symptom table in order to verify that all of the following conditions are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
- Review the system description and operation in order to familiarize yourself with the system functions. Refer to the following:
 - **Exterior Lighting Systems Description and Operation**
 - **Interior Lighting Systems Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the lighting system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Thoroughly inspect the wiring and connectors. An incomplete inspection of the wiring and connectors may result in misdiagnosis causing part replacement with the reappearance of the malfunction. If an intermittent malfunction exists, refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Backup Lamps Malfunction (Automatic Transmission), Backup Lamps Malfunction (Manual Transmission)**

- Courtesy Lamps Malfunction
- Daytime Running Lamps Malfunction
- Dome Lamps Malfunction
- Rear Fog Lamps Malfunction
- Hazard Lamps Malfunction
- Headlamps Malfunction
- Interior Backlighting Malfunction
- Park, License, and/or Tail Lamps Malfunction
- Rear Compartment Lamp Malfunction
- Stop Lamps Malfunction
- Turn Signal Lamps and/or Indicators Malfunction

BACKUP LAMPS MALFUNCTION (AUTOMATIC TRANSMISSION)

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backup Lamps Control	B2545 02	B2545 01, B2545 04	1	-
Backup Lamp Ground - Left	-	1	-	-
Backup Lamp Ground - Right	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

With the engine running and the transmission in the reverse position, the transmission control module (TCM) sends a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM applies battery voltage to the backup lamps control circuit illuminating the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the TCM via serial data requesting the BCM to remove battery voltage from the backup lamps control circuit. The engine must be running for the backup lamps to operate.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E42 Tail Lamp Assembly.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 4 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance

3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

BACKUP LAMPS MALFUNCTION (MANUAL TRANSMISSION)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Backup Lamp Switch Signal	1	1	1	-
Backup Lamps Control	B2545 02	B2545 01, B2545 04	1	-
Backup Lamp Switch Ground	-	1	-	-
Backup Lamp Ground - Left	-	1	-	-
Backup Lamp Ground - Right	-	1	-	-
1. Backup Lamps Malfunction				

Circuit/System Description

The engine control module (ECM) provides a signal circuit to the backup lamp switch which is permanently grounded. With the engine running and the transmission in the reverse position, the backup lamp switch signal circuit is pulled low and the ECM responds by sending a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM applies battery voltage to the backup lamps control circuit illuminating the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the ECM via serial data requesting the BCM to remove battery voltage from the backup lamps control circuit. The engine must be running for the backup lamps to operate.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

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Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Engine ON.
2. Verify the scan tool Reverse Position Switch parameter changes between ON and OFF while shifting the vehicle between the neutral and reverse gears.

- **If the parameter does not change**

Refer to Backup Lamp Switch Malfunction.

- **If the parameter changes**

3. Verify the backup lamps turn ON and OFF when commanding the Backup Lamps ON and OFF

- **If the backup lamps do not turn ON and OFF**

Refer to Backup Lamps Malfunction.

- **If the backup lamps turn ON and OFF**

4. All OK.

Circuit/System Testing

Backup Lamp Switch Malfunction

1. Ignition OFF, exterior lamps OFF, all doors closed, disconnect the harness connector at the B16 Backup Lamp Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal B and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool Reverse Position Switch parameter is Off.
 - **If not Off**
 1. Ignition OFF, disconnect the X2 harness connector at the K20 Engine Control Module.
 2. Test for infinite resistance between the signal circuit terminal A and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K20 Engine Control Module.
 - **If Off**
5. Install a 3 A fused jumper wire between the signal circuit terminal A and the ground circuit terminal B.
6. Verify the scan tool Reverse Position Switch parameter is On.
 - **If not On**
 1. Ignition OFF, disconnect the X2 harness connector at the K20 Engine Control Module.
 2. Test for less than 1 V between the signal circuit terminal A and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K20 Engine Control Module.
 - **If On**

7. Test or replace the B16 Backup Lamp Switch.

Backup Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E42 Tail Lamp Assembly.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 4 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Backup Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Backup Lamp Switch Replacement**
- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM or ECM replacement, programming and setup

COURTESY LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Courtesy Lamps Control - Terminal 7 X6	B1480 02	1	1	-
Dome/Reading Lamps - Left Front Ground	-	1	-	-
Dome/Reading Lamps - Right Front Ground	-	1	-	-
Instrument Panel Compartment Lamp Ground	-	1	-	-
Sunshade Mirror Lamp - Left Ground	-	1	-	-
Sunshade Mirror Lamp - Right Ground	-	1	-	-
1. Courtesy Lamps Malfunction				

Circuit/System Description

The body control module (BCM) supplies battery voltage to the reading lamps, left and right sunshade lamps and instrument panel compartment lamp via the courtesy lamp control circuit. When the instrument panel compartment or a sunshade mirror is opened, the switch contacts close allowing battery voltage to flow illuminating the respective lamps. The reading lamps are controlled by individual switches that are activated by the occupants when additional cabin lighting is required. In the event that any of these courtesy lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the courtesy lamp control circuit to prevent total battery discharge.

Reference Information

Schematic Reference

- **Interior Lights Schematics**
- **Body Control System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the inoperative courtesy lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the appropriate ground circuit terminal listed below and ground.
 - E27 Instrument Panel Compartment Lamp - terminal 2
 - A3L Sunshade - Left terminal B
 - A3R Sunshade - Right terminal B
 - E37LF Dome/Reading Lamps - Left Front terminal 4
 - E37RF Dome/Reading Lamps - Right Front terminal 4
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - E27 Instrument Panel Compartment Lamp - terminal 1
 - A3L Sunshade - Left terminal A
 - A3R Sunshade - Right terminal A
 - E37LF Dome/Reading Lamps - Left Front terminal 2
 - E37RF Dome/Reading Lamps - Right Front terminal 2

4. Verify the test lamp turns ON and OFF when commanding the Inadvertent Load ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X6 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
 - 5. Test or replace the appropriate courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Sunshade Replacement**
- **Instrument Panel Compartment Lamp Replacement**
- **Center Reading and Courtesy Lamp Lens Replacement**
- **Control Module References** for BCM replacement, programming and setup

DAYTIME RUNNING LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ambient Light/Sunload	B2645 03	B2645 07	B2645 07	-

Daytime Running Lamp Control - Left	B2600 02	B2600 04	B2600 01	-
Daytime Running Lamp Control - Right	B2605 02	B2605 04	B2605 01	-
Ambient Light/Sunload Sensor Low Reference	1	B2645 07, B0163 05, B0183 05,	1	-
Daytime Running Lamp Ground - Left	-	1	-	-
Daytime Running Lamp Ground - Right	-	1	-	-
1. Daytime Running Lamps Malfunction				

Circuit/System Description

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 volts depending on outside lighting conditions. The body control module (BCM) provides a 5-volt reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lights (DRL) or automatic lamp control (ALC) when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the DRLs ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel DRL operation.

Reference Information

Schematic Reference

Headlights/Daytime Running Lights (DRL) Schematics

Connector End View Reference

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- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the left daytime running lamp turns ON and OFF while commanding the Left Dedicated Daytime Running Lamp ON and OFF with a scan tool.
 - **If the left daytime running lamp does not turn ON and OFF**

Refer to Daytime Running Lamp Malfunction.
 - **If the left daytime running lamp turns ON and OFF**
3. Verify the right daytime running lamp turns ON and OFF while commanding the Right Dedicated Daytime Running Lamp ON and OFF with a scan tool.
 - **If the right daytime running lamp does not turn ON and OFF**

Refer to Daytime Running Lamp Malfunction.
 - **If the right daytime running lamp turns ON and OFF**
4. Refer to Ambient Light Sensor Malfunction.

Circuit/System Testing

Daytime Running Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E13 Headlamp Assembly.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Dedicated Daytime Running Lamp Command ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.

- If infinite resistance
- 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
- **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**
- 5. Test or replace the appropriate E13 Headlamp Assembly.

Ambient Light Sensor Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the B10B Ambient Light/Sunload Sensor. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the low reference circuit terminal 6 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K33 HVAC Control Module.
 2. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K33 HVAC Control Module.
 - **If less than 10 ohms**
3. Ignition ON.
4. Verify the scan tool Ambient Light Sensor parameter is greater than 4.65 V.
 - **If 4.65 V or less**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If greater than 4.65 V**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the low reference circuit terminal 6.
6. Verify the scan tool Ambient Light Sensor parameter is less than 0.196 V.
 - **If 0.196 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 5 and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V
- 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If less than 0.196 V**
- 7. Test or replace the B10B Ambient Light/Sunload Sensor.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement**
- **Sun Load Temperature and Headlamp Automatic Control Ambient Light Sensor Replacement**
- **Control Module References** for BCM or HVAC control module replacement, programming and setup

DOMELAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Dome Lamps Control - Terminal 1 X7	B2615 02	B2615 04	1	-
Dome/Reading Lamps - Left Front Ground	-	1	-	-
Dome/Reading Lamps - Right Front Ground	-	1	-	-
Instrument Panel Courtesy Lamp - Left Ground	-	1	-	-
Instrument Panel Courtesy Lamp - Right Ground	-	1	-	-
1. Dome Lamps Malfunction				

Circuit/System Description

The dome lamp switch has 3 positions: DOOR, OFF and ON. The ON position provides a ground for continuous operation and the dome/courtesy lamps will remain illuminated until the switch is placed in either the DOOR or OFF position. When in the DOOR position, the dome/courtesy lamps operation is controlled by the body control module (BCM). When any door is opened, the door ajar switch contacts close and the BCM receives a door-open input. The BCM illuminates the dome/courtesy lamps when any door is opened or a door lock/unlock request is activated with the key fob. After all doors have been closed, the dome/courtesy lamps will remain illuminated approximately 3 seconds after the last door closes. When the driver places the dome lamp switch in the OFF position, the dome/courtesy lamps will be disabled. In the event that the dome lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position the BCM will deactivate the dome/courtesy lamps control circuit to prevent total battery discharge.

Reference Information

Schematic Reference

Interior Lights Schematics

Connector End View Reference

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Interior Lighting Systems Description and Operation

Electrical Information Reference

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Door Ajar Sw. parameter changes between Active and Inactive while opening and closing each vehicle door.
 - **If the parameter does not change**

Refer to **Door Ajar Indicator Malfunction** .

- **If the parameter changes**

3. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter changes between Door and On while placing the dome lamp switch in the Door and On positions.

- **If the parameter does not change**

Refer to Dome Lamp Switch Malfunction.

- **If the parameter changes**

4. Verify the dome/courtesy lamps turn ON and OFF while commanding the Courtesy Lamps ON and OFF with a scan tool.

- **If the dome/courtesy lamps do not turn ON and OFF**

Refer to Dome/Courtesy Lamp Malfunction.

- **If the dome/courtesy lamps turn ON and OFF**

5. All OK.

Circuit/System Testing

Dome Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S36 Instrument Panel Dimmer switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the ground circuit terminal 4 and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Ignition ON.
4. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is Door.
 - **If On**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 3 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Door**
5. Install a 3 A fused jumper wire between the signal circuit terminal 3 and ground.
6. Verify the scan tool Interior/Courtesy Lighting Master Switch parameter is On.

- **If not On**

1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 3 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If On**

7. Test or replace the S36 Instrument Panel Dimmer switch.

Dome/Courtesy Lamps Malfunction

1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connector at the inoperative dome/courtesy lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the appropriate ground circuit terminal listed below and ground.

- E8J Instrument Panel Courtesy Lamp - Left terminal 2
- E8K Instrument Panel Courtesy Lamp - Right terminal 2
- E37LF Dome/Reading Lamps - Left Front terminal 4
- E37RF Dome/Reading Lamps - Right Front terminal 4

- **If 10 ohms or greater**

1. Ignition OFF.
2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.

- **If less than 10 ohms**

3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - E8J Instrument Panel Courtesy Lamp - Left terminal 1
 - E8K Instrument Panel Courtesy Lamp - Right terminal 1
 - E37LF Dome/Reading Lamps - Left Front terminal 3
 - E37RF Dome/Reading Lamps - Right Front terminal 3
4. Verify the test lamp turns ON and OFF when commanding the Courtesy Lamps ON and OFF with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
- 1. Ignition OFF, disconnect the X7 harness connectors at the K9 Body Control Module, ignition ON.
- 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
- 5. Test or replace the appropriate dome/reading/courtesy lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Floor Flood Lamp Replacement (Left Side), Front Floor Flood Lamp Replacement (Right Side)**
- **Center Reading and Courtesy Lamp Lens Replacement**
- **Control Module References** for BCM replacement, programming and setup

REAR FOG LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Fog Lamp Switch Signal	B3588 00	2	2	-
Rear Fog Lamps Control	B2540 02	B2540 04	1	-
Fog Lamp - Left Rear Ground	-	1	-	-
Fog Lamp - Right Rear Ground	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	2	-	-

2. Rear Fog Lamp Switch Malfunction

Circuit/System Description

The rear fog lamp switch signal circuit is grounded momentarily by pressing the rear fog lamp switch. The body control module (BCM) responds to the rear fog lamp request by applying voltage to the rear fog lamp control circuit which illuminates the rear fog lamp.

Reference Information

Schematic Reference

Fog Lights Schematics

Connector End View Reference

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- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON, headlamps ON.
2. Verify the scan tool Rear Fog Lamps Switch parameter changes between Active and Inactive while commanding the rear fog lamp ON and OFF with the rear fog lamp switch.
 - **If the parameter does not change**

Refer to Rear Fog Lamp Switch Malfunction.
 - **If the parameter changes**
3. Verify the rear fog lamp turns ON and OFF when commanding the Rear Fog Lamps ON and OFF with a scan tool.

- **If the rear fog lamp does not turn ON and OFF**

Refer to Rear Fog Lamp Malfunction.

- **If the rear fog lamp turns ON and OFF**

4. Verify the rear fog lamp indicator on the instrument cluster turns ON and OFF while commanding the rear fog lamp ON and OFF with the rear fog lamp switch.

- **If the rear fog lamp indicator does not turn ON and OFF**

Refer to Rear Fog Lamp Indicator Malfunction.

- **If the rear fog lamp indicator turns ON and OFF**

5. All OK.

Circuit/System Testing

Rear Fog Lamp Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the ground circuit terminal 6 and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Ignition ON.
4. Verify the scan tool Rear Fog Lamp Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 1 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and the ground circuit terminal 6.
6. Verify the scan tool Rear Fog Lamp Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module,

ignition ON.

2. Test for less than 1 V between the signal circuit terminal 1 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
- **If Active**
7. Test or replace the S78 Turn Signal/Multifunction Switch.

Rear Fog Lamp Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connectors at the components listed below.
 - E42L Tail Lamp Assembly - Left
 - E42R Tail Lamp Assembly - Right
2. Test for less than 5 ohms between each ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the each control circuit terminal 5 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Rear Fog Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.

- If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**

5. Test or replace the appropriate E42 Tail Lamp Assembly.

Rear Fog Lamp Indicator Malfunction

1. Ignition ON.
2. Verify the rear fog lamp indicator turns ON and OFF when commanding the Instrument Cluster All Indicators Test ON and OFF with a scan tool.

- **If the rear fog lamp indicator is always OFF or remains ON**

Replace the P16 Instrument Cluster.

- **If the rear fog lamp indicator turns ON and OFF**

3. Replace the K9 Body Control Module.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Turn Signal Multifunction Switch Replacement
- Rear Fascia Lower Signal Lamp Replacement
- Control Module References for BCM and instrument cluster replacement, programming and setup

HAZARD LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.
- Review Strategy Based Diagnosis for an overview of the diagnostic approach.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Hazard Warning Switch Signal	1	1	1	B3596 00
Hazard Warning Switch LED Backlighting Control	2	2	2	-
Hazard Warning Switch Ground	-	1, 2	-	-

2. Hazard Warning Switch Backlighting Malfunction

Circuit/System Description

The hazard flashers may be activated in any power mode. The hazard warning switch signal circuit is momentarily grounded when the hazard warning switch is pressed. The body control module (BCM) responds to the hazard warning switch signal input by supplying battery voltage to all four turn signal lamps in an ON and OFF duty cycle. When the hazard warning switch is activated, the BCM sends a serial data message to the instrument cluster requesting both turn signal indicators to be cycled ON and OFF.

The instrument panel dimmer switch controls are located on the headlamp switch assembly and are used to increase and decrease the brightness of the interior backlighting components. When the instrument panel dimmer switch is placed in a desired brightness position, the body control module (BCM) receives a signal from the instrument panel dimmer switch and responds by applying a pulse width modulated (PWM) voltage to the hazard warning switch LED backlighting control circuit illuminating the LED to the desired level of brightness.

Reference Information

Schematic Reference

- **Exterior Lights Schematics**
- **Interior Lights Dimming Schematics**

Connector End View Reference

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- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Hazard Lamps Switch parameter changes between Active and Inactive while commanding the hazard lamps ON and OFF with the hazard warning switch.
 - **If the parameter does not change**

Refer to Hazard Warning Switch Malfunction.
 - **If the parameter changes**
3. Verify all left and right turn signal lamps turn ON and OFF while commanding the hazard lamps ON and OFF with the hazard warning switch.
 - **If all turn signal lamps do not turn ON and OFF**

Refer to Turn Signal Lamps and/or Indicators Malfunction
 - **If all turn signal lamps turn ON and OFF**
4. Verify the hazard warning switch backlighting turns ON and OFF while commanding the Hazard Lamps Switch Backlight ON and OFF with a scan tool.
 - **If the hazard warning switch backlighting does not turn ON and OFF**

Refer to Hazard Warning Switch Backlighting Malfunction.
 - **If the hazard warning switch backlighting turns ON and OFF**
5. All OK.

Hazard Warning Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool Hazard Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.

- If infinite resistance, replace the K9 Body Control Module.
- **If Inactive**
- 5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and ground.
- 6. Verify the scan tool Hazard Lamps Switch parameter is Active.
 - **If not Active**
 - 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 - 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 - 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
- 7. Test or replace the S48A Multifunction Switch - Instrument Panel.

