

ACCESSORIES & EQUIPMENT

Remote Functions - Coupe And Wagon

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Garage Door Opener Bolt/Screws	2.5 N.m	22 lb in

SCHEMATIC WIRING DIAGRAMS

REMOTE FUNCTION WIRING SCHEMATICS

Garage Door Opener (UG1)

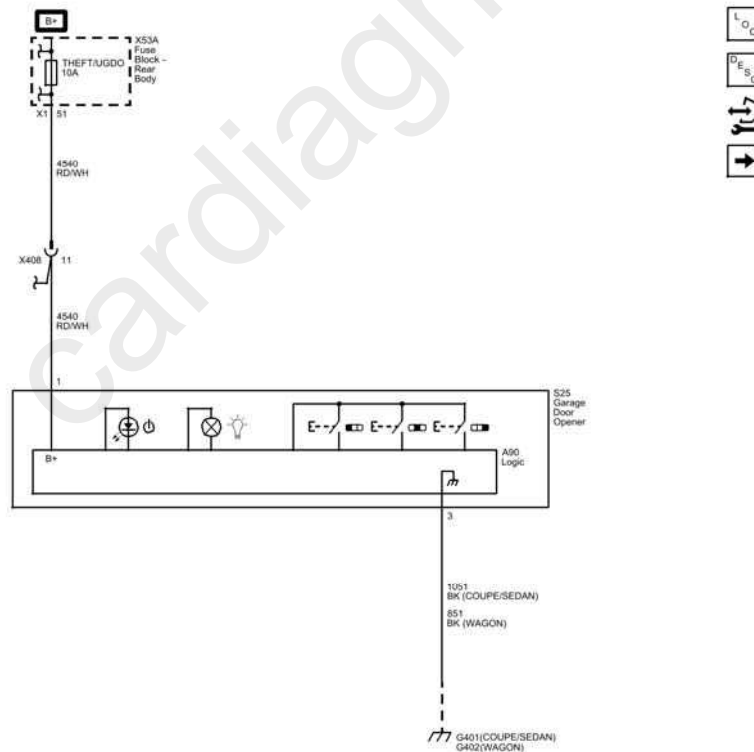


Fig. 1: Garage Door Opener (UG1)

Courtesy of GENERAL MOTORS COMPANY

Keyless Entry System (without ATH)

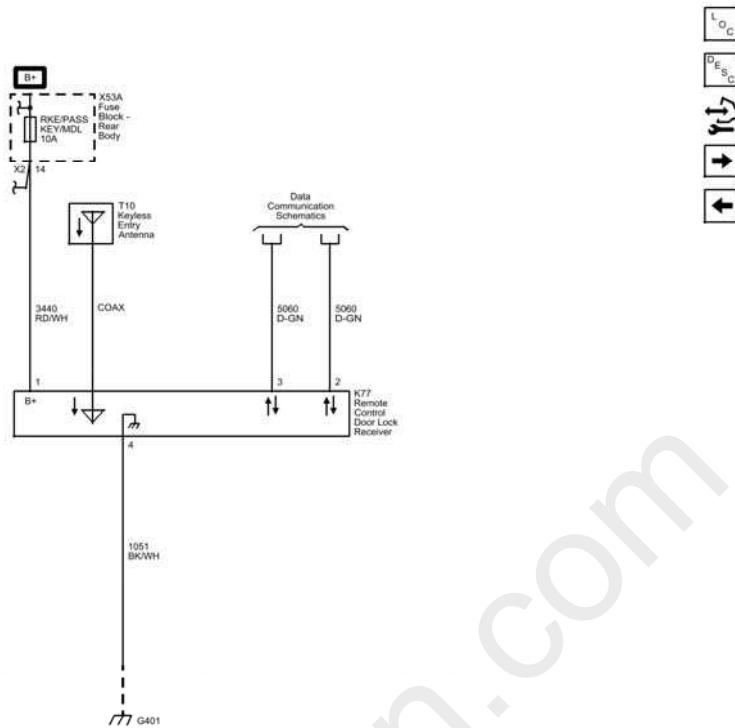


Fig. 2: Keyless Entry System (without ATH)
 Courtesy of GENERAL MOTORS COMPANY

Easy Keyless Entry System (ATH)

