

# CHIME/BUZZER WARNING SYSTEMS

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### DESCRIPTION AND OPERATION

#### CHIME WARNING SYSTEM

##### DESCRIPTION

A chime warning system is standard factory-installed equipment on this model. The chime warning system is designed to provide an audible warning or feedback of various conditions that may require the attention or awareness of the vehicle operator. The chime warning system has access to both non-switched and ignition switched sources of battery current so that some audible warnings may occur at any time, while others may only occur with the ignition switch in the On or Accessory positions.

A Body Control Module (BCM) is used on this model to control and integrate many of the electronic functions and features included on the vehicle. One of the functions and features that the BCM supports is the chime warning system. The BCM contains a chime tone generator and control logic to perform the functions of the chime warning system. The BCM contains a central processing unit and interfaces with other modules in the vehicle on the Programmable Communications Interface (PCI) data bus network.

The chime warning system includes the following components:

- Body Control Module (BCM)
- Driver door ajar switch
- Driver seat belt switch
- Key-in ignition switch.

Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information on this component. Refer to **Body Control Module** in the Contents of Group 8W - Wiring Diagrams for complete circuit diagrams. Following are general descriptions

of the remaining major components in the factory-installed chime warning system.

##### OPERATION

The chime warning system provides an audible indication to the vehicle operator under the following conditions:

- **Fasten Seat Belt Reminder** - If the driver side seat belt is not fastened with the ignition switch in the On position, a chime will sound for about six seconds.
- **Head Lamps On Warning** - If the head or park lamps are left on with the ignition switch Off and the driver side front door open, a chime will sound.
- **Key In Ignition Warning** - If the driver side front door is open while the key is in the ignition switch lock cylinder, a chime will sound.
- **Tactile Beep Support** - A beep tone is generated as audible confirmation that an Electronic Vehicle Information Center (EVIC) button was completely depressed, and/or that certain Sentry Key Immobilizer System (SKIS) functions have been completed.
- **Warning Indicator Chime** - An audible alert to the vehicle operator that supplements certain visual warning indications displayed by the Electro-Mechanical Instrument Cluster (EMIC) and/or the Electronic Vehicle Information Center (EVIC).

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the chime warning system.

The BCM uses hard wired inputs, internal programming, and PCI data bus chime request message inputs to decide when a chime tone is required. This group only covers the diagnosis and service of the hard wired inputs used by the BCM to determine that a chime tone should be generated. For diagnosis of the BCM, the PCI data bus, or the other electronic

## DESCRIPTION AND OPERATION (Continued)

modules on the PCI data bus that send chime request messages to the BCM, the use of a DRB scan tool and the proper Diagnostic Procedures manual are recommended.

Refer to **Body Control Module** in the Removal and Installation section of Group 8E - Instrument Panel Systems for the BCM service procedures. The BCM can only be serviced by an authorized electronic repair station. See the latest version of the Chrysler Corporation Warranty Policies and Procedures manual for a current listing of authorized electronic repair stations.

## DRIVER DOOR MODULE

The Driver Door Module (DDM) monitors the driver door ajar switch through a hard wired circuit. The DDM is programmed to send driver door ajar messages over the Programmable Communications Interface (PCI) data bus to the Body Control Module (BCM) and the Electronic Vehicle Information Center when it detects that the driver door is ajar. The BCM and the EVIC are programmed to determine if any other monitored vehicle conditions are present that will require a chime tone (BCM) or chime tone request message (EVIC) to be generated.

Refer to **Door Module** in the Description and Operation section of Group 8P - Power Lock Systems for more information on the DDM. Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information on this component. Refer to **Electronic Vehicle Information Center** in the Description and Operation section of Group 8V - Overhead Console Systems for more information on this component.

## ELECTRO-MECHANICAL INSTRUMENT CLUSTER

The Electro-Mechanical Instrument Cluster (EMIC) is also supported by the chime warning system. The EMIC is programmed to send chime request messages over the Programmable Communications Interface (PCI) data bus to the Body Control Module (BCM) when it detects the following conditions:

- Airbag indicator lamp illuminated
- Anti-lock Brake System (ABS) lamp illuminated
- Check gauges lamp illuminated for one of the following conditions:
  - Charging system voltage high or low
  - Engine coolant temperature high
  - Engine coolant temperature critical
  - Engine oil pressure low
  - Low fuel warning lamp illuminated (customer programmable)
- Malfunction Indicator Lamp (MIL) illuminated

- Transmission oil temperature warning lamp illuminated.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the EMIC. Refer to **Instrument Cluster** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information on the EMIC.