Hazard Warning Switch Backlighting Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S48A Multifunction Switch - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 - 1. Ignition OFF.
 - 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Hazard Lamps Switch Backlight ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 - 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 - 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 - 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the S48A Multifunction Switch - Instrument Panel.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

Control Module References for BCM replacement, programming and setup

HEADLAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Headlamp Low Beam Relay Control	B258A 02, B258A 04	B258A 02, B258A 04	B258A 01	-
Headlamp High Beam Relay Control	B2580 02, B2580 04	B2580 02, B2580 04	B2580 01	-
Low Beam Headlamp Control - Left	1	1	1	-
Low Beam Headlamp Control - Right	1	1	1	-
High Beam Headlamp Control - Left	2	2	2	-
High Beam Headlamp Control - Right	2	2	2	-
Turn Signal/Multifunction Switch Park Lamps ON Signal	3	B257A 00	3	-
Turn Signal/Multifunction Switch Headlamps OFF Signal	B257A 00	3	3	-

Headlamps ON Signal	B257A 00	3	3	-
Turn Signal/Multifunction Switch Flash To Pass Signal	B3806 00	3	3	-
Turn Signal/Multifunction Switch High Beam Signal	B3650 08	3	3	-
Headlamp Ground - Left	-	1	-	-
Headlamp Ground - Right	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	3	-	-
1. Headlamps Malfunction - Low Beam 2. Headlamps Malfunction - High Beam 3. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

For headlamp operation, the body control module (BCM) monitors three signal circuits from the turn signal/multifunction switch. When the turn signal/multifunction switch is in the AUTO position, the three signal circuits are unaffected (open) and the BCM relies on the ambient light sensor input to turn the headlamps and daytime running lamps (DRLs) ON and OFF. When the turn signal/multifunction switch is placed in the OFF position, the turn signal/multifunction switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the turn signal/multifunction switch in the PARK LAMPS position, the turn signal/multifunction switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the turn signal/multifunction switch is in the HEADLAMP position, both the turn signal/multifunction switch park lamps ON signal circuit and the turn signal/multifunction switch headlamps ON signal circuit are grounded. The BCM responds to the low beam request by applying ground to the low beam relay control circuit which energizes the low beam relay. With the low beam relay energized, the switch contacts close allowing battery voltage to flow through the left and right low beam fuses to the low beam control circuits illuminating the low beam headlamps.

The high beam and flash to pass functions are contained within the turn signal/multifunction switch. The BCM provides the turn signal/multifunction switch with two signal circuits, the high beam signal circuit and the flash to pass signal circuit. When the low beam headlamps are ON and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the BCM through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the left and right high beam fuses to the high beam control circuits actuating the left and right high beam solenoid actuators opening the right and left high beam shutters exposing the full headlamps for high beam operation.

When the turn signal/multifunction switch is momentarily placed in the flash to pass position, ground is applied to the BCM through the flash to pass signal circuit. The BCM responds by applying ground to the high beam relay control circuit which energizes the high beam relay illuminating the high beams for a brief moment or until the flash to pass switch is released.

Reference Information

Schematic Reference

- **Headlights/Daytime Running Lights (DRL) Schematics**
- **Body Control System Schematics**

Connector End View Reference

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Headlamps On Switch parameter changes between Active and Inactive while commanding the headlamp ON and OFF with the turn signal/multifunction switch.
 - **If the parameter does not change**

Refer to Turn Signal/Multifunction Switch Malfunction.
 - **If the parameter changes**
3. Verify the scan tool Automatic Headlamps Disable Switch parameter changes between Active and Inactive while commanding the automatic lamp control ON and OFF with the turn signal/multifunction switch.
 - **If the parameter does not change**

Refer to Turn Signal/Multifunction Switch Malfunction.
 - **If the parameter changes**
4. Verify the scan tool Headlamps Flash Switch parameter changes between Active and Inactive while commanding the flash to pass ON and OFF with the turn signal/multifunction switch.

Refer to Turn Signal/Multifunction Switch Malfunction.

- **If the parameter changes**

5. Verify the scan tool High Beam Select Switch parameter changes between Active and Inactive while commanding the high beams ON and OFF with the turn signal/multifunction switch.

- **If the parameter does not change**

Refer to Turn Signal/Multifunction Switch Malfunction.

- **If the parameter changes**

6. Verify the left low beam/daytime running lamp turn ON and OFF when commanding the Left Low Beam/Daytime Running Lamp ON and OFF with a scan tool.

- **If the left low beam/daytime running lamp does not turn ON and OFF**

Refer to Headlamps Malfunction - Low Beam.

- **If the left low beam/daytime running lamp turns ON and OFF**

7. Verify the right low beam/daytime running lamp turn ON and OFF when commanding the Right Low Beam/Daytime Running Lamp ON and OFF with a scan tool.

- **If the right low beam/daytime running lamp does not turn ON and OFF**

Refer to Headlamps Malfunction - Low Beam.

- **If the right low beam/daytime running lamp turns ON and OFF**

8. Verify the high beams turn ON and OFF when commanding the High Beams ON and OFF with a scan tool.

- **If the high beams do not turn ON and OFF**

Refer to Headlamps Malfunction - High Beam.

- **If the high beams turn ON and OFF**

9. Verify the high beam indicator on the instrument cluster turns ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.

- **If the high beam indicator does not turn ON and OFF**

Refer to High Beam Indicator Malfunction.

- **If the high beam indicator turns ON and OFF**

10. All OK.

Circuit/System Testing

Turn Signal/Multifunction Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the ground circuit terminal 6 and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Ignition ON.
4. Verify the scan tool Automatic Headlamps Disable Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 9 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 9 and ground.
6. Verify the scan tool Automatic Headlamps Disable Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 9 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
7. Verify the scan tool Park Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 7 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
8. Install a 3 A fused jumper wire between the signal circuit terminal 7 and ground.

9. Verify the scan tool Park Lamps Switch parameter is Active.
- **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 7 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
10. Verify the scan tool Headlamps On Switch parameter is Inactive.
- **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 2 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
11. Install a 3 A fused jumper wire between the signal circuit terminal 2 and ground.
12. Verify the scan tool Headlamps On Switch parameter is Active.
- **If not Active**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 2 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
13. Verify the scan tool High Beam Select Switch parameter is Inactive.
- **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 11 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**

15. Verify the scan tool High Beam Select Switch parameter is Active.
- **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 11 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
16. Verify the scan tool Headlamps Flash Switch parameter is Inactive.
- **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 12 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
17. Install a 3 A fused jumper wire between the signal circuit terminal 12 and ground.
18. Verify the scan tool Headlamps Flash Switch parameter is Active.
- **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 12 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
19. Test or replace the S78 Turn Signal/Multifunction Switch.

Headlamps Malfunction - Low Beam

1. Ignition OFF, disconnect the KR49 Headlamp Low Beam Relay.
2. Verify a test lamp illuminates between the B+ circuit terminal 86 and ground.
 - **If the test lamp does not illuminate**

Replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

3. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.

- **If the test lamp does not illuminate**

Replace the X50A Fuse Block - Underhood.

- **If the test lamp illuminates**

4. Connect a test lamp between the control circuit terminal 85 and B+, ignition ON.
5. Verify the test lamp turns ON and OFF when commanding the Low Beams ON and OFF with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Ignition OFF.
4. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

6. Ignition OFF, exterior lamps OFF, connect the KR49 Headlamp Low Beam Relay.
7. Disconnect the harness connector at the appropriate E13 headlamp Assembly.
8. Test for less than 5 ohms between the ground circuit terminal 8 and ground.

- **If 5 ohms or greater**

1. Ignition OFF.
2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.

- **If less than 5 ohms**

9. Connect a test lamp between the control circuit terminal 4 and ground, ignition ON.
10. Verify the test lamp turns ON and OFF when commanding the Low Beams ON and OFF with a scan tool.

1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the KR49 Headlamp Low Beam Relay.
 - **If the test lamp is always ON**
1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the KR49 Headlamp Low Beam Relay.
 - **If the test lamp turns ON and OFF**
11. Test or replace the appropriate E13 Headlamp Assembly.

Headlamps Malfunction - High Beam

1. Ignition OFF, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Verify a test lamp illuminates between the control circuit terminal 18 and ground.
 - **If the test lamp does not illuminate**
 - 1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood.
 - 2. Test for infinite resistance between the control circuit terminal and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 - 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the X50A Fuse Block - Underhood.
 - **If the test lamp illuminates**
3. Ignition OFF, connect a 3 A fused jumper between the control circuit terminal 18 and ground.
4. Remove the F51UA fuse at the X50A Fuse Block - Underhood.
5. Verify a test lamp illuminates between the F51UA fuse B+ switch control terminal and ground.
 - **If the test lamp does not illuminate**
 - 1. Ignition OFF, disconnect the X3 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 - 2. Test for less than 1 V between the control circuit terminal 18 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the X50A Fuse Block - Underhood.

6. Ignition OFF, connect the X5 harness connector at the K9 Body Control Module.
7. Install the F51UA fuse at the X50A Fuse Block - Underhood.
8. Disconnect the harness connector at the appropriate E13 Headlamp Assembly.
9. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
10. Connect a test lamp between the control circuit terminal 5 and ground, ignition ON.
11. Verify the test lamp turns ON and OFF when commanding the High Beams ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the X50A Fuse Block - Underhood.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the X50A Fuse Block - Underhood.
 - **If the test lamp turns ON and OFF**
12. Test or replace the appropriate E13 Headlamp Assembly.

High Beam Indicator Malfunction

1. Ignition ON.
2. Verify the high beam indicator turns ON and OFF when commanding the Instrument Cluster All Indicators Test ON and OFF with a scan tool.
 - **If the high beam indicator is always OFF or remains ON**

Replace the P16 Instrument Cluster.

3. Replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement**
- **Relay Replacement (Within an Electrical Center)** , **Relay Replacement (Attached to Wire Harness)**
- **Turn Signal Multifunction Switch Replacement**
- **Front Compartment Fuse Block Replacement**
- **Control Module References** for BCM or Instrument Cluster replacement, programming and setup

INTERIOR BACKLIGHTING MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Instrument Panel Dimmer Switch B+	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
Instrument Panel Dimmer Switch Signal	B1395 03, B3600 03	B1395 03, B3600 03	B1395 07, B3600 07	-
LED Backlight Dimming Control Terminal 8 X2	B2610 02	B2610 04	1	-
LED Backlight Dimming Control Terminal 9 X7	B2610 02	B2610 04	1	-
Switch Indicator LED Backlight Dimming Control Terminal 17 X1	B2625 02	B2625 04	B2625 01	-
Instrument Panel Dimmer Switch Low Reference	1	1	1	-
Door Handle Switch - Driver Interior Ground	-	2	-	-
Door Handle Switch - Passenger Interior Ground	-	2	-	-
	-	2	-	-

Ground				
Door Lock Switch - Passenger Ground	-	2	-	-
Folding Top Control Switch Ground	-	2	-	-
Heads - Up Display Switch Ground	-	2	-	-
Ignition Mode Switch Ground	-	2	-	-
Instrument Panel Dimmer Switch Ground	-	2	-	-
Multifunction Switch - Center Console Ground	-	2	-	-
Multifunction Switch 1 - Instrument Panel Ground	-	2	-	-
Multifunction Switch 2 - Instrument Panel Ground	-	3	-	-
Outside Rearview Mirror Switch Ground	-	2	-	-
Park Brake Control Switch Ground	-	2	-	-
Seat Memory Switch - Driver Ground	-	2	-	-
Steering Wheel Controls Switch - Left Upper Ground	-	2	-	-
Steering Wheel Controls Switch - Left Lower Ground	-	2	-	-
Steering Wheel Controls Switch - Right Upper Ground	-	2	-	-
Steering Wheel Controls Switch - Right Lower Ground	-	2	-	-
Window Switch - Driver Ground	-	2	-	-
Window Switch - Passenger Ground	-	2	-	-
1. Dimmer Switch Malfunction 2. Interior Backlighting Malfunction 3. Switch Indicator LED Backlighting Malfunction				

Circuit/System Description

The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal and a B+ circuit

desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming 1 and dimming 2 control circuits as well as the switch indicator LED control circuit illuminating the interior backlighting and switch indicator LED's to the requested level of brightness.

Reference Information

Schematic Reference

Interior Lights Dimming Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool LED Backlight Dimming Command parameter changes between a high percentage to a low percentage while operating the dimmer switch from high to low.
 - **If the parameter does not change**

Refer to Dimmer Switch Malfunction.
 - **If the parameter changes**
3. Verify the switch indicator LED's for the S48D multifunction switch 2 - instrument panel turn ON and OFF while commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the switch indicator LED's do not turn ON and OFF**

Refer to Switch Indicator LED Backlighting Malfunction.

- **If the switch indicator LED's turn ON and OFF**

4. Verify the steering wheel control switches and driver window switch backlighting turn ON and OFF while commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the steering wheel control switches and driver window switch backlighting does not turn ON and OFF**

Refer to Serial Data Backlighting Malfunction.

- **If the steering wheel control switches and driver window switch backlighting turns ON and OFF**

5. Verify all backlighting components turn ON and OFF while commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If all backlighting components do not turn ON and OFF**

Refer to Interior Backlighting Malfunction.

- **If all backlighting components turn ON and OFF**

6. All OK.

Circuit/System Testing

Dimmer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S36 Instrument Panel Dimmer Switch, ignition ON.
2. Test for B+ between the B+ circuit terminal 6 and ground.
 - **If less than B+**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If B+**
3. Verify a test lamp illuminates between the B+ circuit terminal 6 and the low reference circuit terminal 1.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.

2. Test for less than 1 V between the low reference circuit terminal 1 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the low reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp illuminates**
4. Verify a test lamp does not illuminate between the B+ circuit terminal 6 and the signal circuit terminal 2.
 - **If the test lamp illuminates**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If the test lamp does not illuminate**
5. Test for B+ between the B+ circuit terminal 6 and the signal circuit terminal 2.
 - **If less than B+**
 1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 2 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If B+**
6. Test or replace the S36 Instrument Panel Dimmer Switch.

Interior Backlighting Malfunction

NOTE: Each component with backlighting may need to be disconnected to isolate a short to voltage or short to ground. Use the schematics to identify the following:

- Backlighting components the vehicle is equipped with
- Each component's control and ground circuit terminals
- Component locations on the backlighting control circuit

1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connector at the

power down.

2. Test for less than 15 ohms between the appropriate ground circuit terminal and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Connect a test lamp between the appropriate control circuit terminal and ground.
4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X2 terminal 8
 - X7 terminal 9
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
 - X2 terminal 8
 - X7 terminal 9
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the component with inoperative backlighting.

Serial Data Backlighting Malfunction

1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connector at the component with inoperative backlighting. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the appropriate ground circuit terminal listed below and

- S70A Steering Wheel Controls Switch - Left Lower terminal 1
- S70C Steering Wheel Controls Switch - Left Upper terminal 1
- S70B Steering Wheel Controls Switch - Right Lower terminal 2
- S70D Steering Wheel Controls Switch - Right Upper terminal 10
- S79D Window Switch - Driver terminal 1
- **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
- 3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - S70A Steering Wheel Controls Switch - Left Lower terminal 4
 - S70C Steering Wheel Controls Switch - Left Upper terminal 3
 - S70B Steering Wheel Controls Switch - Right Lower terminal 5
- 4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the harness connector at the S70D Steering Wheel Controls Switch - Right Upper.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the S70D Steering Wheel Controls Switch - Right Upper.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the harness connector at the S70D Steering Wheel Controls Switch - Right Upper.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the S70D Steering Wheel Controls Switch - Right Upper.
 - **If the test lamp turns ON and OFF**
- 5. Test or replace the component with inoperative backlighting.

Switch Indicator LED Backlighting Malfunction

1. Ignition OFF, all doors closed, all accessories OFF, disconnect the harness connector at the

S48D Multifunction Switch 2 - Instrument Panel. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 15 ohms between the ground circuit terminal 3 and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground.
4. Verify the test lamp turns ON and OFF when commanding the LED Backlight Dimming ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate S48D Multifunction Switch 2 - Instrument Panel.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Front Side Door Window Switch Replacement
- Dimmer Switch Replacement
- Ignition and Start Switch Replacement
- Door Latch Release Switch Replacement - Passenger Side
- Door Lock Switch Replacement - Driver Side
- Door Lock Switch Replacement - Passenger Front

- **Driver Seat Adjuster Memory Switch Replacement**
- **Head-Up Display Dimmer Switch Replacement**
- **Parking Brake Actuator Switch Replacement**
- **Instrument Panel Accessory Switch Trim Panel Replacement**
- **Front Side Door Window Control Switch Replacement**
- **Control Module References** for BCM replacement, programming and setup

PARK, LICENSE, AND/OR TAIL LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal/Multifunction Switch Park Lamps ON Signal	2	B257A 00	2	-
Park Lamps Control - Left	1	1	1	-
Park Lamps Control - Right	1	1	1	-
License Plate Lamp Control	B3883 02	B3883 01, B3883 04	B3883 01	-
License Plate Lamp Ground - Left	-	B3883 01, B3883 04	-	-
License Plate Lamp Ground - Right	-	B3883 01, B3883 04	-	-
Side Marker Lamp Ground - Left Front	-	1	-	-
Side Marker Lamp Ground - Left Rear	-	1	-	-
Side Marker Lamp Ground - Right Front	-	1	-	-
Side Marker Lamp Ground - Right Rear	-	1	-	-
Tail Lamp Ground - Left	-	1	-	-
Tail Lamp Ground - Right	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	2	-	-
1. Park, License, and/or Tail Lamps Malfunction 2. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

When the headlamp switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the body control module (BCM). The BCM responds by applying voltage to the park lamps, tail lamps and license lamps control circuits illuminating the park, tail and license lamps.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Park Lamp Switch parameter changes between Active and Inactive while commanding the park lamps ON and OFF with the turn signal/multifunction switch.
 - **If the parameter does not change**

Refer to Turn Signal/Multifunction Switch Malfunction.
 - **If the parameter changes**
3. Verify the left park lamps turn ON and OFF when commanding the Left Park Lamps ON and OFF with a scan tool.
 - **If the left park lamps do not turn ON and OFF**

Refer to Park Lamps Malfunction.

