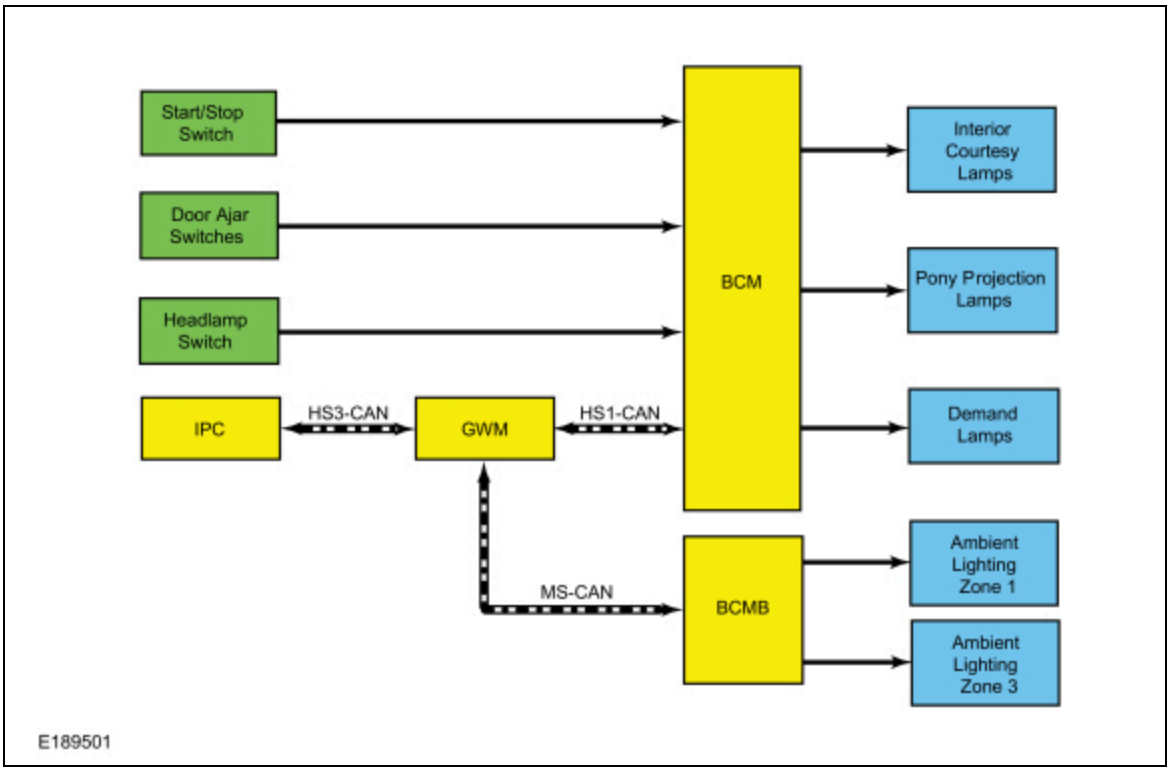
Interior Lighting - System Operation and Component Description

System Operation

System Diagram



Network Message Chart

GWM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Ambient light color/intensity request	IPC	Indicates the color and brightness setting selected from the display interface. This commands the ambient color and brightness setting as requested by the operator.
Headlamp switch status	BCM	Indicates the headlamp switch position to enable or disable the ambient lighting.
Illuminated entry status	BCM	Indicates the status of the illuminated entry lighting to enable or disable the ambient lighting.

Body Control Module (BCMB) Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Ambient light color/intensity request	GWM	Indicates the color and brightness setting selected from the display interface. This commands the ambient color and brightness setting as requested by the operator.
Headlamp switch status	GWM	Indicates the headlamp switch position to enable or disable the ambient lighting.
Illuminated entry status	GWM	Indicates the status of the illuminated entry lighting to enable or disable the ambient lighting.

Battery Saver

NOTE: *Time-out is 10 seconds if the vehicle is in factory mode or 1 minute if the vehicle is in transport mode.*

The BCM provides automatic shut-off of the courtesy and demand lamps after a time-out period when the ignition is OFF. A timer in the BCM starts when:

- the ignition transitions to OFF.
- the front or rear interior lamp was switched ON.
- any door or the luggage compartment lid becomes ajar.
- any button of a RKE transmitter is pressed.
- a door is unlocked using the passive entry feature.
- a valid code was entered on the keyless entry keypad.

When 10 minutes (30 minutes for demand lamps) have elapsed, the BCM automatically shuts off voltage to the lamps. The timer restarts (voltage is restored if the BCM is in battery saver mode) when:

- the ignition transitions out of OFF.
- the front or rear interior lamp was switched ON.
- any door or the luggage compartment lid becomes ajar.
- any button of a RKE transmitter is pressed.
- a door is unlocked using the passive entry feature.
- a valid code was entered on the keyless entry keypad.

Courtesy Lamps

The BCM controls the courtesy lighting functions and timing by monitoring inputs from the following:

- Ignition state
- Door ajar switches
- RKE system

The BCM sends a voltage signal to each door ajar switch. When the doors are closed, the circuit is switched to ground and the voltage is pulled low, indicating closed doors.

For vehicles with a memory seat, the DDM and the PDM provide ground for the door ajar switch.

The BCM monitors the ignition state and inputs from the RKE system to determine when to energize the interior lighting output. When the interior lighting output is energized, voltage is provided to the interior overhead lamps.

Illuminated Entry and Exit

The illuminated entry and exit features provide temporary illumination of the parking lamps, the dimmable backlighting, the ambient backlighting and the courtesy lamps. Refer to the table for additional information.