## ELECTRONIC VEHICLE INFORMATION CENTER

The Electronic Vehicle Information Center (EVIC) uses the chime warning system for two different kinds of support. In addition to requesting chime tones from the Body Control Module (BCM) as tactile beep support, the EVIC is programmed to send chime request messages over the Programmable Communications Interface (PCI) data bus when it detects the following conditions:

- **Door Ajar Warning** - A door is ajar above a critical speed [about 16 kilometers-per-hour (10 miles-per-hour) for the driver side front door, or about 5 kilometers-per-hour (3 miles-per-hour) for any other door].
- **Liftgate Ajar Warning** - The liftgate or liftgate flip-up glass is ajar above a critical speed [about 5 kilometers-per-hour (3 miles-per-hour)].
- **Low Coolant Level Warning** - The coolant level in the engine coolant reservoir is low.
- **Perform Service Alert** - An audible alert that a "Perform Service" reminder message is being displayed by the EVIC.
- **Turn Signal On Warning** - A turn signal remains on for about 1.6 kilometers (one mile) with no decrease in speed or throttle opening
- **Washer Fluid Low Warning** - The fluid level in the washer reservoir is low.

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the EVIC. Refer to **Electronic Vehicle Information Center** in the Description and Operation section of Group 8V - Overhead Console Systems for more information on the EVIC.

## SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) also uses tactile beep support from the chime warning system. The Sentry Key Immobilizer Module (SKIM) is programmed to send chime request messages over the Programmable Communications Interface (PCI) data bus to the Body Control Module (BCM) to provide audible confirmation that:

- The SKIM has been successfully placed in the Customer Learn mode.
- A new Sentry key transponder has been successfully programmed by the SKIM.

## DESCRIPTION AND OPERATION (Continued)

See the owner's manual in the vehicle glove box for more information on the features, use and operation of the SKIS. Refer to **Sentry Key Immobilizer System** in the Description and Operation section of Group 8Q - Vehicle Theft/Security Systems for more information on the SKIS.

**DRIVER DOOR AJAR SWITCH****DESCRIPTION**

The driver door ajar switch is concealed within and integral to the driver side front door latch unit. The driver door ajar switch is actuated by the front door latch mechanism, and is hard wired between a body ground and the Driver Door Module (DDM) through the driver side front door wire harness.

The driver door ajar switch cannot be adjusted or repaired and, if faulty or damaged, the driver side front door latch unit must be replaced. Refer to **Front Door Latch** in the Removal and Installation section of Group 23 - Body for the service procedures. Refer to **Door Module** in the Power Lock System section of Group 8P - Power Lock Systems for more information on this component. For complete circuit diagrams, refer to **Interior Lighting** in the Contents of Group 8W - Wiring Diagrams.

**OPERATION**

The driver door ajar switch closes a path to ground for the DDM when the driver side front door is opened, and opens the ground path when the driver side front door is closed. The DDM reads the switch status through an internal pull-up, then sends the proper switch status messages to other electronic modules over the Programmable Communications Interface (PCI) data bus network. The driver door ajar switch status message is used by the Body Control Module (BCM) as an input for chime warning system operation.

**DRIVER SEAT BELT SWITCH****DESCRIPTION**

The driver seat belt switch is concealed within and integral to the driver seat belt buckle-half unit. The driver seat belt switch is actuated by the seat belt buckle mechanism, and is hard wired between a body ground and the Body Control Module (BCM) through the left body wire harness with manual seats, or through the driver side power seat and left body wire harnesses with power seats.

The driver seat belt switch cannot be adjusted or repaired and, if faulty or damaged, the entire driver seat belt buckle-half unit must be replaced. Refer to **Front Shoulder Belt/Buckle** in the Removal and

Installation section of Group 23 - Body for the service procedures. Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information on this component. For complete circuit diagrams, refer to **Body Control Module** in the Contents of Group 8W - Wiring Diagrams.