- **If the left park lamps turn ON and OFF**

4. Verify the right park lamps turn ON and OFF when commanding the Right Park Lamps ON and OFF with a scan tool.

- **If the right park lamps do not turn ON and OFF**

Refer to Park Lamps Malfunction.

- **If the right park lamps turn ON and OFF**

5. Verify the license plate lamps turn ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.

- **If the license plate lamps do not turn ON and OFF**

Refer to License Plate Lamps Malfunction.

- **If the license plate lamps turn ON and OFF**

6. All OK.

Circuit/System Testing

Turn Signal/Multifunction Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal 6 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify the scan tool Park Lamps Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 7 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**

6. Verify the scan tool Park Lamps Switch parameter is Active.

- **If not Active**

1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal 7 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If Active**

7. Test or replace the S78 Turn Signal/Multifunction Switch.

Park Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate park lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the appropriate ground circuit terminal listed below and ground.
 - E2LF Side Marker Lamp - Left Front terminal 2
 - E13LA Headlamp Assembly - Left Terminal 3
 - E42L Tail Lamp Assembly - Left terminal 3
 - E2LR Side Marker Lamp - Left Rear terminal 2
 - E2RF Side Marker Lamp - Right Front terminal 2
 - E13RA Headlamp Assembly - Right Terminal 3
 - E42R Tail Lamp Assembly - Right terminal 3
 - E2RR Side Marker Lamp - Right Rear terminal 2
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground, ignition ON.
 - E2LF Side Marker Lamp - Left Front terminal 1
 - E13LA Headlamp Assembly - Left Terminal 2
 - E42L Tail Lamp Assembly - Left terminal 2
 - E2LR Side Marker Lamp - Left Rear terminal 1

- E2RF Side Marker Lamp - Right Front terminal 1
 - E13RA Headlamp Assembly - Right Terminal 2
 - E42R Tail Lamp Assembly - Right terminal 2
 - E2RR Side Marker Lamp - Right Rear terminal 1
4. Verify the test lamp turns ON and OFF when commanding the appropriate Park Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
 5. Test or replace the appropriate park lamp

License Plate Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, remove both E7 License Plate Lamp bulbs.
2. Test for less than 5 ohms between each ground circuit terminal 2 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the E7L License Plate Lamp - Left control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
- **If the test lamp is always ON**
- 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
- 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**
- 5. Connect a test lamp between the E7R License Plate Lamp - Right control circuit terminal 1 and ground, ignition ON.
- 6. Verify the test lamp turns ON and OFF when commanding the License Plate Lamps ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 - 1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
 - 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 - 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
- 7. Test or replace the appropriate E7 License Plate Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement**
- **Rear License Plate Lamp Replacement**
- **Front Side Marker Lamp Replacement**
- **Turn Signal Multifunction Switch Replacement**
- **Rear Fascia Auxiliary Signal Lamp Replacement**
- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Rear Compartment Courtesy Lamp Control	B2570 02	B2570 04	1	-
Rear Compartment Courtesy Lamp - Left Ground	-	1	-	-
Rear Compartment Courtesy Lamp - Right Ground	-	1	-	-
1. Rear Compartment Lamp Malfunction				

Circuit/System Description

The body control module (BCM) applies battery voltage to the rear compartment courtesy lamps through the rear compartment lamp control circuit. When the BCM receives a rear compartment lid open input from the rear compartment lid latch, the BCM applies battery voltage to the rear compartment lamp control circuit illuminating the rear compartment courtesy lamps. In the event that the rear compartment lamps were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position and no doors opened, the BCM will deactivate the rear compartment lamp control circuit to prevent total battery discharge.

Reference Information

Schematic Reference

Interior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Interior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
-

- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, exterior lamps OFF, trunk latch latched, disconnect the harness connectors at the E8E Rear Compartment Courtesy Lamp - Left and E8F Rear Compartment Courtesy Lamp - Right. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between each ground circuit terminal 2 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between each control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Trunk Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the X7 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E8 Rear Compartment Courtesy Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Rear Compartment Courtesy Lamp Replacement**
- **Control Module References** for BCM replacement, programming and setup

STOP LAMPS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Brake Pedal Position Sensor 5 V Reference	C0277 06, C0890 03, U0140 71	C0277 06, U0140 71	C0277 07, C0890 07, U0140 71	-
Brake Pedal Position Sensor Signal	C0277 06, U0140 71	C0277 06, U0140 71	C0277 07, C0890 07, U0140 71	C0277 09
Center High Mounted Stop Lamp Control	B3884 02	B3884 04	B3884 01	-
Stop Lamp Control - Left	1	1	1	-
Stop Lamp Control - Right	1	1	1	-
Brake Pedal Position Sensor Low Reference	-	C0277 07, U0140 71	1	-
Center High Mounted Stop Lamp Ground	-	2	-	-
Tail/Stop Lamp Ground - Left	-	1	-	-
Tail/Stop Lamp Ground - Right	-	1	-	-
1. Stop Lamps Malfunction 2. Center High Mounted Stop Lamp Malfunction				

Circuit/System Description

The brake pedal position (BPP) sensor is used to sense the action of the driver application of the brake pedal. The BPP sensor provides an analog voltage signal that will increase as the brake pedal is applied. The body control module (BCM) provides a low reference signal and a 5-volt reference voltage to the BPP sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the left and right stop lamp control

circuits as well as the center high mounted stop lamp (CHMSL) control circuit illuminating the left and right stop lamps and the CHMSL.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Brake Pedal Applied parameter changes between Active and Inactive while pressing and releasing the brake pedal.
 - **If the parameter does not change**

Refer to Brake Pedal Position Sensor Malfunction.
 - **If the parameter changes**
3. Verify the left brake lamp turns ON and OFF when commanding the Left Brake Lamp ON and OFF with a scan tool.
 - **If the left brake lamp does not turn ON and OFF**

Refer to Stop Lamps Malfunction.
 - **If the left brake lamp turns ON and OFF**

4. Verify the right brake lamp turns ON and OFF when commanding the Right Brake Lamp ON and OFF with a scan tool.

- **If the right brake lamp does not turn ON and OFF**

Refer to Stop Lamps Malfunction.

- **If the right brake lamp turns ON and OFF**

5. Verify the center high mounted stop lamp turns ON and OFF when commanding the Center Brake Lamp ON and OFF with a scan tool.

- **If the center high mounted stop does not turn ON and OFF**

Refer to Center High Mount Stop Lamp Malfunction.

- **If the center high mounted stop turns ON and OFF**

6. All OK.

Circuit/System Testing

Brake Pedal Position Sensor Malfunction

1. Ignition OFF, disconnect the harness connector at the B22 Brake Pedal Position Sensor, ignition ON.
2. Test for less than 1 V between the appropriate low reference circuit terminal listed below and ground.
 - Terminal A - without MYC
 - Terminal 2 - with MYC
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X1 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the low reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **If less than 1 V**
3. Test or replace the B22 Brake Pedal Position Sensor.

Stop Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate E42 Tail Lamp Assembly. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the ground circuit terminal 3 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.

2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the appropriate Brake Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X4 left stop lamp
 - X5 right stop lamp
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X4 left stop lamp
 - X5 right stop lamp
 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**
5. Test or replace the appropriate E42 Tail Lamp Assembly.

Center High Mount Stop Lamp Malfunction

1. Ignition OFF, exterior lamps OFF, rear hatch latch latched, disconnect the harness connector at the E6 Center High Mounted Stop Lamp.
2. Test for less than 5 ohms between the ground circuit terminal 2 and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.

- **If less than 5 ohms**

3. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
4. Verify the test lamp turns ON and OFF when commanding the Center Brake Lamp ON and OFF with a scan tool.

- **If the test lamp is always OFF**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If the test lamp is always ON**

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.

- **If the test lamp turns ON and OFF**

5. Test or replace the E6 Center High Mounted Stop Lamp.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **High Mount Stop Lamp Replacement**
- **Rear Fascia Lower Signal Lamp Replacement**
- **Brake Pedal Position Sensor Replacement**
- **Brake Pedal Position Sensor Calibration**
- **Control Module References** for BCM replacement, programming and setup

TURN SIGNAL LAMPS AND/OR INDICATORS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Turn Signal Switch Signal - Left	2	2	2	-
Turn Signal Switch Signal - Right	2	2	2	-
Turn Signal Control - Left Front	B3948 02	B3948 01, B3948 04	1	-
Turn Signal Control - Left Rear	B3950 02	B3950 01, B3950 04	1	-
Turn Signal Control - Right Front	B3949 02	B3949 01, B3949 04	1	-
Turn Signal Control - Right Rear	B3951 02	B3951 01, B3951 04	1	-
Outside Rearview Mirror Ground - Driver	-	1	-	-
Outside Rearview Mirror Ground - Passenger	-	1	-	-
Turn Signal Lamp Ground - Left Front	-	1	-	-
Turn Signal Lamp Ground - Right Front	-	1	-	-
Turn Signal Lamp Ground - Left Rear	-	1	-	-
Turn Signal Lamp Ground - Right Rear	-	1	-	-
Turn Signal/Multifunction Switch Ground	-	2	-	-
1. Turn Signal Lamps and/or Indicators Malfunction 2. Turn Signal/Multifunction Switch Malfunction				

Circuit/System Description

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the turn right or turn left position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Reference Information

Schematic Reference

Exterior Lights Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Exterior Lighting Systems Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Right Turn Signal Switch and Left Turn Signal Switch parameters change between Active and Inactive while cycling the turn signal switch between the right and left positions.
 - **If the parameters do not change**

Refer to Turn Signal/Multifunction Switch Malfunction.
 - **If the parameters change**
3. Verify the left front turn signal lamps turn ON and OFF while commanding the Left Front Turn Signal Lamp ON and OFF with a scan tool.
 - **If the left front turn signal lamps do not turn ON and OFF**

Refer to Turn Signal Lamps Malfunction.
 - **If the left front turn signal lamps turn ON and OFF**
4. Verify the right front turn signal lamps turn ON and OFF while commanding the Right Front Turn Signal Lamp ON and OFF with a scan tool.
 - **If the right front turn signal lamps do not turn ON and OFF**

Refer to Turn Signal Lamps Malfunction.

- **If the right front turn signal lamps turn ON and OFF**

5. Verify the left rear turn signal lamp turns ON and OFF while commanding the Left Rear Turn Signal Lamp ON and OFF with a scan tool.

- **If the left rear turn signal lamp does not turn ON and OFF**

Refer to Turn Signal Lamps Malfunction.

- **If the left rear turn signal lamp turns ON and OFF**

6. Verify the right rear turn signal lamp turns ON and OFF while commanding the Right Rear Turn Signal Lamp ON and OFF with a scan tool.

- **If the right rear turn signal lamp does not turn ON and OFF**

Refer to Turn Signal Lamps Malfunction.

- **If the right rear turn signal lamp turns ON and OFF**

7. Observe the left and right turn signal lamps and turn signal indicators on the IPC while activating the left and right turn signals. The left and right turn signal lamps and indicators should illuminate and flash at a normal rate when turned ON.

- **If the left and right turn signal lamps and indicators illuminate but flash in a rapid manner**

Refer to Turn Signal Lamp Outage Detection Malfunction.

- **If the left and right turn signal lamps and indicators operate normally**

8. Verify the left and right turn signal indicators turn ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.

- **If the left or right turn signal indicators do not turn ON and OFF**

Refer to Turn Signal Indicators Malfunction.

- **If the left and right turn signal indicators turn ON and OFF**

9. All OK.

Circuit/System Testing

Turn Signal/Multifunction Switch Malfunction

1. Ignition OFF, scan tool disconnected, all doors closed, all accessories OFF, disconnect the harness connector at the S78 Turn Signal/Multifunction Switch. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 5 ohms between the ground circuit terminal 6 and ground.

- **If 5 ohms or greater**

1. Ignition OFF.

- If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
- 3. Ignition ON.
- 4. Verify the scan tool Left Turn Signal Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
- 5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and ground.
- 6. Verify the scan tool Left Turn Signal Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 5 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
- 7. Verify the scan tool Right Turn Signal Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 4 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
- 8. Install a 3 A fused jumper wire between the signal circuit terminal 4 and ground.
- 9. Verify the scan tool Right Turn Signal Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 4 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.

3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.

- **If Active**

10. Test or replace the S78 Turn Signal/Multifunction Switch.

Turn Signal Lamps Malfunction

1. Ignition OFF, exterior lamps OFF, disconnect the harness connector at the appropriate turn signal lamp. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 5 ohms between the appropriate ground circuit terminal listed below and ground.
 - A9A Outside Rearview Mirror - Driver terminal 10
 - A9B Outside Rearview Mirror - Passenger terminal 10
 - E13LA Headlamp Assembly - Left terminal 3
 - E13RA Headlamp Assembly - Right terminal 3
 - E42L Tail Lamp Assembly - Left terminal 3
 - E42R Tail Lamp Assembly - Right terminal 3
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Connect a test lamp between the appropriate control circuit terminal listed below and ground.
 - A9A Outside Rearview Mirror - Driver terminal 6
 - A9B Outside Rearview Mirror - Passenger terminal 6
 - E13LA Headlamp Assembly - Left terminal 6
 - E13RA Headlamp Assembly - Right terminal 6
 - E42L Tail Lamp Assembly - Left terminal 7
 - E42R Tail Lamp Assembly - Right terminal 7
4. Verify the test lamp turns ON and OFF when commanding the appropriate Turn Signal Lamp ON and OFF with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X5 left turn signals
 - X4 right turn signals
 2. Test for infinite resistance between the control circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
- **If the test lamp is always ON**
- 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
 - X5 left turn signals
 - X4 right turn signals
- 2. Test for less than 1 V between the control circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp turns ON and OFF**
- 5. Test or replace the appropriate turn signal lamp.

Turn Signal Lamp Outage Detection Malfunction

1. Ignition OFF, disconnect the harness connector at the appropriate component listed below, ignition ON.
 - E13LA Headlamp Assembly - Left
 - E13RA Headlamp Assembly - Right
 - E42L Tail Lamp Assembly - Left
 - E42R Tail Lamp Assembly - Right
2. Test for B+ between the appropriate signal circuit terminal listed below and ground.
 - E13LA Headlamp Assembly - Left terminal 7
 - E13RA Headlamp Assembly - Right terminal 7
 - E42L Tail Lamp Assembly - Left terminal 8
 - E42R Tail Lamp Assembly - Right terminal 8
- **If not B+**
1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module.
 - X4 front turn signals
 - X6 rear turn signals
2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 ohms in the signal circuit end to end.

- If less than 2 ohms, replace the K9 Body Control Module.
- **If B+**
- 3. Verify a test lamp does not illuminate between the appropriate signal circuit terminal listed below and ground.
 - E13LA Headlamp Assembly - Left terminal 7
 - E13RA Headlamp Assembly - Right terminal 7
 - E42L Tail Lamp Assembly - Left terminal 8
 - E42R Tail Lamp Assembly - Right terminal 8
- **If the test lamp illuminates**
- 1. Ignition OFF, disconnect the appropriate harness connector listed below at the K9 Body Control Module, ignition ON.
 - X4 front turn signals
 - X6 rear turn signals
- 2. Test for less than 1 V between the signal circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **If the test lamp does not illuminate**
- 4. Test or replace the appropriate lamp assembly.

Turn Signal Indicators Malfunction

1. Ignition ON.
2. Verify the left and right turn signal indicators turn ON and OFF while commanding the All Indicators Test ON and OFF with a scan tool.
 - **If the left or right turn signal indicators are always OFF or remain ON**

Replace the P16 Instrument Cluster.

 - **If the left and right turn signal indicators turn ON and OFF**
3. Replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Headlamp Replacement**
- **Turn Signal Multifunction Switch Replacement**
- **Outside Rearview Mirror Replacement**
- **Rear Fascia Lower Signal Lamp Replacement**
- **Control Module References** for BCM or Instrument Cluster replacement, programming and setup

REPAIR INSTRUCTIONS

BRAKE PEDAL POSITION SENSOR CALIBRATION

NOTE: Brake system does not use a brake switch, stoplight switch or brakelight switch. System uses a Brake Pedal Position Sensor to control these functions.

Calibration Criteria

NOTE: Do not apply the brake pedal during the brake pedal position sensor calibration procedure. Any movement of the brake pedal during this procedure will cause the calibration procedure to fail. If this occurs, the brake pedal position sensor calibration must be repeated.

Brake pedal position sensor calibration must be performed after the brake pedal position sensor, body control module (BCM) or engine control module (ECM) have been serviced. The calibration procedure will set the brake pedal position sensor home value. This value is used by the BCM and ECM to determine the action of the driver applying the brake system and to provide this information to the vehicle subsystems via serial data.

Calibration Procedure

1. Apply the parking brake.
2. Ignition ON, engine OFF, place the transmission in the PARK position for automatic transmission or NEUTRAL position for manual transmission.
3. Install a scan tool.
4. Clear all DTCs before proceeding.
5. Navigate to the Configuration/Reset Functions menu of the BCM.
6. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.
7. Navigate to the Configuration/Reset Functions menu of the ECM.
8. Select the Learn Functions menu.
9. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.

BRAKE PEDAL POSITION SENSOR REPLACEMENT

NOTE: Brake system does not use a brake switch, stoplight switch or brakelight switch. System uses a Brake Pedal Position Sensor to control these functions.

Removal Procedure

1. Remove the left side instrument panel insulator panel. Refer to **Instrument Panel Insulator Panel Replacement - Left Side** .