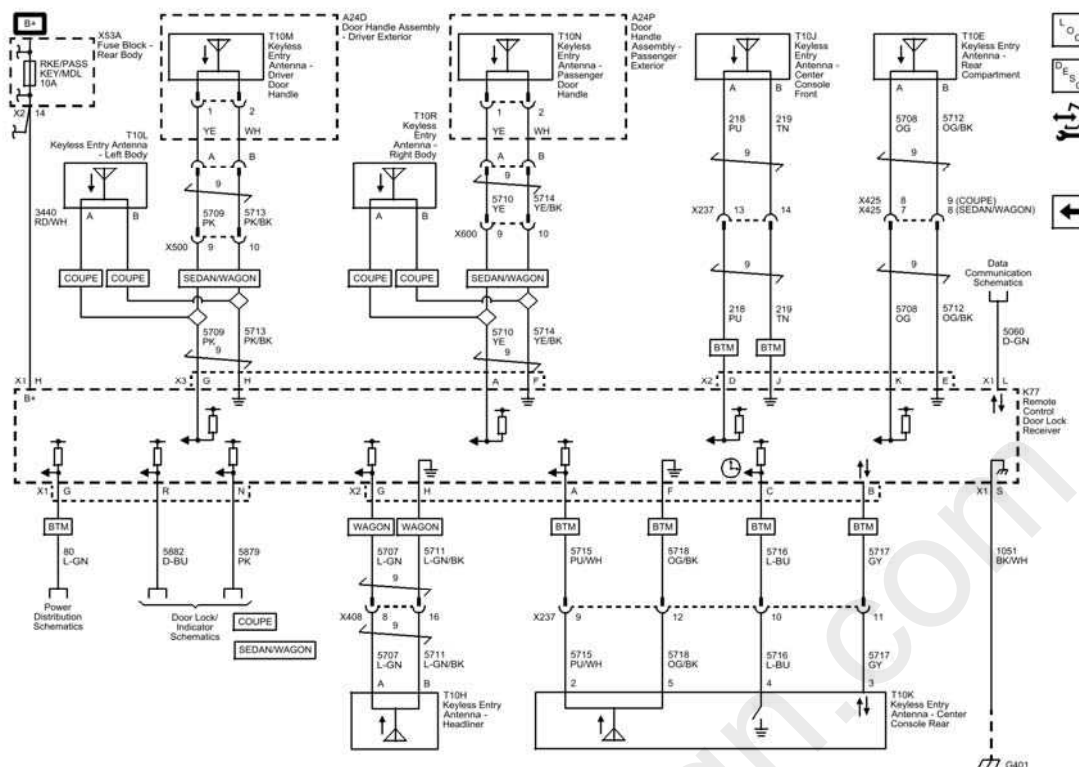


Fig. 3: Easy Keyless Entry System (ATH)
 Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1008	DTC B1008 00 Calibration Data Not Programmed
DTC B2961	DTC B2961 02 Key In Ignition Circuit Short to Ground
DTC B3105	DTC B3105 00 Keyless Entry System Key Fobs Not Programmed
DTC B3109, B3110, B3111, or B3112	DTC B3109 00 Keyless Entry Transmitter 1 Low Battery DTC B3110 00 Keyless Entry Transmitter 2 Low Battery DTC B3111 00 Keyless Entry Transmitter 3 Low Battery DTC B3112 00 Keyless Entry Transmitter 4 Low Battery
DTC B3119	DTC B3119 00 Keyless Entry Antenna 1 Performance - LF Door Antenna
DTC B3120	DTC B3120 00 Keyless Entry Antenna 2 Performance - RF Door Antenna
DTC B3121	DTC B3121 00 Keyless Entry Antenna 3 Performance - Rear Compartment Antenna
DTC B3122	DTC B3122 00 Keyless Entry Antenna 4 Performance - Console Active Antenna
DTC B3123	DTC B3123 00 Keyless Entry Antenna 5 Performance - Console Passive

	Antenna
DTC B3124	DTC B3124 00 Keyless Entry Antenna 6Performance - Headliner Antenna
DTC B3601	DTC B3601 01 Ignition Switch Key Capture Solenoid Circuit Short to Battery DTC B3601 02 Ignition Switch Key Capture Solenoid Circuit Short to Ground

DTC B1008: CALIBRATION DATA NOT PROGRAMMED

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 B1008 00

Calibration Data Not Programmed

Circuit/System Description

When replacing a remote control door lock receiver (RCDLR), the service replacement part is shipped with no installed software. Before the new RCDLR is operational, a software calibration is required to be downloaded using the SPS terminal. Failure to download this software calibration will result in the setting of DTC B1008.