**OPERATION**

The driver seat belt switch closes a path to ground for the BCM when the tip-half of the driver seat belt is not fastened to the buckle-half, and opens the ground path when the two halves of the seat belt are fastened. The BCM monitors the driver seat belt switch status through an internal pull-up, then sends the proper switch status messages to other electronic modules over the Programmable Communications Interface (PCI) data bus network. The driver seat belt switch status is also used by the BCM as an input for chime warning system operation.

**KEY-IN IGNITION SWITCH****DESCRIPTION**

The key-in ignition switch is concealed within and integral to the ignition switch, which is mounted on the steering column. The key-in ignition switch is actuated by the ignition lock cylinder mechanism, and is hard wired between a body ground and the Body Control Module (BCM) through the instrument panel wire harness.

The key-in ignition switch cannot be adjusted or repaired and, if faulty or damaged, the entire ignition switch unit must be replaced. Refer to **Ignition Switch and Key Cylinder** in the Removal and Installation section of Group 8D - Ignition Systems for the service procedures. Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information on this component. For complete circuit diagrams, refer to **Body Control Module** in the Contents of Group 8W - Wiring Diagrams.

**OPERATION**

The key-in ignition switch closes a path to ground for the BCM when the ignition key is inserted in the ignition lock cylinder, and opens the ground path when the key is removed from the ignition lock cylinder. The BCM monitors the key-in ignition switch status through an internal pull-up, then sends the proper switch status messages to other electronic modules over the Programmable Communications Interface (PCI) data bus network. The key-in ignition switch status is also used by the BCM as an input for chime warning system operation.

## DESCRIPTION AND OPERATION (Continued)

## HEADLAMP SWITCH

## DESCRIPTION

The headlamp switch is integral to the exterior lighting switch, which is part of the left (lighting) multi-function switch unit located on the left side of the steering column. A knob on the end of the left multi-function switch control stalk controls all of the exterior lighting switch functions. The exterior lighting switch is hard wired to the Body Control Module (BCM) through the instrument panel wire harness.

The exterior lighting switch cannot be adjusted or repaired and, if faulty or damaged, the entire left multi-function switch unit must be replaced. Refer to **Turn Signal and Hazard Warning Switch** in the Removal and Installation section of Group 8J - Turn Signal and Hazard Warning Systems for the service procedures. Refer to **Body Control Module** in the Description and Operation section of Group 8E - Instrument Panel Systems for more information on this component. For complete circuit diagrams, refer to **Body Control Module** in the Contents of Group 8W - Wiring Diagrams.

## OPERATION

The exterior lighting switch uses a hard wired five volt reference circuit from the BCM, resistor multiplexing and a hard wired switch output circuit in the instrument panel wire harness to provide the BCM with a zero to five volt signal that indicates the status of all of the exterior lighting switch settings. The BCM then uses control outputs to energize the headlamp and park lamp relays that activate the exterior lighting circuits.

The BCM monitors the exterior lighting switch status, then sends the proper switch status messages to other electronic modules over the Programmable Communications Interface (PCI) data bus network. The exterior lighting switch status is also used by the BCM as an input for chime warning system operation.

## DIAGNOSIS AND TESTING

## CHIME WARNING SYSTEM

Following are tests that will help to diagnose the components and circuits that provide hard wired inputs to the chime warning system. However, these tests may not prove conclusive in the diagnosis of this system. In order to obtain conclusive testing of the chime warning system, the Programmable Communications Interface (PCI) data bus network and all of the electronic modules that provide inputs to, or receive outputs from the chime warning system components must be checked.

The most reliable, efficient, and accurate means to diagnose the chime warning system requires the use of a DRB scan tool and the proper Diagnostic Procedures manual. The DRB scan tool can provide confirmation that the PCI data bus is functional, that the Body Control Module (BCM) is sending and receiving the proper messages on the PCI data bus, and that the BCM is receiving the proper hard wired inputs to perform its chime warning system functions.

## DRIVER DOOR AJAR SWITCH

The driver door ajar switch is hard wired to the Driver Door Module (DDM). The DDM communicates the switch status to the other electronic modules in the vehicle on the Programmable Communications Interface (PCI) data bus network. Be certain that the PCI data bus is functional before attempting diagnosis of the driver door ajar switch. A simple test to confirm PCI data bus operation is to operate the passenger side power mirror. If the passenger side power mirror does not operate, use a DRB scan tool and the proper Diagnostic Procedures manual to test the operation of the PCI data bus and the DDM. If the passenger side power mirror operates, the following test will diagnose a faulty driver door ajar switch and circuits. For complete circuit diagrams, refer to **Interior Lighting** in the Contents of Group 8W - Wiring Diagrams.

**WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.**

(1) Check that the interior lighting switch on the control stalk of the left multi-function switch is not in the dome lamp disable position. Open the driver side front door and note whether the interior lamps light. They should light. If OK, refer to Key-In Ignition Switch in the Diagnosis and Testing section of this group for further diagnosis of the chime warning system. If not OK, go to Step 2.

(2) Disconnect and isolate the battery negative cable. Remove the trim panel from the driver side front door and disconnect the 4-way door wire harness connector from the front door latch connector receptacle. Check for continuity between the ground circuit cavity of the 4-way door wire harness connector for the front door latch and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the ground circuit to ground as required.

## DIAGNOSIS AND TESTING (Continued)

(3) Disconnect the white 15-way door wire harness connector from the Driver Door Module (DDM) connector receptacle. Check for continuity between the driver door ajar switch sense circuit of the white 15-way door wire harness connector for the DDM and a good ground. There should be no continuity. If OK, go to Step 4. If not OK, repair the shorted driver door ajar switch sense circuit as required.

(4) Check for continuity between the driver door ajar switch sense circuit cavities of the white 15-way door wire harness connector for the DDM and the 4-way door wire harness connector for the front door latch. There should be continuity. If OK, go to Step 5. If not OK, repair the open driver door ajar switch sense circuit as required.

(5) Check for continuity between the ground circuit terminal and the driver door ajar switch sense circuit terminal of the front door latch connector receptacle. There should be continuity with the driver side front door open, and no continuity with the door closed. If OK, use a DRB scan tool and the proper Diagnostic Procedures manual to test the operation of the PCI data bus and the DDM. If not OK, replace the faulty driver side front door latch unit.

**DRIVER SEAT BELT SWITCH**

For complete circuit diagrams, refer to **Body Control Module** in the Contents of Group 8W - Wiring Diagrams.

**WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.**

(1) Disconnect and isolate the battery negative cable. Disconnect the left body wire harness (manual seat), or the driver side power seat wire harness (power seat) from the driver seat belt switch wire harness connector located under the driver side front seat cushion. Check for continuity between the seat belt switch sense circuit and the ground circuit cavities in the seat belt switch wire harness connector. There should be continuity with the driver side seat belt tip-half and buckle-half unfastened, and no continuity with tip-half and buckle-half fastened. If OK, go to Step 2. If not OK, replace the faulty driver side seat belt buckle-half unit.

(2) Check for continuity between the ground circuit cavity in the left body wire harness connector (manual seat), or the driver side power seat wire har-

ness connector (power seat) for the driver seat belt switch and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open ground circuit to ground as required.

(3) Disconnect the 52-way left body wire harness connector from the junction block. Check for continuity between the seat belt switch sense circuit cavity in the left body wire harness connector (manual seat), or the driver side power seat wire harness connector (power seat) for the driver seat belt switch and a good ground. There should be no continuity. If OK, go to Step 4. If not OK, repair the shorted seat belt switch sense circuit as required.

(4) Check for continuity between the seat belt switch sense circuit cavities in the left body wire harness connector (manual seat), or the driver side power seat wire harness connector (power seat) for the driver seat belt switch and the 52-way left body wire harness connector for the junction block. There should be continuity. If OK, use a DRB scan tool and the proper Diagnostic Procedures manual to test the BCM. If not OK, repair the open seat belt switch sense circuit as required.

**KEY-IN IGNITION SWITCH**

For complete circuit diagrams, refer to **Body Control Module** in the Contents of Group 8W - Wiring Diagrams.

**WARNING: ON VEHICLES EQUIPPED WITH AIR-BAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIR-BAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.**

(1) Disconnect and isolate the battery negative cable. Disconnect the instrument panel wire harness connector from the key-in ignition switch connector receptacle on the ignition switch. Check for continuity between the key-in ignition switch sense and ground terminals of the key-in ignition switch connector receptacle. There should be continuity with the key inserted in the ignition lock cylinder, and no continuity with the key removed from the ignition lock cylinder. If OK, go to Step 2. If not OK, replace the faulty ignition switch unit.