2. Disconnect the brake pedal position sensor electrical connector.

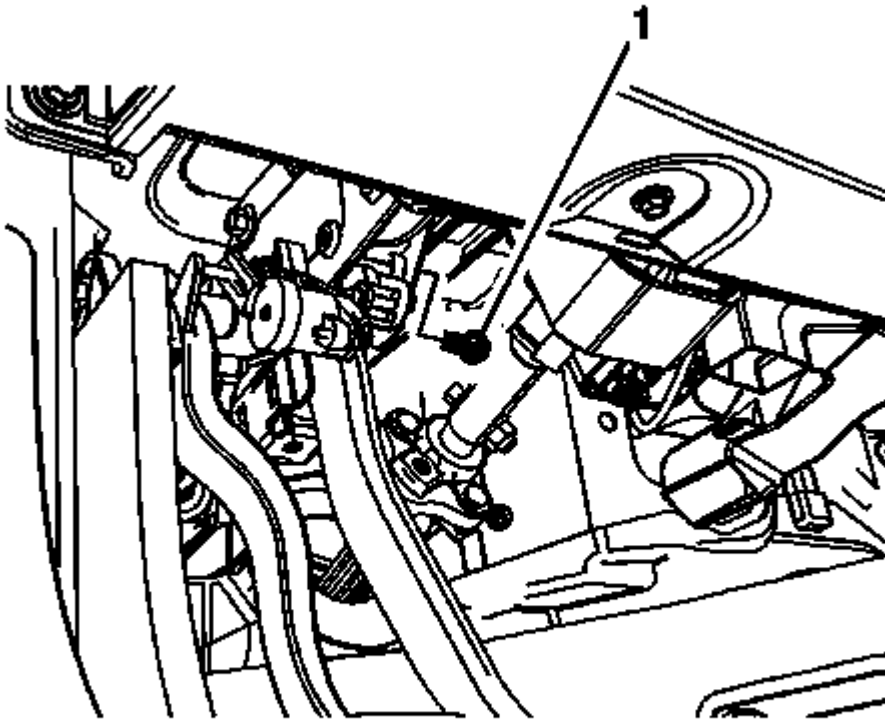


Fig. 17: Brake Pedal Position Sensor Bolt
Courtesy of GENERAL MOTORS COMPANY

NOTE: Do not reuse the brake pedal position sensor bolt.

3. Remove the brake pedal position sensor bolt (1).
4. Discard the brake pedal position sensor bolt.

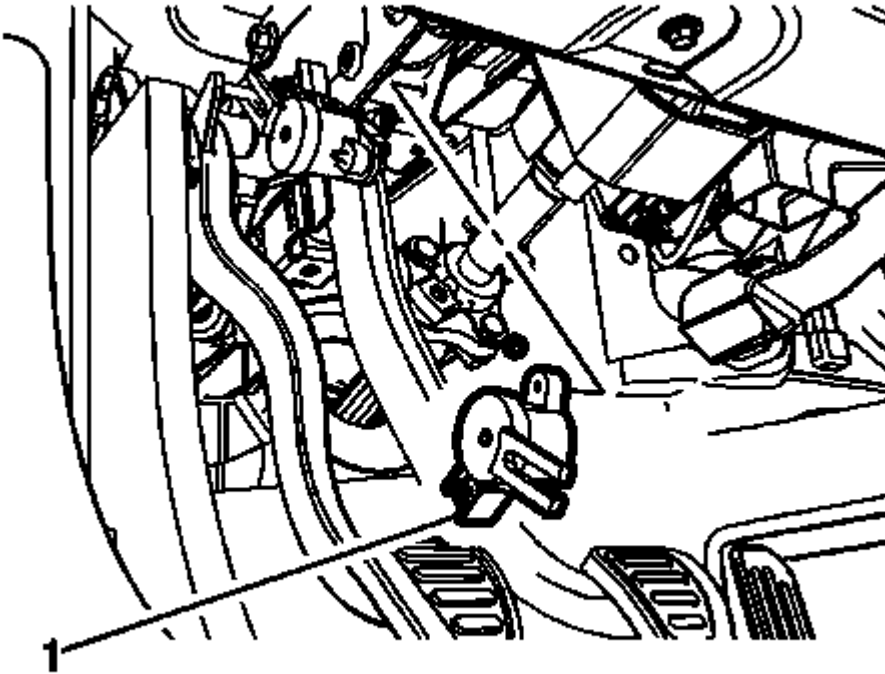


Fig. 18: Brake Pedal Position Sensor
Courtesy of GENERAL MOTORS COMPANY

5. Remove the brake pedal position sensor (1).

Installation Procedure

1. Position the fork of the brake pedal position sensor over the brake pedal pin.

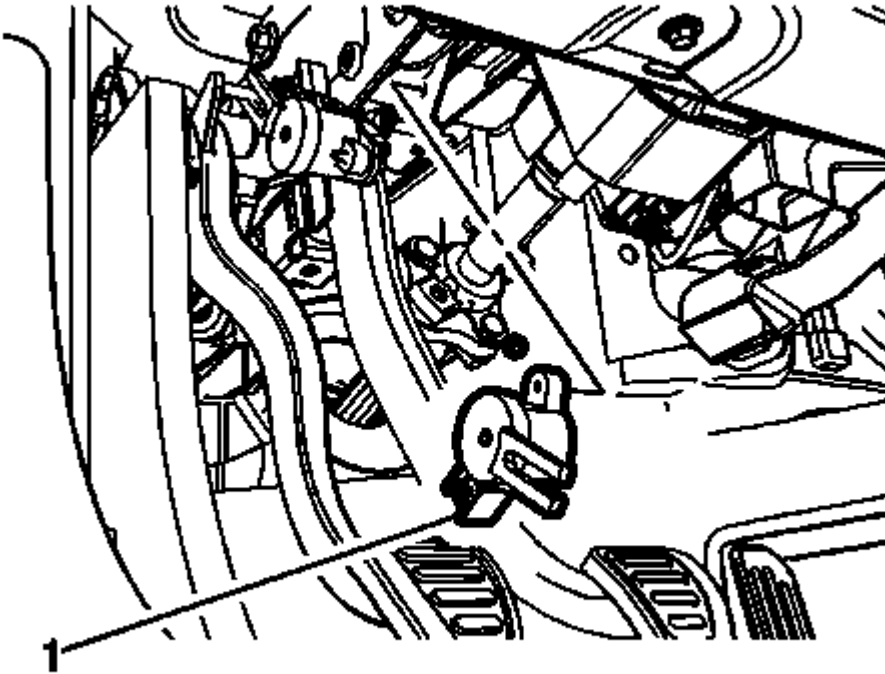


Fig. 19: Brake Pedal Position Sensor
Courtesy of GENERAL MOTORS COMPANY

2. Align the brake pedal position sensor locating pin and install the brake pedal position sensor (1).

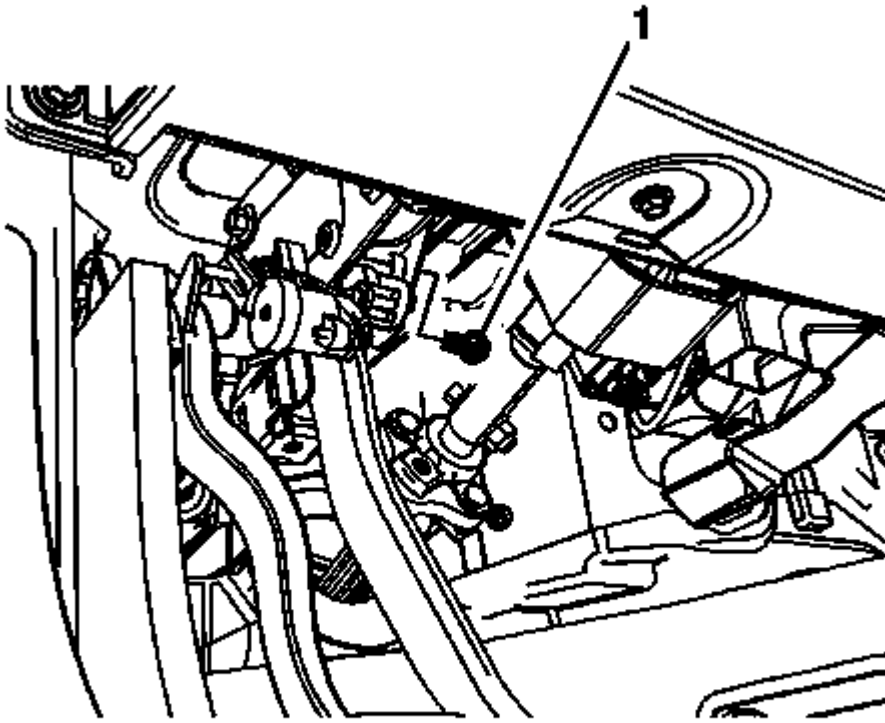


Fig. 20: Brake Pedal Position Sensor Bolt
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

3. Install the new brake pedal position sensor bolt (1) and tighten to 2 (18 lb in).
4. Connect the brake pedal position sensor electrical connector.
5. Install the left side instrument panel insulator panel. Refer to Instrument Panel Insulator Panel Replacement - Left Side .
6. Calibrate the brake pedal position sensor. Refer to Brake Pedal Position Sensor Calibration.

DIMMER SWITCH REPLACEMENT

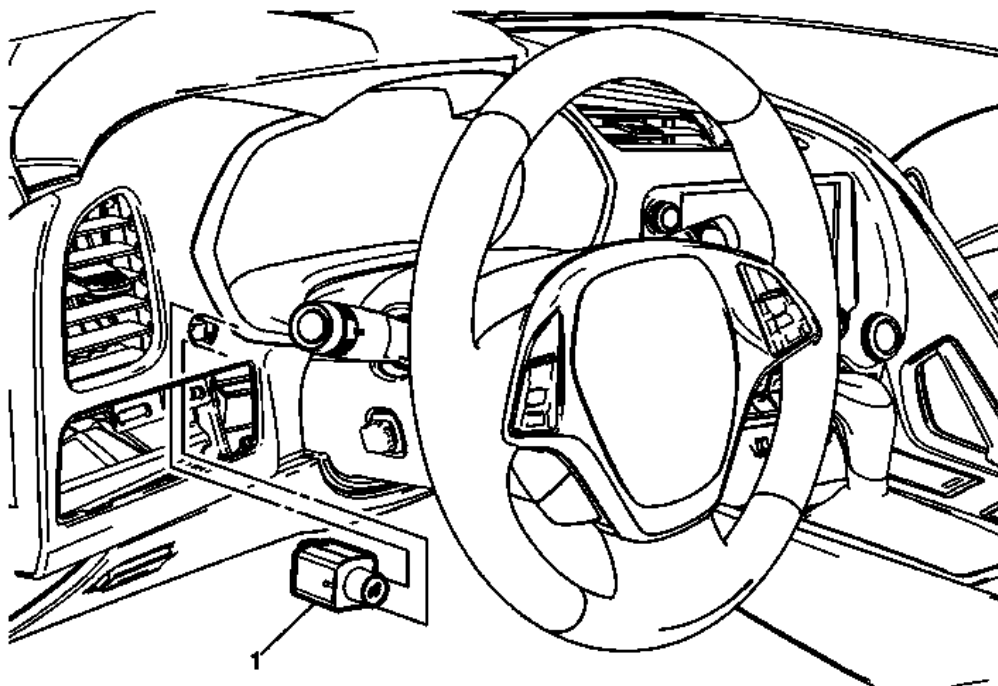


Fig. 21: Dimmer Switch
Courtesy of GENERAL MOTORS COMPANY

Dimmer Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel accessory switch trim panel. Refer to <u>Instrument Panel Accessory Switch Trim Panel Replacement</u> .	
1	Dimmer Switch Procedure 1. Disconnect the electrical connection. 2. Release tabs on switch by reaching through the trim panel opening to remove.

CENTER READING AND COURTESY LAMP LENS REPLACEMENT

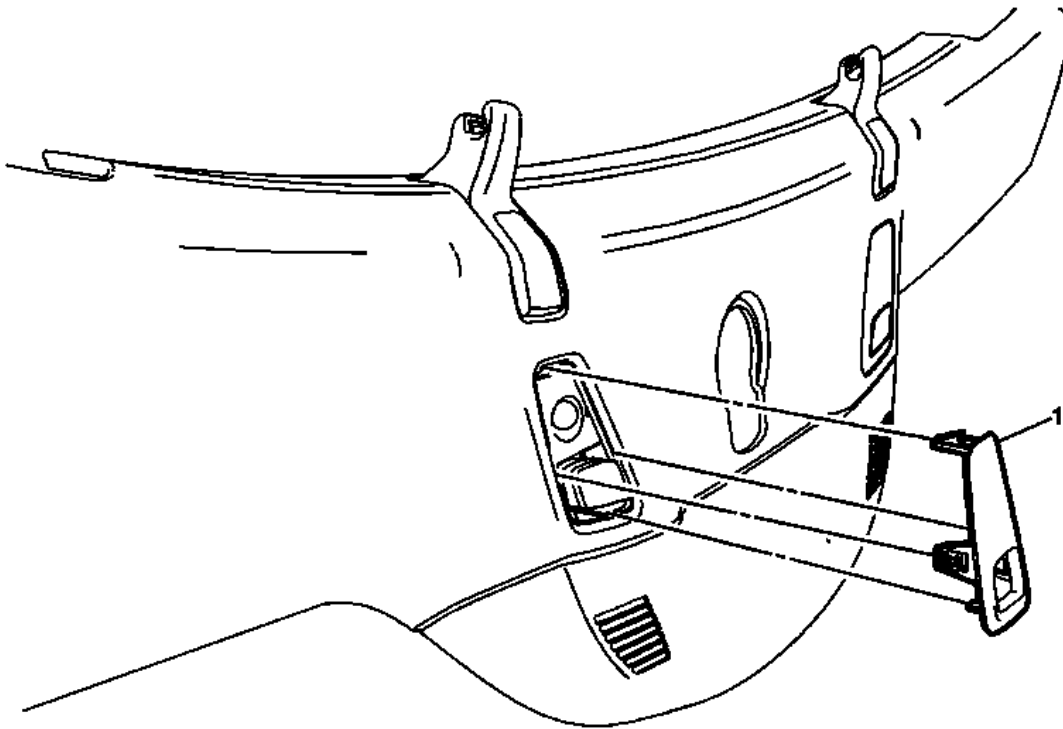


Fig. 22: Center Reading and Courtesy Lamp Lens
 Courtesy of GENERAL MOTORS COMPANY

Center Reading and Courtesy Lamp Lens Replacement

Callout	Component Name
Preliminary Procedure Remove the windshield upper garnish molding. Refer to Windshield Upper Garnish Molding Replacement .	
1	Center Reading and Courtesy Lamp Lens Procedure Carefully use the appropriate tool to release the retainers securing the lens to the reading lamp housing.

FRONT FLOOR FLOOD LAMP REPLACEMENT (LEFT SIDE)

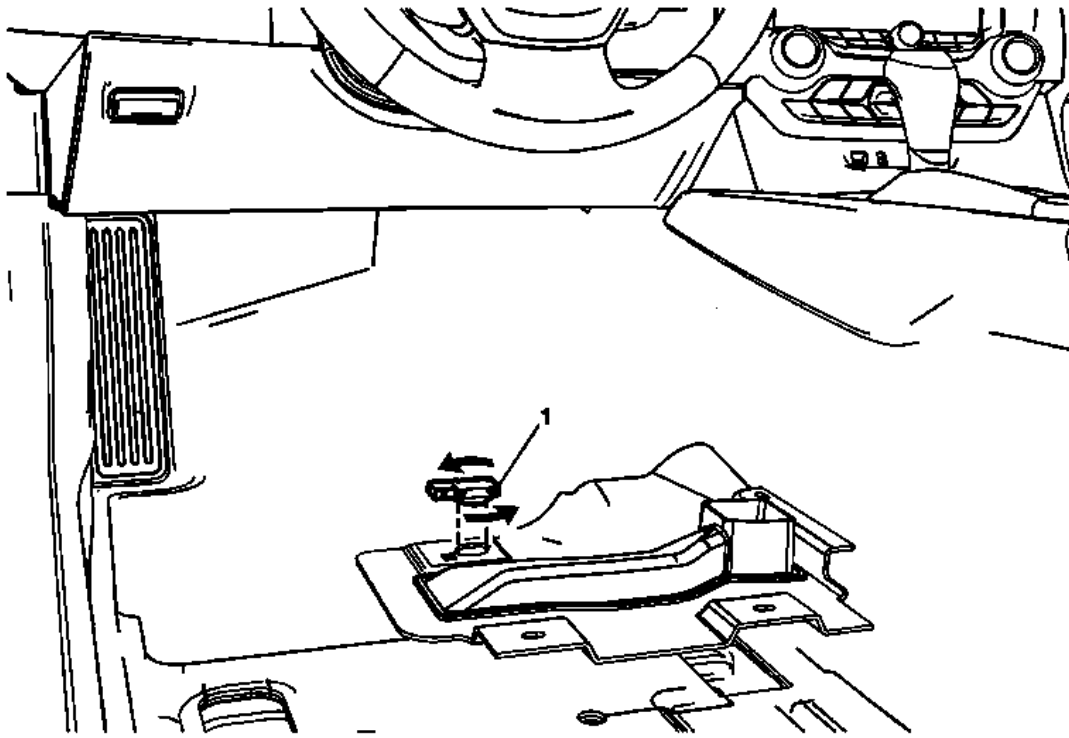


Fig. 23: Front Floor Flood Lamp (Left Side)
Courtesy of GENERAL MOTORS COMPANY

Front Floor Flood Lamp Replacement (Left Side)

Callout	Component Name
Preliminary Procedure Remove the instrument panel insulator panel - left side. Refer to <u>Instrument Panel Insulator Panel Replacement - Left Side</u> .	
1	Front Floor Flood Lamp Procedure 1. Disconnect the electrical connector. 2. Twist the lamp and line up the tabs to release.