NOTE: *An arbitrator (software programming) within the BCM determines which actions take precedence over others (for example, an open door keeps the courtesy lamps on even when a command to lock the doors is received).*

Action	Parking Lamps	Courtesy Lamps	Dimmable Backlighting	Ambient Lighting
RKE transmitter or mechanical unlocking of the doors	On for 25 seconds	On for 25 seconds	On for 25 seconds	Off
RKE transmitter or mechanical locking of the doors	Off	Off	Off	Off 3 seconds after courtesy lamps turned off
Open a closed door after previously unlocking (no ignition state change since unlock)	Off (on for remaining time if unlocked from transmitter or mechanical unlocking of the doors)	On	Off	On
Close all doors	Off	On for 25 seconds	On for 25 seconds	On for 25 seconds

Action	Parking Lamps	Courtesy Lamps	Dimmable Backlighting	Ambient Lighting
Ignition changed to ON	Off	On for 25 seconds	Off	On
Ignition changed out of ON	Off	On for 25 seconds	On for 25 seconds	On for 25 seconds
Open a door after the ignition is changed to OFF	Off	On	Off	On
Ignition is OFF and doors are unlocked from the door lock switch	Off	On for 25 seconds	Off	Off
Ignition is OFF and doors are locked from the door lock switch	Off	Off	Off	Off

Demand Lamps

When the BCM is in not in battery saver mode, the interior light output is energized to provide voltage to the demand lamps.

Ambient Lighting

NOTE: *On vehicles equipped with an analog cluster, ambient lighting color and dim settings can only be changed during nighttime ambient lighting conditions.*

The ambient lighting subsystem consists of the Body Control Module B (BCMB), and the Light Emitting Diodes (LEDs) located within the floor console (cup holders), front door panels (interior door release handles), front footwell areas, the scuff plate trim panels and the IPC . The message center switch is used to cycle the Light Emitting Diodes (LEDs) through 132 different color combinations (7 preset colors or 125 colors created through the MyColor™ feature) or to turn the ambient lighting off. The Body Control Module B (BCMB) provides the necessary voltage to all the Light Emitting Diodes (LEDs) to illuminate the 2 different zones.

Based on the ambient lighting system selections made using the IPC message center, the IPC sends ambient light color request and ambient light intensity request messages over the HS-CAN3 to the GWM , then to the Body Control Module B (BCMB) through the MS-CAN for color and brightness settings.

The ambient lighting is split up into 2 separate zones, zone 1 and zone 3. Zone 2 is not used. Zone 1 consists of the front footwells, interior door release handles and the cup holders. Zone 3 consists of the scuff plate trim panels. Both zones share an ambient lighting LED ground circuit. Ground is provided by the Body Control Module B (BCMB).

When a door is opened, the Body Control Module B (BCMB) turns on both zones of the ambient lighting system. Zone 3 (door scuff plate Light Emitting Diodes (LEDs)) are turned off when any door is closed, or the illuminated entry request is detected by the Body Control Module B (BCMB). The zone is turned off at the same time as the courtesy lighting by the Body Control Module B (BCMB) if the key is not activated in the ignition switch. The ambient lighting is reactivated when until the parking lamps are turned on or the ignition is in ON.

Field Effect Transistor (FET) Protection

A Field Effect Transistor (FET) is a type of transistor that, when used with module software, monitors and controls current flow on module outputs. The Field Effect Transistor (FET) protection strategy prevents module damage in the event of excessive current flow.

The BCM utilizes a Field Effect Transistor (FET) protective circuit strategy for many of its outputs (for example, a headlamp output circuit). Output loads (current level) are monitored for excessive current (typically short circuits) and are shut down (turns off the voltage or ground provided by the module) when a fault event is detected. A short circuit DTC is stored at the fault event and a cumulative counter is started.

When the demand for the output is no longer present, the module resets the Field Effect Transistor (FET) circuit protection to allow the circuit to function. The next time the driver requests a circuit to activate that has been shut down by a previous short (Field Effect Transistor (FET) protection) and the circuit is still shorted, the Field Effect Transistor (FET) protection shuts off the circuit again and the cumulative counter advances.

When the excessive circuit load occurs often enough, the module shuts down the output until a repair procedure is carried out. Each Field Effect Transistor (FET) protected circuit has 3 predefined levels of short circuit tolerance based on the harmful effect of each circuit fault on the Field Effect Transistor (FET) and the ability of the Field Effect Transistor (FET) to withstand it. A module lifetime level of fault events is established based upon the durability of the Field Effect Transistor (FET). If the total tolerance level is determined to be 600 fault events, the 3 predefined levels would be 200, 400 and 600 fault events.

When each tolerance level is reached, DTC U1000:00 sets along with the short circuit DTC that was stored on the first failure. These Diagnostic Trouble Codes (DTCs) cannot be cleared until the vehicle is repaired.

After the repair, it is necessary to clear the Diagnostic Trouble Codes (DTCs). Use the clear DTC operation on the scan tool, cycle the ignition, and run the BCM on-demand self-test.

The module never resets the fault event counter to zero and continues to advance the fault event counter as short circuit fault events occur. If the number of short circuit fault events reach the third level, DTC U3000:49 sets along with the associated short circuit DTC . DTC U3000:49 cannot be cleared and the module must be replaced after the initial fault is repaired.

Component Description

Door Ajar Switch

The door ajar switches (ground switches) each receive a voltage signal from the BCM on independent circuits. When the door is closed, the ajar switch is closed, routing the signal to ground. When the door is opened, the ajar switch opens.

Luggage Compartment Lid Ajar Switch

The luggage compartment lid ajar switch receives a voltage signal from the BCM through the cargo area lamp. The luggage compartment lid ajar switch is grounded to the vehicle. When the luggage compartment lid is closed, the ajar switch is closed, providing ground to the luggage compartment lamp.