(2) Check for continuity between the ground circuit cavity of the instrument panel wire harness connector for the key-in ignition switch and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open ground circuit to ground as required.

## DIAGNOSIS AND TESTING (Continued)

(3) Disconnect the gray 26-way instrument panel wire harness connector from the Body Control Module (BCM) connector receptacle. Check for continuity between the key-in ignition switch sense circuit cavity of the instrument panel wire harness connector for the key-in ignition switch and a good ground. There should be no continuity. If OK, go to Step 4. If not OK, repair the shorted key-in ignition switch sense circuit as required.

(4) Check for continuity between the key-in ignition switch sense circuit cavities of the instrument panel wire harness connector for the key-in ignition switch and the gray 26-way instrument panel wire harness connector for the BCM. There should be continuity. If OK, use a DRB scan tool and the proper Diagnostic Procedures manual to test the BCM. If not OK, repair the open key-in ignition switch sense circuit as required.

## HEADLAMP SWITCH

Before testing the headlamp switch, turn on the exterior lighting and open the driver side front door. If the exterior lamps of the vehicle operate, but there is no chime warning issued with the driver side front door open, refer to **Driver Door Ajar Switch** in the Diagnosis and Testing section of this group. If the exterior lamps of the vehicle are inoperative, but the chime warning is issued, refer to **Lamp Diagnosis** in the Diagnosis and Testing section of Group 8L - Lamps.

If the exterior lamps and the chime warning are both inoperative, test the left (lighting) multi-function switch. Refer to **Turn Signal and Hazard Warning Switch** in the Diagnosis and Testing section of Group 8J - Turn Signal and Hazard Warning Systems to test the left (lighting) multi-function switch. If the left (lighting) multi-function switch tests OK, proceed as follows. The following tests will help to locate a short or open in the hard wired circuits between the left (lighting) multi-function switch and the Body Control Module (BCM). For complete circuit diagrams, refer to **Body Control Module** in the Contents of Group 8W - Wiring Diagrams.

**WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.**

(1) Disconnect and isolate the battery negative cable. Disconnect the instrument panel wire harness connector from the left multi-function switch connec-

tor receptacle. Disconnect the gray 26-way instrument panel wire harness connector from the Body Control Module (BCM). Check for continuity between the headlamp switch mux circuit cavity of the instrument panel wire harness connector for the left multi-function switch and a good ground. There should be no continuity. If OK, go to Step 2. If not OK, repair the shorted headlamp switch mux circuit as required.

(2) Check for continuity between the headlamp switch mux circuit cavities of the instrument panel wire harness connector for the left multi-function switch and the gray 26-way instrument panel wire harness connector for the BCM. There should be continuity. If OK, go to Step 3. If not OK, repair the open headlamp switch mux circuit as required.

(3) Check for continuity between the headlamp switch return circuit cavity of the instrument panel wire harness connector for the left multi-function switch and a good ground. There should be no continuity. If OK, go to Step 4. If not OK, repair the shorted headlamp switch return circuit as required.

(4) Check for continuity between the headlamp switch return circuit cavities of the instrument panel wire harness connector for the left multi-function switch and the gray 26-way instrument panel wire harness connector for the BCM. There should be continuity. If OK, use a DRB scan tool and the proper Diagnostic Procedures manual to test the BCM. If not OK, repair the open headlamp switch return circuit as required.

## REMOVAL AND INSTALLATION

### CHIME WARNING SYSTEM SWITCHES

Service procedures for the various hard wired switches used in the chime warning system can be found in the proper group as follows:

- **Driver door ajar switch** - Refer to **Front Door Latch** in the Removal and Installation section of Group 23 - Body for the service procedures.

- **Driver seat belt switch** - Refer to **Front Shoulder Belt/Buckle** in the Removal and Installation section of Group 23 - Body for the service procedures.

- **Headlamp switch** - Refer to **Turn Signal and Hazard Warning Switch** in the Removal and Installation section of Group 8J - Turn Signal and Hazard Warning Systems for the service procedures.

- **Key-in ignition switch** - Refer to **Ignition Switch and Key Cylinder** in the Removal and Installation section of Group 8D - Ignition Systems for the service procedures.