FRONT FLOOR FLOOD LAMP REPLACEMENT (RIGHT SIDE)

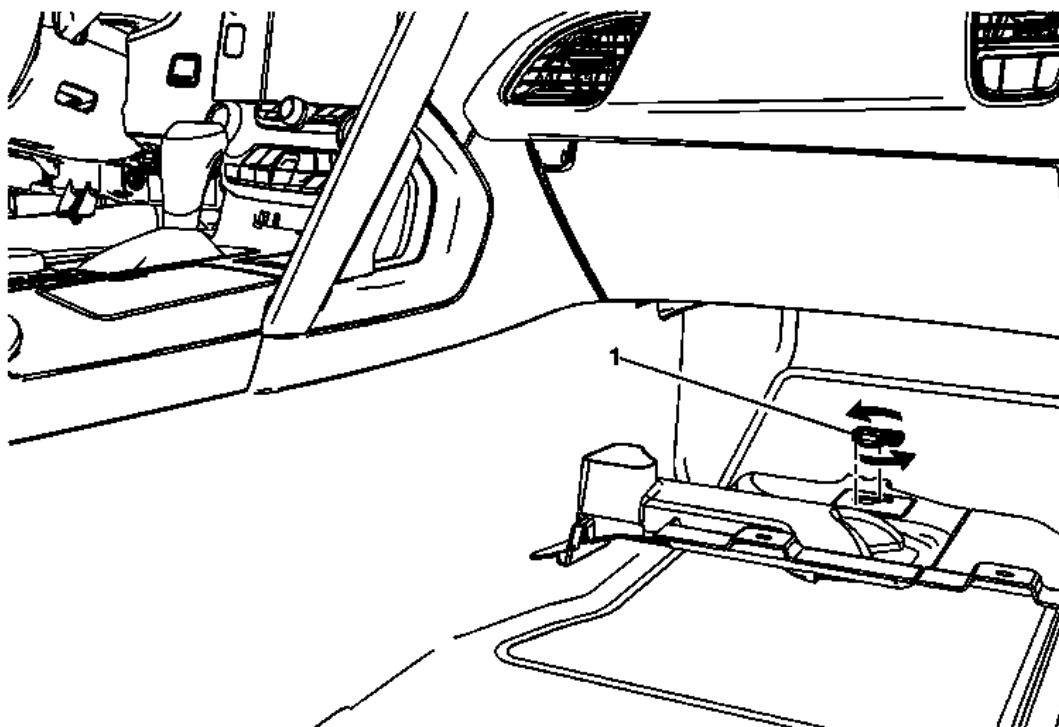


Fig. 24: Front Floor Flood Lamp (Right Side)
 Courtesy of GENERAL MOTORS COMPANY

Front Floor Flood Lamp Replacement (Right Side)

Callout	Component Name
Preliminary Procedure Remove the instrument panel insulator panel - right side. Refer to <u>Instrument Panel Insulator Panel Replacement - Right Side</u> .	
1	Front Floor Flood Lamp Procedure 1. Disconnect the electrical connector. 2. Twist the lamp and line up the tabs to release.

INSTRUMENT PANEL COMPARTMENT LAMP REPLACEMENT

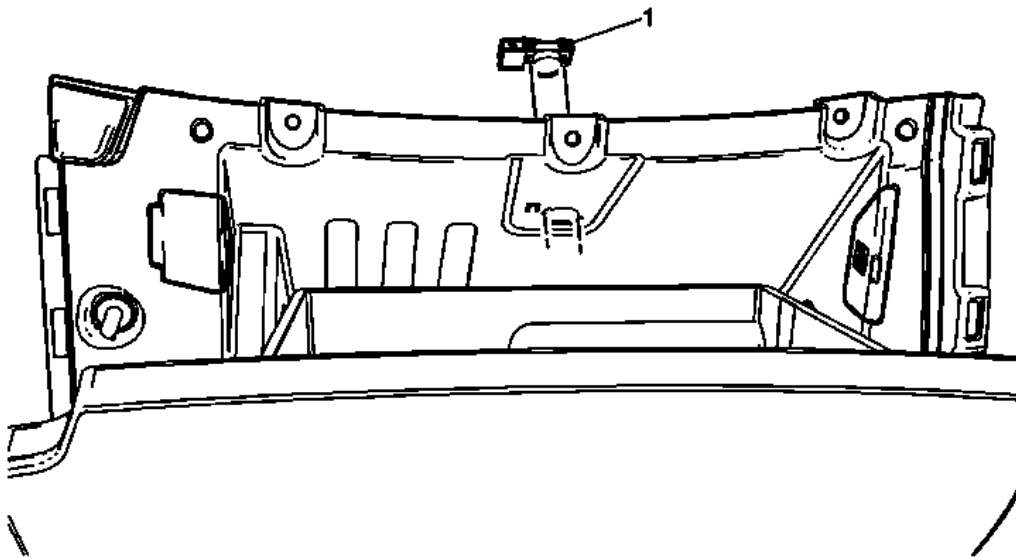


Fig. 25: Instrument Panel Compartment Lamp
 Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Compartment Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel compartment. Refer to <u>Instrument Panel Compartment Replacement</u> .	
1	Instrument Panel Compartment Lamp Procedure 1. Disconnect the electrical connector. 2. Twist the lamp and line up tabs to release.

INSTRUMENT PANEL COMPARTMENT LAMP SWITCH REPLACEMENT

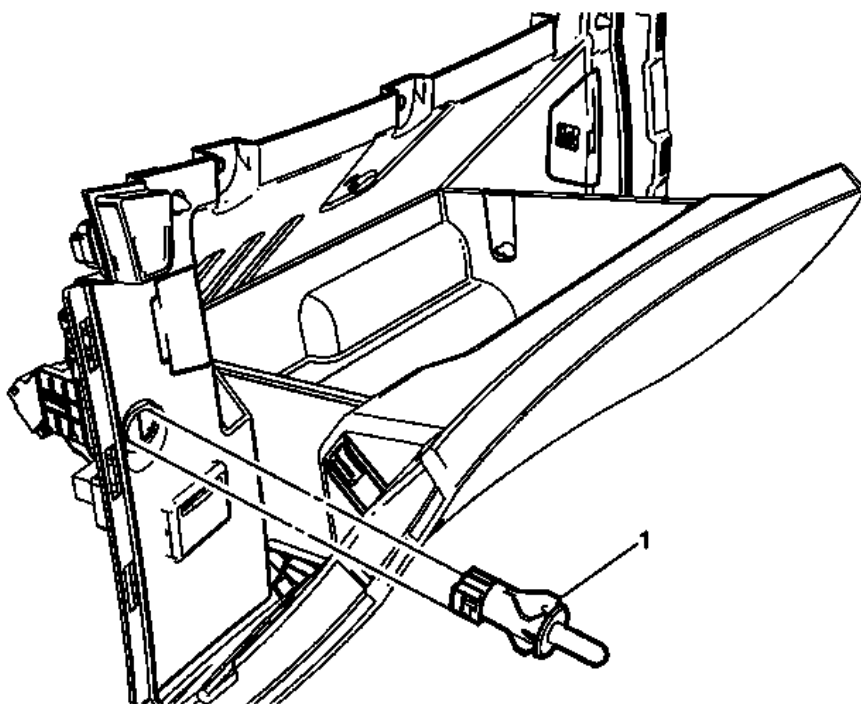


Fig. 26: Instrument Panel Compartment Lamp Switch
 Courtesy of GENERAL MOTORS COMPANY

Instrument Panel Compartment Lamp Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel compartment. Refer to <u>Instrument Panel Compartment Replacement</u> .	
1	Instrument Panel Compartment Lamp Switch Procedure 1. Disconnect the electrical connector. 2. Depress the tabs on the lamp switch to remove.

HEADLAMP REPLACEMENT

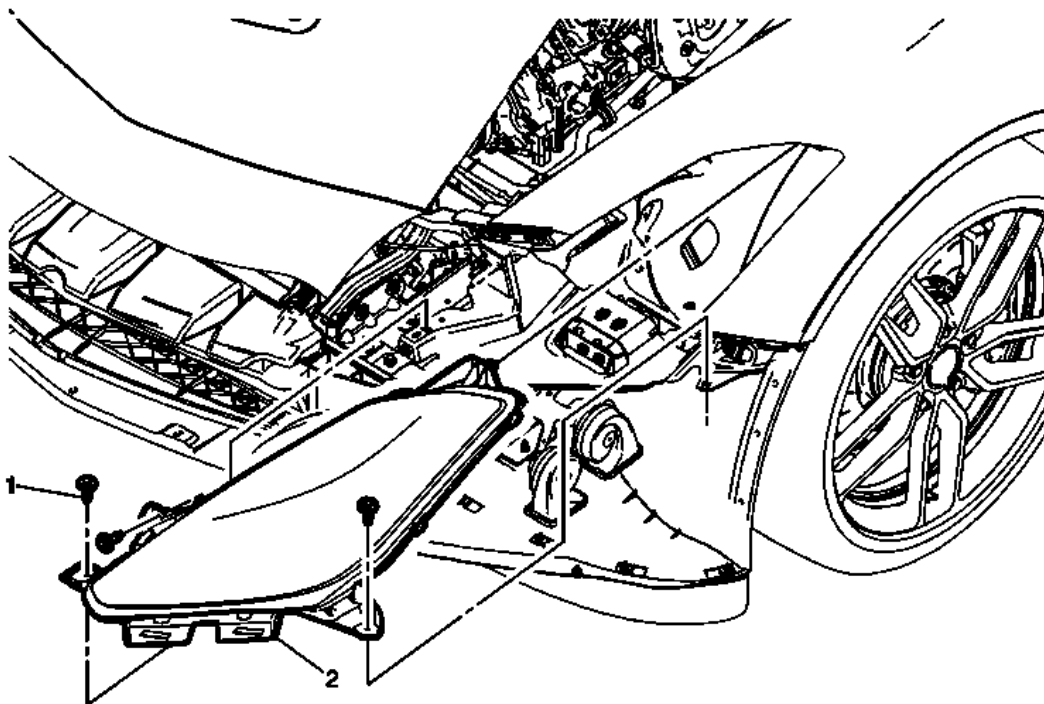


Fig. 27: Headlamp
 Courtesy of GENERAL MOTORS COMPANY

Headlamp Replacement

Callout	Component Name
WARNING: The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system.	
WARNING: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns: • Never open the high intensity discharge system ballast or the arc tube assembly starter. • Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.	
Preliminary Procedure Remove the front bumper fascia. Refer to Front Bumper Fascia Replacement .	
1	Headlamp Bolt (Qty: 3) CAUTION:

	Tighten 2.5 N.m(22 lb in)
2	Headlamp Procedure 1. Disconnect the electrical wiring harness and remove the headlamp. 2. Aim the headlamp after replacement. Refer to <u>Headlamp Aiming</u>.

HEADLAMP BALLAST REPLACEMENT

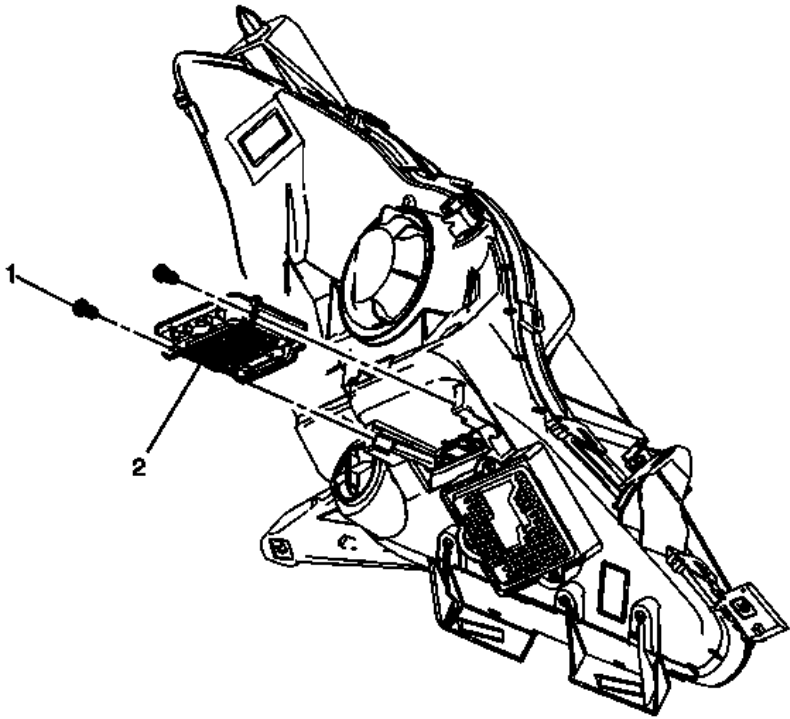


Fig. 28: Headlamp Ballast
Courtesy of GENERAL MOTORS COMPANY

Headlamp Ballast Replacement

Callout	Component Name
WARNING: The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system.	
WARNING: The high intensity discharge system produces high voltage and current. To reduce the risk of severe	

shocks and burns:

- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure Remove the headlamp. Refer to **Headlamp Replacement**.

1	Headlamp Ballast Screw (Qty: 2) CAUTION: Refer to Fastener Caution .
2	Headlamp Ballast Procedure Firmly pull straight back to disconnect the electrical connector.

HEADLAMP BULB REPLACEMENT

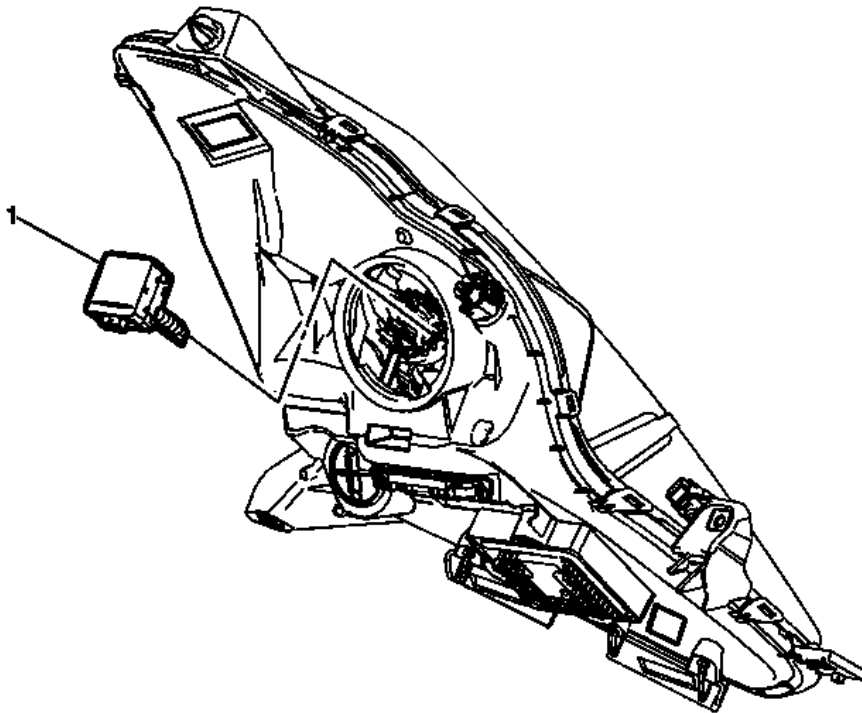


Fig. 29: Headlamp Bulb
Courtesy of GENERAL MOTORS COMPANY

Headlamp Bulb Replacement

Callout	Component Name
WARNING: The high intensity discharge system produces high voltage and current. In order to reduce the risk	

of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system.

WARNING:

The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:

- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure Remove the headlamp bulb access cover. Refer to **Headlamp Bulb Access Cover Replacement**.

1	Headlamp Bulb Procedure Disconnect the electrical connector and pull straight out.
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HEADLAMP BULB ACCESS COVER REPLACEMENT

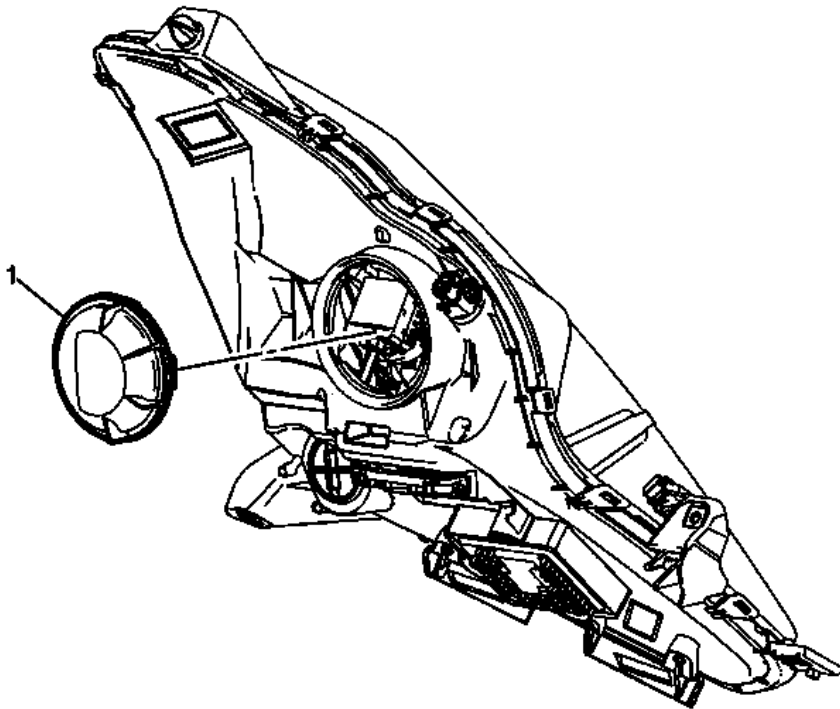


Fig. 30: Headlamp Bulb Access Cover
Courtesy of GENERAL MOTORS COMPANY

Headlamp Bulb Access Cover Replacement

Callout	Component Name

The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system.

WARNING:

The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:

- Never open the high intensity discharge system ballast or the arc tube assembly starter.
- Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.

Preliminary Procedure Remove the headlamp. Refer to Headlamp Replacement.

1

Headlamp Bulb Access Cover

Procedure

Turn counterclockwise and pull from headlamp.

HEADLAMP AIMING

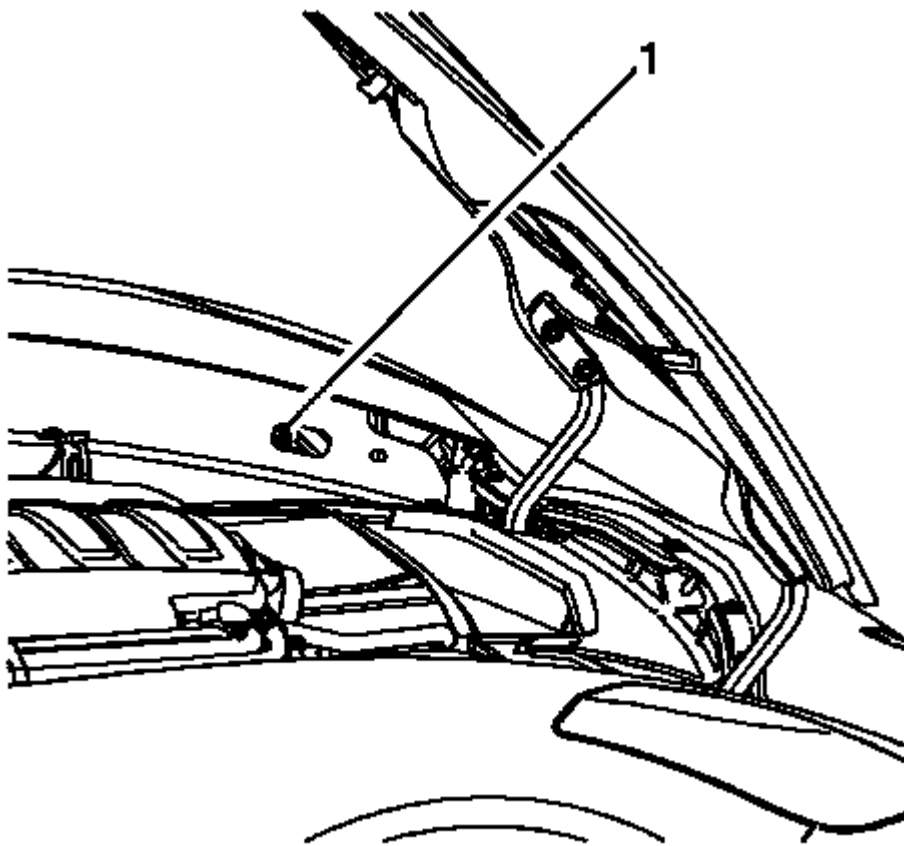


Fig. 31: Headlamp Vertical Aiming Screw
Courtesy of GENERAL MOTORS COMPANY

Remove front compartment side sight shield. Refer to **Front Compartment Side Sight Shield Replacement - Front** .

Headlight aiming is only adjusted vertically. Vertical aiming of each of the composite headlamps is done by turning adjusting screws which move the headlamp capsule in relation to the headlamp frame. The vertical adjustment screw (1) is located on the inner wheelhouse.

Some state and local authorities have specific requirements for aiming the headlamps. These requirements must be followed.

Aiming Area Preparation

Choose an appropriate aiming area, then prepare the aiming screen as described in the following.

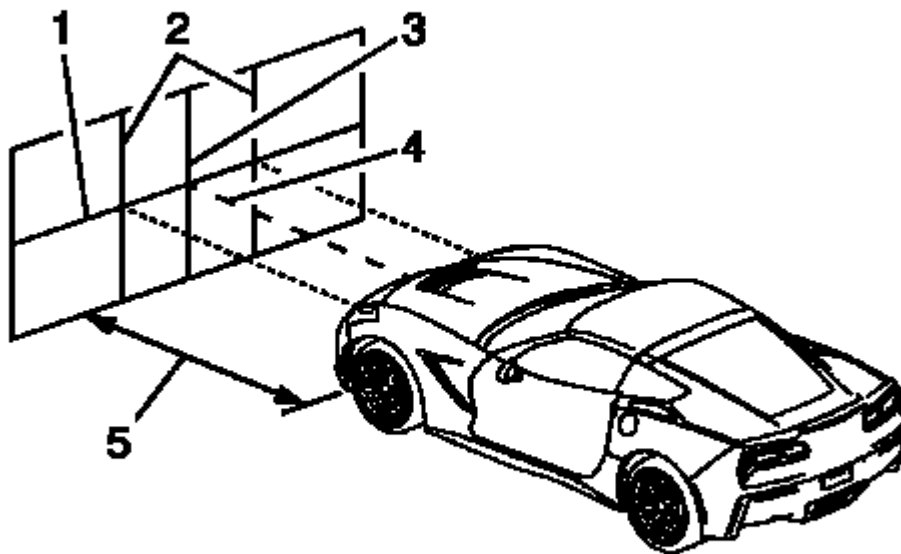


Fig. 32: Choosing Headlamp Aiming Area
Courtesy of GENERAL MOTORS COMPANY

- The aiming area should be darkened and large enough to accommodate the vehicle and an additional 7.62 m (25 ft) measured from the face of the headlamp capsules to the front of the screen.
- The floor on which the vehicle rests must be flat with the bottom of the screen. If the floor is not

- The aiming screen should be at least 1.52 m (5 ft) high by 3.66 m (12 ft) wide with a matte white surface well shaded from extraneous light and properly adjusted to the floor on which the vehicle stands. The screen should be provided with a vertical centerline (3), 2 laterally adjustable vertical tapes (2) and 1 vertically adjustable horizontal tape (1).

IMPORTANT: For each vehicle checked, the horizontal line or tape (1) on the screen must be adjusted. Vehicles of the same model and year may have different standing height for the headlamp capsules.

- Make provisions to allow the screen to be movable, so that it can be aligned parallel with the rear axle of the vehicle. This will allow for a horizontal line drawn perpendicular to the centerline of the screen to pass through the center point between the 2 headlamp capsules (4).
- After the aiming screen has been set up in a permanent location, paint or tape a reference line on the floor 7.62 m (25 ft) from the screen, to identify the proper location of the headlamp capsules when they are being aimed (5).

If a regular commercial aiming screen is not available, the screen may consist of a vertical wall having a clear uninterrupted area at least 1.83 m (6 ft) high by 3.66 m (12 ft) wide, finished with a washable non-gloss white paint.

Vehicle Preparation

Prepare the vehicle for checking the headlamp beam aim as follows:

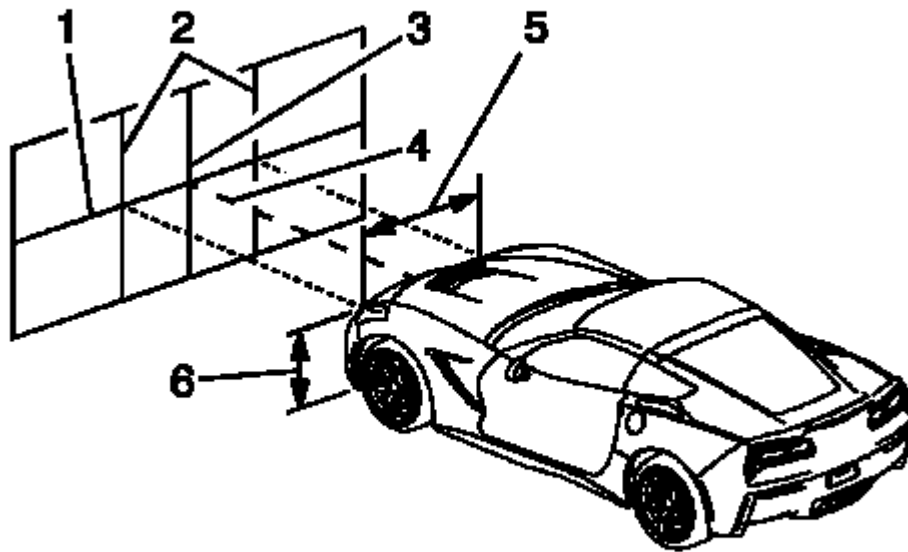


Fig. 33: Preparing Vehicle For Adjusting Headlamp Beam Aim
Courtesy of GENERAL MOTORS COMPANY

1. Make sure that all the components are in place on the vehicle, if other service has been performed on the vehicle.
2. The vehicle must have a full tank of gas.
3. Make sure the tires are inflated to the proper pressures.
4. Stop all other operations of work on the vehicle.
5. Position the vehicle so it is square with the aiming screen and with the headlamp capsules directly over the reference line which has been painted or taped on the floor.
6. Locate the vertical center line on the aiming screen (3) so that it is in line with the center of the vehicle (4). This can be accomplished by sighting through the center of the rear window and over the hood.
7. Mark the vertical center of the front and rear windows with narrow tape. Use these marks as sights to locate the centerline of the vehicle. Move the vehicle or the screen until the center line of the screen comes into alignment with the 2 points.
8. Close the doors.
9. Rock the vehicle sideways to stabilize the suspension.
10. Measure the height from the floor to the horizontal center of a headlamp capsule lens (6). Adjust

the horizontal tape on the aiming screen (1) to match this dimension.

11. Measure the distance between the centerline of the right headlamp capsule lens and the center of the left headlamp capsule lens (5). Position the vertical tapes on the aiming screen (2) this distance to the right and left of the screen centerline.

Adjustment Procedure

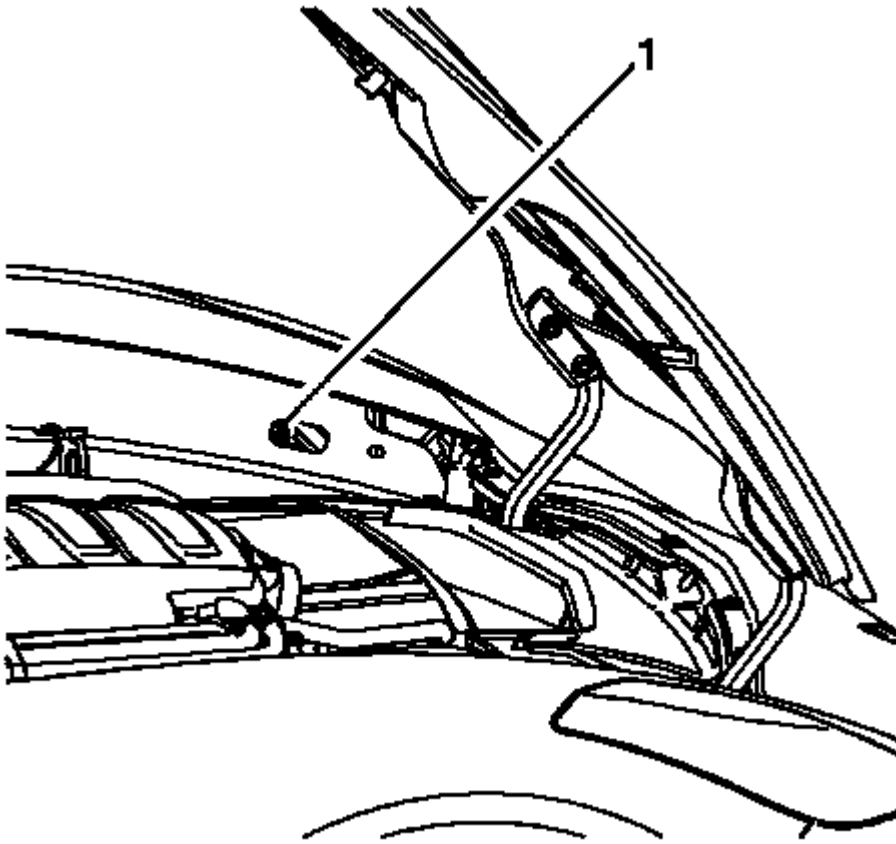


Fig. 34: Vertical Adjustment Screw
Courtesy of GENERAL MOTORS COMPANY

1. Raise the hood to access the adjusting screw (1).

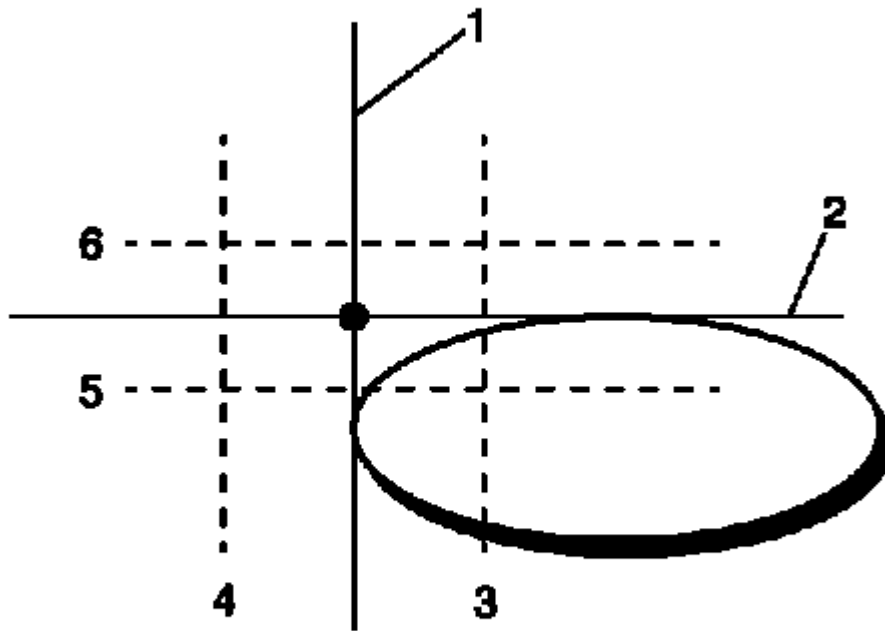


Fig. 35: Following Aiming Procedure
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: DO NOT cover the headlamp, this may cause excessive heat build up.

2. Turn on the low beam headlamps and block the light from projecting onto the screen from the passenger side headlamp.
3. Inspect the vertical aim.
4. Adjust the aim using the vertical adjusting screw, to align the top edge of the high intensity zone to the headlamp horizontal centerline (2), within the range of 51 mm (2 in) above (6) the lamp horizontal centerline (2), to 64 mm (2.5 in) below (5) the lamp horizontal centerline (2) on the aiming screen.
5. Repeat the aiming procedure for the passenger side headlamp while blocking the light from projecting onto the screen from the driver side headlamp.
6. Turn OFF the headlamps.
7. Install front compartment side sight shield. Refer to **Front Compartment Side Sight Shield Replacement - Front**.
8. Close the hood.

HEADLAMP CONTROL MODULE REPLACEMENT

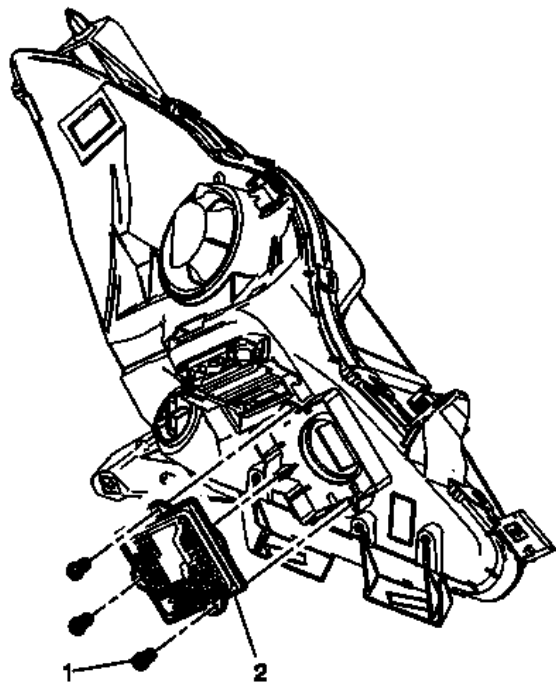


Fig. 36: Headlamp Control Module
Courtesy of GENERAL MOTORS COMPANY

Headlamp Control Module Replacement

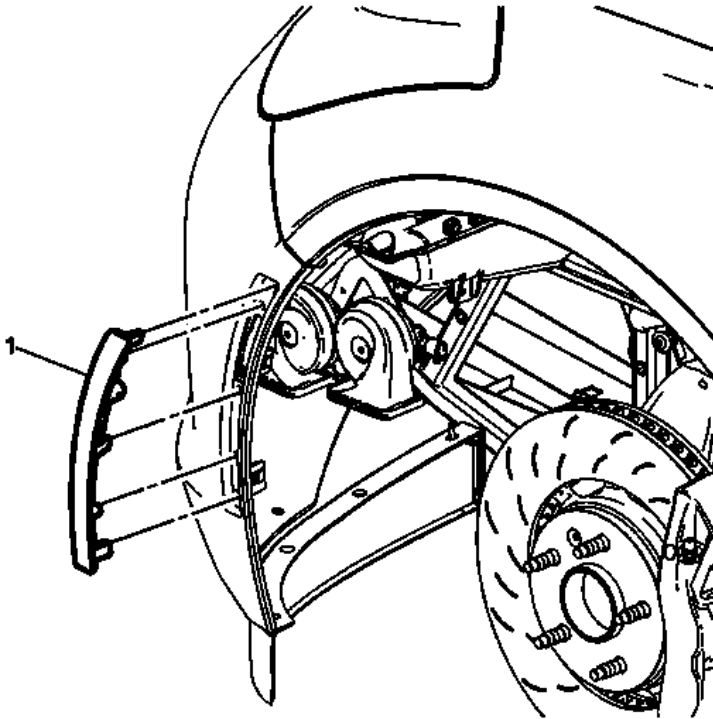
Callout	Component Name
WARNING: The high intensity discharge system produces high voltage and current. In order to reduce the risk of severe shocks and burns, the battery negative cable must be disconnected any time service work is being performed on or around the high intensity discharge system. WARNING: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns: • Never open the high intensity discharge system ballast or the arc tube assembly starter. • Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.	
Preliminary Procedure Remove the headlamp. Refer to <u>Headlamp Replacement</u>.	
1	Headlamp Control Module Screw (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> .

2

Headlamp Control Module

Procedure

Firmly pull straight back to disconnect the electrical connector.

FRONT SIDE MARKER LAMP REPLACEMENT**Fig. 37: Front Side Marker Lamp**

Courtesy of GENERAL MOTORS COMPANY

Front Side Marker Lamp Replacement

Callout	Component Name
Preliminary Procedure	
Remove the front wheelhouse. Refer to Front Wheelhouse Liner Replacement .	
1	Front Side Marker Lamp Procedure 1. Disconnect the electrical connector. 2. Compress the 3 locking tabs and pull the front side marker lamp from the front bumper fascia.

REAR REFLECTOR REPLACEMENT

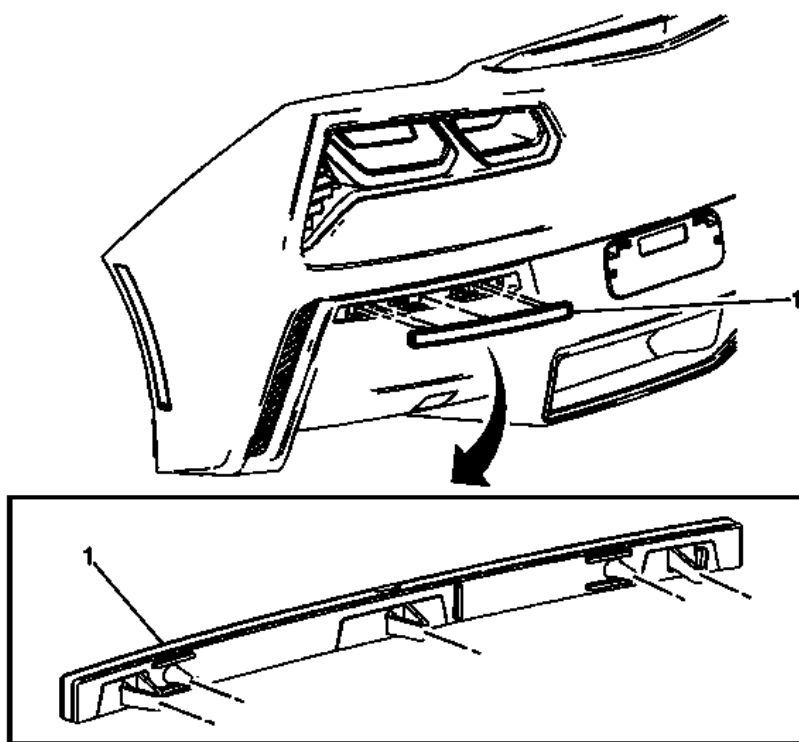


Fig. 38: Rear Reflector
 Courtesy of GENERAL MOTORS COMPANY

Rear Reflector Replacement

Callout	Component Name
Preliminary Procedure Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .	
1	Rear Reflector Procedure Compress the 3 locking tabs and pull the rear reflector from the rear bumper fascia.

HIGH MOUNT STOP LAMP REPLACEMENT

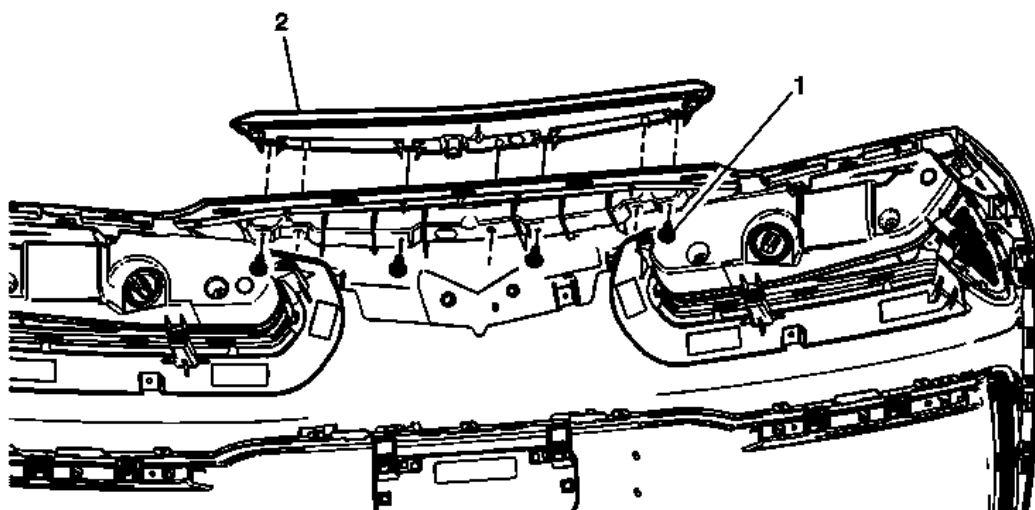


Fig. 39: High Mount Stop Lamp
 Courtesy of GENERAL MOTORS COMPANY

High Mount Stop Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .	
1	High Mount Stop Lamp Bolt (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	High Mount Stop Lamp Procedure 1. Disconnect the electrical connector. 2. Pull the high mount stop lamp straight up from the rear bumper fascia.

CARGO CENTER COURTESY LAMP BULB REPLACEMENT

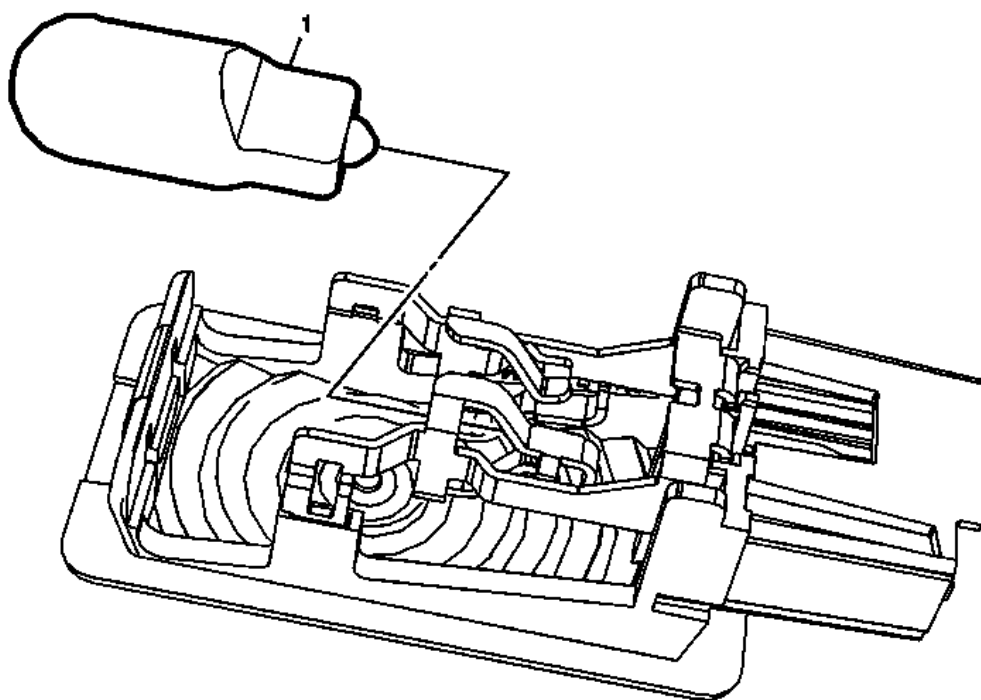


Fig. 40: Cargo Center Courtesy Lamp Bulb
Courtesy of GENERAL MOTORS COMPANY

Cargo Center Courtesy Lamp Bulb Replacement

Callout	Component Name
Preliminary Procedure Remove the rear compartment courtesy lamp. Refer to <u>Rear Compartment Courtesy Lamp Replacement</u> .	
1	Cargo Center Courtesy Lamp Bulb Procedure Gently bend back the contact lever that secures the bulb to remove.

REAR LICENSE PLATE LAMP REPLACEMENT

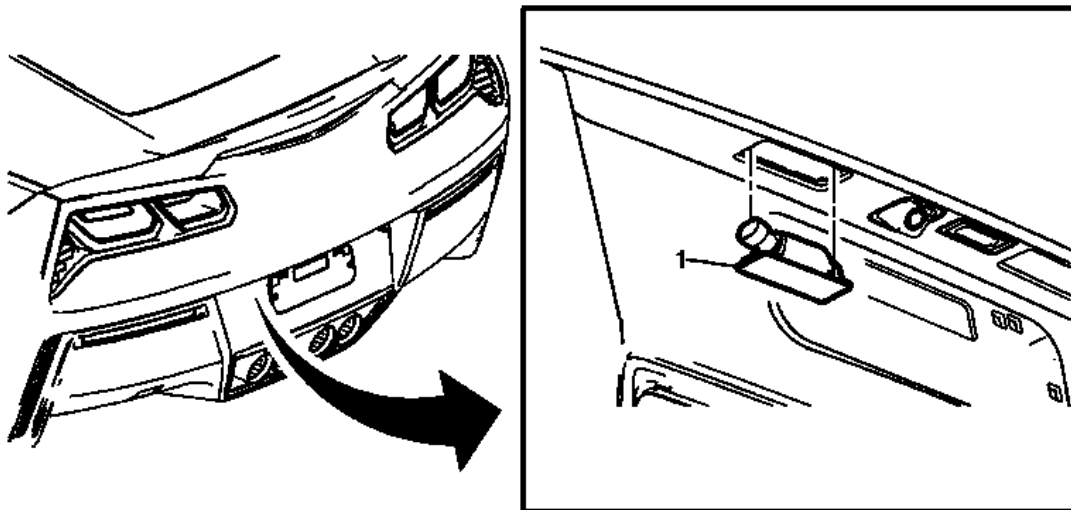


Fig. 41: Rear License Plate Lamp
 Courtesy of GENERAL MOTORS COMPANY

Rear License Plate Lamp Replacement

Callout	Component Name
1	Rear License Plate Lamp Procedure 1. Use a suitable plastic flat bladed tool to push the drivers side end of the rear license plate lamp towards the passenger side end and pull the lamp down from the rear bumper fascia. 2. Disconnect the electrical connector. 3. Upon reinstalling load the passenger side end first (spring clip) then push up on the drivers side end to lock in place.

REAR FASCIA AUXILIARY SIGNAL LAMP REPLACEMENT

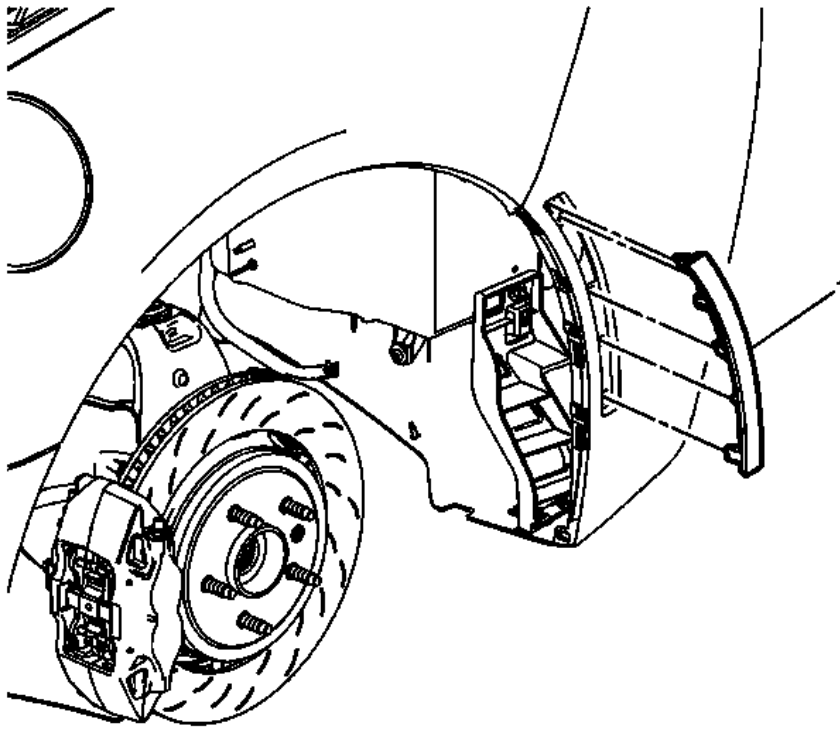


Fig. 42: Rear Fascia Auxiliary Signal Lamp
Courtesy of GENERAL MOTORS COMPANY

Rear Fascia Auxiliary Signal Lamp Replacement

Callout	Component Name
Preliminary Procedure	
Remove the rear wheelhouse. Refer to <u>Rear Wheelhouse Liner Replacement</u> .	
1	Rear Fascia Auxiliary Signal Lamp
	Procedure 1. Disconnect the electrical connector. 2. Compress the 3 locking tabs and pull the rear fascia auxiliary signal lamp from the rear bumper fascia.

REAR FASCIA LOWER SIGNAL LAMP REPLACEMENT

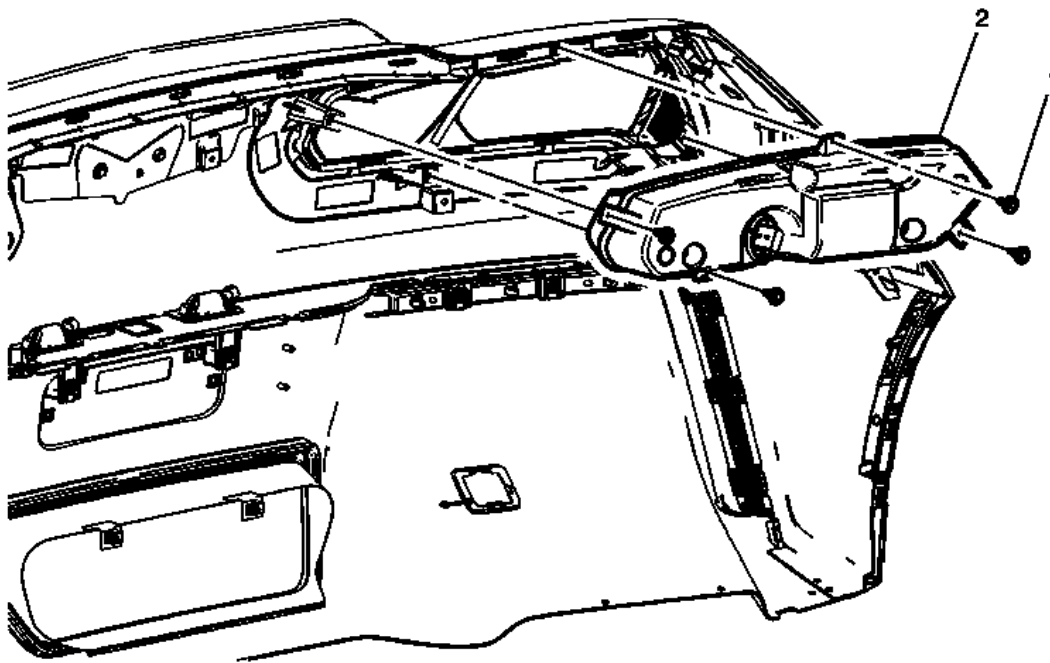


Fig. 43: Rear Fascia Lower Signal Lamp
 Courtesy of GENERAL MOTORS COMPANY

Rear Fascia Lower Signal Lamp Replacement

Callout	Component Name
Preliminary Procedure Remove the rear bumper fascia. Refer to Rear Bumper Fascia Replacement .	
1	Tail Lamp Bolt (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Rear Fascia Lower Signal Lamp Procedure Disconnect the electrical connector and pull the rear fascia lower signal lamp straight back from the rear bumper fascia.

REAR COMPARTMENT COURTESY LAMP REPLACEMENT

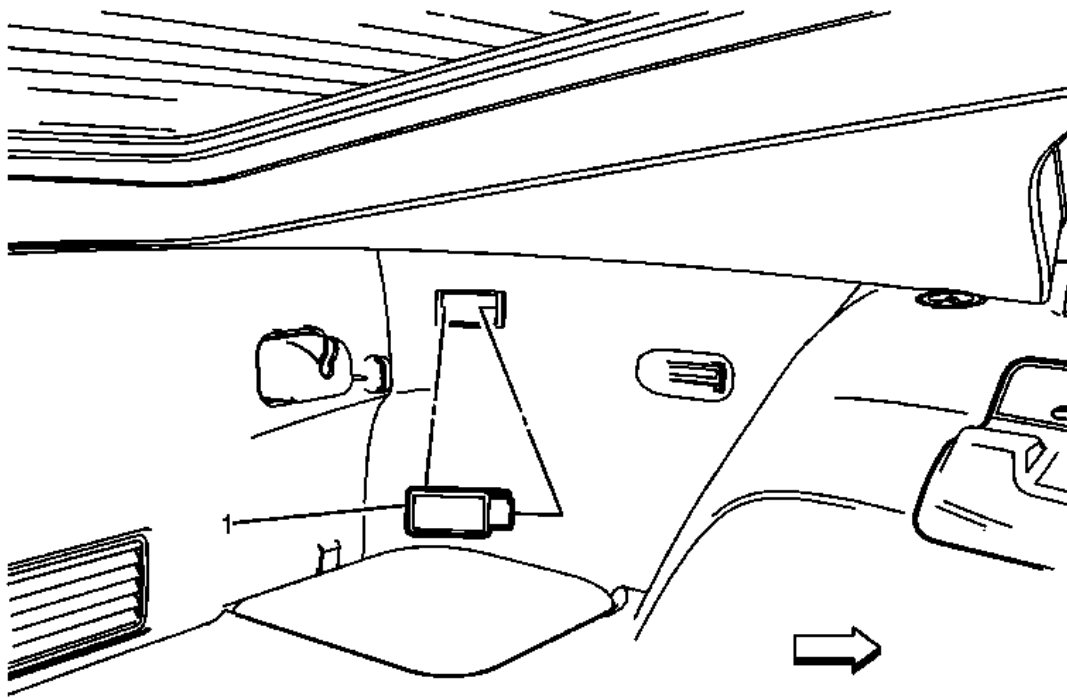


Fig. 44: Rear Compartment Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

Rear Compartment Courtesy Lamp Replacement

Callout	Component Name
1	Rear Compartment Courtesy Lamp Procedure 1. Use a plastic flat bladed trim tool in order to release the lamp assembly from the rear trim panel. 2. Disconnect the electrical connection.

DESCRIPTION AND OPERATION

EXTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

The exterior lighting system consist of the following lamps:

- Backup lamps
- Daytime running lamps (DRL)
- Hazard warning lamps
- Headlamps

- Stop lamps
- Turn signal lamps

Low Beam Headlamps

WARNING: The high intensity discharge system produces high voltage and current. To reduce the risk of severe shocks and burns:

- **Never open the high intensity discharge system ballast or the arc tube assembly starter.**
- **Never probe between the high intensity discharge system ballast output connector and the arc tube assembly.**

The headlamps consist of 1 high intensity discharge (HID) arc tube and ballast on each side of the vehicle which provide high and low beams.

The headlamps may be turned ON in 3 different ways:

- When the headlamp switch is placed in the ON position, for normal operation
- When the headlamp switch is placed in the AUTO position, for automatic lamp control (ALC)
- When the headlamp switch is placed in the AUTO position, with the windshield wipers ON in daylight conditions, after a 6 second delay

The body control module (BCM) monitors three signal circuits from the turn signal/multifunction switch. When the turn signal/multifunction switch is in the AUTO position, all three signal circuits are open. When placed in the AUTO position, the BCM monitors inputs from the ambient light sensor to determine if headlamps are required or if daytime running lamps will be activated based on outside lighting conditions. When the turn signal/multifunction switch is placed in the OFF position, the turn signal/multifunction switch headlamps OFF signal circuit is grounded, indicating to the BCM that the exterior lamps should be turned OFF. With the turn signal/multifunction switch in the PARK position, the turn signal/multifunction switch park lamps ON signal circuit is grounded, indicating that the park lamps have been requested. When the turn signal/multifunction switch is placed in the HEADLAMP position, both the turn signal/multifunction switch park lamps ON signal circuit and the turn signal/multifunction switch headlamps ON signal circuit are grounded. The BCM responds to the low beam request by applying ground to the low beam relay control circuit which energizes the low beam relay. With the low beam relay energized, the switch contacts close allowing battery voltage to flow through the low beam fuses. Battery voltage is then applied from the fuses, through the low beam control circuits to the left and right headlamp ballast located in each headlamp assembly. When battery voltage is applied to the headlamp ballast through the low beam control circuits, the ballast charge the starter to start the lamp. High intensity discharge (HID) headlamps do not have filaments like traditional bulbs, instead the starter uses a high voltage transformer to convert the input voltage into a higher voltage. This increased voltage is used in order to create an arc between the electrodes in the bulb.

The BCM will also command the low beam headlamps ON during daylight conditions when the following conditions are met:

- Headlamp switch in the AUTO position
- Windshield wipers ON
- Vehicle in any gear but PARK

When the BCM commands the low beam headlamps ON, the operator will notice the interior backlighting for the instrument cluster and the various other switches dim to the level of brightness selected by the instrument panel dimmer switch.

Run Up Of The Lamp

Each ballast requires higher amperage in order to ensure normal startup and run up of the lamp. Run up is the term used to describe the extra power level given to the bulb. The input current during the steady state operation is lower than the start up amperage. After the lamp receives the strike from the starter and the arc is established, the ballast uses its operating voltage in order to provide the run up power needed in order to keep the lamp on. The lamp rapidly increases in intensity from a dim glow to a very high-intensity, bright light called a steady state. Within a few seconds of the arc being established in the bulb, the majority of steady state is complete. 100 percent of the steady state is completed shortly thereafter. A high watt power level is necessary in order to bring the lamp to a steady state in such a short period of time. The high watt power level allows the lamp to meet the SAE light vs. time specification.

When To Change The HID Bulb

Bulb failure, end of life occurs when the bulb gets old and becomes unstable. The bulb may begin shutting itself off sporadically and unpredictably at first, perhaps only once during a 24-hour period. When the bulb begins shutting itself off occasionally, the ballast will automatically turn the bulb back on again within 0.5 seconds. The ballast will re-strike the bulb so quickly that the bulb may not appear to have shut off. As the bulb ages, the bulb may begin to shut off more frequently, eventually over 30 times per minute. When the bulb begins to shut off more frequently, the ballast receives excessive, repetitive current input. Repetitive and excessive restarts or re-strikes, without time for the ballast to cool down, will permanently damage the ballast. As a safeguard, when repetitive re-strikes are detected, the ballast will not attempt to re-strike the lamp. The ballast then shuts down and the bulb goes out.

The following symptoms are noticeable signs of bulb failure:

- Flickering light, caused in the early stages of bulb failure
- Lights go out, caused when the ballast detects excessive, repetitive bulb re-strike
- Color change-The lamp may change to a dim pink glow.

Input power to the ballast must be terminated in order to reset the ballast's fault circuitry. In order to terminate the input power to the ballast, turn the lights off and back on again. Turning the lights off and back on again resets all of the fault circuitry within the ballast until the next occurrence of excessive, repetitive bulb re-strikes. When excessive, repetitive bulb re-strikes occur, replace the starter/arc tube assembly. The ballast will begin the start-up process when the starter/arc tube assembly is replaced. Repeatedly resetting the input power can overheat the internal components

and cause permanent damage to the ballast. Allow a few minutes of cool-down time in between reset attempts.

Light Color

White light has a different color rating than regular headlamps. The range of white light that is acceptable is broad when compared to halogens. Therefore, some variation in headlight coloring between the right and left headlamp will be normal. One high intensity discharge (HID) at the end of the normal range may appear considerably different in color from one at the other end of the range. Difference in color is normal. Replace the arc tube only if the arc tube is determined to be at the bulb failure stage.

High Beam Headlamps

When the low beam headlamps are ON and the turn signal/multifunction switch is placed in the high beam position, ground is applied to the BCM through the high beam signal circuit. The BCM responds to the high beam request by applying ground to the high beam relay control circuit which energizes the high beam relay. With the high beam relay energized, the switch contacts close allowing battery voltage to flow through the left and right high beam fuses to the high beam control circuits and on to the left and right high beam solenoid actuators within the headlamp assemblies. Once the high beam solenoid actuators are active, the solenoid shutters open in each headlamp assembly exposing the remaining portion of the headlamp that was covered by the shutters illuminating the high beams at full intensity.

Daytime Running Lamps (DRL)

The daytime running lamps (DRL) will illuminate continuously when the following conditions are met:

- The ignition is in the RUN or CRANK position
- The shift lever is out of the PARK position for vehicles equipped with automatic transmissions or the parking brake is released for vehicles with manual transmissions
- The low and high beam headlamps are OFF

The ambient light sensor is used to monitor outside lighting conditions. The ambient light sensor provides a voltage signal that will vary between 0.2 and 4.9 volts depending on outside lighting conditions. The body control module (BCM) provides a 5-volt reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. The BCM monitors the ambient light sensor signal circuit to determine if outside lighting conditions are correct for either daytime running lights (DRL) or automatic lamp control (ALC) when the headlamp switch is in the AUTO position. In daylight conditions the BCM will command the designated DRLs ON. During low light conditions the BCM will command the low beam headlamps ON. Any function or condition that turns on the headlamps will cancel DRL operation.

Automatic Lamp Control

Place the turn signal/multifunction switch in the AUTO position for automatic lamp control. During automatic lamp control the headlamps will be off during daylight conditions but will turn on when the

ambient light sensor detects low outside light level. The ambient light sensor is a light sensitive transistor that varies the voltage signal to the BCM. The BCM provides a 5-volt reference signal to the ambient light sensor and the HVAC control module provides a low reference ground. During low light conditions the BCM will command the low beam headlamps ON by applying ground to the headlamp low beam relay control circuit. This energizes the low beam relay, closing the switched side and applies battery voltage to the LEFT and RIGHT LOW BEAM fuses. Battery voltage is applied from the low beam fuses, through the low beam voltage supply circuits to low headlamp assemblies.

Flash to Pass (FTP)

When the turn signal/multifunction switch is momentarily placed in the flash to pass (FTP) position, ground is applied to the turn signal/multifunction switch. The turn signal/multifunction switch applies ground to the body control module (BCM) through the FTP switch signal circuit. The BCM responds to the FTP request by applying ground to the high beam relay control circuit. This energizes the high beam relay, closing the switch side contacts of the high beam relay, applying battery voltage to the left and right high beam fuses. Battery voltage is applied from the high beam fuses through the high beam control circuit to the high beam headlamp assemblies. This causes the high beam headlamps to illuminate at full brightness momentarily.

Hazard Lamps

The hazard flashers may be activated in any power mode. The hazard switch signal circuit is momentarily grounded when the hazard switch is pressed. The body control module (BCM) responds to the hazard switch signal input by supplying battery voltage to all four turn signal lamps in an ON and OFF duty cycle. When the hazard switch is activated, the BCM sends a serial data message to the instrument cluster requesting both turn signal indicators to be cycled ON and OFF.

The instrument panel dimmer switch controls the brightness of the interior backlighting components. When the instrument panel dimmer switch is placed in a desired brightness position, the body control module (BCM) receives a signal from the instrument panel dimmer switch and responds by applying a pulse width modulated (PWM) voltage to the hazard switch light emitting diode (LED) backlighting control circuit illuminating the LED to the desired level of brightness.

Park, Tail and License Lamps

When the headlamp switch is placed in the HEAD or PARK position, ground is applied to the park lamp switch ON signal circuit to the body control module (BCM). The BCM responds by applying voltage to the park lamps, tail lamps and license lamps control circuits illuminating the park, tail and license lamps.

Stop Lamps

NOTE: Brake system does not use a brake switch, stoplight switch or brakelight switch. System uses a Brake Pedal Position Sensor to control these functions.

The brake pedal position (BPP) sensor is used to sense the action of the driver application of the brake pedal. The BPP sensor provides an analog voltage signal that will increase as the brake pedal

voltage to the BPP sensor. When the variable signal reaches a voltage threshold indicating the brakes have been applied, the BCM will apply battery voltage to the left and right stop lamp control circuits as well as the center high mounted stop lamp (CHMSL) control circuit illuminating the left and right stop lamps and the CHMSL.

Turn Signal Lamps

Ground is applied at all times to the turn signal/multifunction switch. The turn signal lamps may only be activated with the ignition switch in the ON or START positions. When the turn signal/multifunction switch is placed in either the TURN RIGHT or TURN LEFT position, ground is applied to the body control module (BCM) through either the right turn or left turn signal switch signal circuit. The BCM responds to the turn signal switch input by applying a pulsating voltage to the front and rear turn signal lamps through their respective control circuits. When a turn signal request is received by the BCM, a serial data message is sent to the instrument cluster requesting the respective turn signal indicator be pulsed ON and OFF.

Backup Lamps

Automatic Transmission

With the engine running and the transmission in the reverse position, the transmission control module (TCM) sends a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM applies battery voltage to the backup lamps control circuit illuminating the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the TCM via serial data requesting the BCM to remove battery voltage from the backup lamps control circuit. The engine must be running for the backup lamps to operate.

Manual Transmission

The engine control module (ECM) provides a signal circuit to the backup lamp switch which is permanently grounded. With the engine running and the transmission in the reverse position, the backup lamp switch signal circuit is pulled low and the ECM responds by sending a serial data message to the body control module (BCM). The message indicates that the gear selector is in the reverse position. The BCM applies battery voltage to the backup lamps control circuit illuminating the backup lamps. Once the driver moves the gear selector out of the reverse position, a message is sent by the ECM via serial data requesting the BCM to remove battery voltage from the backup lamps control circuit. The engine must be running for the backup lamps to operate.

Battery Run Down Protection/Inadvertent Power

To provide battery run down protection, the exterior lamps will be deactivated automatically under certain conditions. The BCM monitors the state of the headlamp switch. If the park or headlamp switch is ON when the ignition switch is placed in either the CRANK or RUN position and then placed in the OFF position, the BCM initiates a 10 min timer. At the end of the 10 min, the BCM will turn off the control power output to the park lamp controls as well as the headlamp relay coils, deactivating the exterior lamps. This feature will be cancelled if any power mode other than OFF becomes active.

headlamp switch is placed in the ON to OFF position and back to the ON position during battery run down protection. The BCM determined that the park or headlamp switch was not active when the ignition was turned OFF.

INTERIOR LIGHTING SYSTEMS DESCRIPTION AND OPERATION

Interior Lamps

The interior lighting system consist of two groups. This first group includes lamps that may not be dimmed.

- Dome lamps
- Instrument panel compartment lamp
- Instrument panel courtesy lamps
- Reading lamps
- Rear compartment courtesy lamps
- Sunshade mirror lamps

Dome Lamps

The dome lamp switch has 2 positions: DOOR and ON. The ON position provides a ground for continuous operation and the dome lamp will remain illuminated until the switch is placed in the DOOR position. When in the DOOR position, the dome lamp operation is controlled by the body control module (BCM). When any door is opened, the door ajar switch contacts close and the BCM receives a door-open input. The BCM illuminates the dome lamp when any door is opened or a door lock/unlock request is activated with the key fob. After all doors have been closed, the dome lamp will remain illuminated approximately 3 seconds after the last door closes. In the event that the dome lamp were to remain illuminated for more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the dome lamp control circuit to prevent total battery discharge. The dome lamps will turn OFF using the theater dimming feature when controlled by the BCM.

Instrument Panel Compartment Lamp

The inadvertent power supply voltage circuit from the BCM provides battery voltage to the instrument panel compartment (glove box) lamp. When the instrument panel compartment is opened, the instrument panel compartment lamp switch contacts close providing a path to ground and the instrument panel compartment lamp illuminates. If the operator inadvertently leaves the instrument panel compartment door open with the instrument panel compartment lamp ON, the BCM will turn all interior lamps OFF after 10 minutes has passed since any switch activation has been detected by the BCM.

Reading Lamps

The inadvertent power supply voltage circuit from the BCM provides battery positive voltage to each reading lamp. When a reading lamp switch is activated, the switch contacts close providing a path to ground and the reading lamp illuminates. If the operator inadvertently leaves a reading lamp ON, the

been detected by the BCM.

Rear Compartment Courtesy Lamps

When the rear compartment is opened, the rear compartment lid latch opens providing a rear compartment open input signal to the BCM. The BCM responds by applying battery voltage to the rear compartment courtesy lamp control circuit illuminating the rear compartment courtesy lamps.

Sunshade Mirror Lamps

The inadvertent power supply voltage circuit from the BCM provides battery voltage to each set of sunshade mirror lamps. When the sunshade mirror cover is opened, a switch closes providing ground and the sunshade lamps illuminate. If the operator inadvertently leaves a sunshade mirror cover open with the lamps ON, the BCM will turn all interior lamps OFF after 10 minutes has passed since any switch activation has been detected by the BCM.

Keyless Entry Interior Illumination

When the operator uses the keyless entry transmitter in order to unlock the doors, the BCM receives a door-unlock signal. The BCM must receive inputs from various systems that indicate that the ignition switch is OFF, the courtesy lamp switch is OFF and all doors are closed before the BCM will activate the interior lamps. After all doors have been closed, the courtesy lamps will turn OFF immediately if the ignition switch is turned to the ON position, the door locks are LOCKED or approximately 20 seconds after the last door closes. The BCM will turn off the courtesy lamps through the theater dimming feature. The BCM keeps the courtesy lamps on for 40 seconds after an alarm event is completed.

Interior Lamps Dimming

The second group includes lamps which may be dimmed. This group may use a combination of light emitting diodes (LED), incandescent lamps and pulse width modulation (PWM) illumination.

- Door lock switch - driver
- Door lock switch - passenger
- Door handle switch - driver interior
- Door handle switch - passenger interior
- Folding top control switch
- Head-up display switch
- Hazard switch
- HVAC control head assembly
- Ignition mode switch
- Instrument panel dimmer switch
- Multifunction switch - center console
- Multifunction switch - instrument panel

- Park brake switch
- Radio
- Rear compartment lid unlatch switch
- Seat memory switch - driver
- Steering wheel controls switch - left lower
- Steering wheel controls switch - left upper
- Steering wheel controls switch - right lower
- Steering wheel controls switch - right upper
- Window switch - driver
- Window switch - passenger

With the headlamp switch in the PARK or HEAD position, the park lamp switch signal circuit provides an input to the body control module (BCM). The BCM responds by applying voltage to the park lamps as well as the backlight dimming control circuits illuminating all components with interior backlighting. All interior backlighting turns ON at the dimming level indicated by the instrument panel dimmer switch. The instrument panel dimmer switch is used to increase and decrease the brightness of the interior backlighting components. The instrument panel dimmer switch provides a voltage signal to the body control module (BCM) that will increase as the brightness of the lights are increased and decrease as the brightness of the lights are decreased. The BCM provides a low reference, signal and B+ voltage reference circuits to the instrument panel dimmer switch. When the instrument panel dimmer switch is placed in the desired position, the dimmed voltage setting is applied from the instrument panel dimmer switch through the instrument panel dimmer switch signal circuit to the BCM. The BCM interprets the signal and applies a pulse width modulated (PWM) voltage through the LED dimming control circuits illuminating the interior backlighting to the requested level of brightness.

Battery Rundown Protection/Inadvertent Power

The BCM inadvertent power supply voltage circuit provides battery voltage to all of the interior courtesy lamps. In the event that any of these lamps were to remain illuminated for a period of more than 10 minutes with the ignition switch in the OFF position, the BCM will deactivate the inadvertent power supply voltage circuit to prevent total battery discharge. If the ignition switch is turned to any position other than OFF or if a lamp switch is activated during this 10 minute period, the timer resets for another 10 minutes.