Conditions for Running the DTC

This DTC runs continuously

Conditions for Setting the DTC

The RCDLR has no calibration loaded.

Action Taken When the DTC Sets

All functions handled by the RCDLR are inoperative

Conditions for Clearing the DTC

A current DTC will clear when software calibrations are installed.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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

Perform the RCDLR Programming and Setup procedure. Refer to **Remote Control Door Lock Receiver Programming and Setup (without ATH)** , **Remote Control Door Lock Receiver Programming and Setup (with ATH - Canada and Europe)** , **Remote Control Door Lock Receiver Programming and Setup (with ATH - N America and Asia)** .

- If the DTC resets, replace the RCDLR.

Repair Instructions

IMPORTANT: This vehicle may be equipped with the 2 Way Advanced Remote Start System. Vehicle equipped with the 2 Way Advanced Remote Start System can be identified by an LCD screen on the keyless entry transmitter or a yellow label on the RCDLR. When servicing the 2 Way Advanced Remote Start System, ensure that the correct parts are installed during replacement. Service parts for the 2 Way Advanced Remote Start System can be found in the Accessory section of the parts manual.

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for RCDLR replacement, setup, and programming

DTC B2961: KEY IN IGNITION CIRCUIT SHORT TO GROUND

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 B2961 02

Key In Ignition Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Key In Ignition Switch Signal	1, 2	1	B2961 02	-
1. Transmitter authentication will not initiate when pushing ignition control knob 2. Power Mode Mismatch				

Circuit/System Description

The remote control door lock receiver (RCDLR) monitors the key in ignition switch signal circuit as a means of initiating transmitter authentication. When the ignition control knob is pressed, the key in ignition switch (part of the ignition switch assembly) is closed. This grounds the key in ignition switch signal circuit and the RCDLR will begin the transmitter authentication process.

If a fault exists on the key in ignition switch signal circuit or within the switch itself, transmitter authentication will not initiate when pressing the ignition control knob. Instead, transmitter authentication will only occur when depressing the brake pedal.

Conditions for Running the DTC

Ignition OFF.

Conditions for Setting the DTC

The RCDLR detects the key in ignition circuit is active for greater than 3 minutes.

Action Taken When the DTC Sets

The key in ignition input is ignored.

Conditions for Clearing the DTC

- A current DTC will clear when the condition for setting the DTC is no longer present.
- A history DTC will clear after 40 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Shift Lock Control Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Automatic Transmission Shift Lock Control 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

Ignition ON, observe the scan tool RCDLR Authentication Switch parameter. The parameter should be Active only when the ignition switch knob is pressed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the ignition switch.
2. Verify the scan tool Authentication Switch parameter is Inactive.
 - If not the specified value, test the signal circuit terminal 5 for a short to voltage. If the circuit tests normal, replace the RCDLR.
3. Install a 3A fused jumper wire between the signal circuit terminal 5 and B+. Verify the scan tool Authentication Switch parameter is Active.
 - If not the specified value, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the RCDLR.
4. If all circuits tests normal, test or replace the ignition switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ignition and Start Switch Replacement**

- **Control Module References** for RCDLR replacement, setup, and programming

DTC B3105: KEYLESS ENTRY SYSTEM KEY FOBS NOT PROGRAMMED

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 B3105 00

Keyless Entry System Key Fobs Not Programmed

Circuit/System Description

The remote control door lock receiver (RCDLR) monitors the number of keyless entry transmitters programmed. Until at least one transmitter is programmed, the RCDLR determines a malfunction condition exists.

Conditions for Running the DTC

The RCDLR has been set up without transmitters being programmed

Conditions for Setting the DTC

No keyless entry transmitter programmed to the RCDLR.

Action Taken When the DTC Sets

The keyless entry system is inoperative.

Conditions for Clearing the DTC

A current DTC is cleared at least one transmitter has been programmed to the RCDLR.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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

Special Tools

J 43241 Keyless Entry Tester

Circuit/System Verification

Attempt to program the keyless entry transmitter, refer to **Remote Control Door Lock Transmitter Learn (without ATH)**, (without ATH) or **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia)**, **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - Canada and Europe)** (with ATH). The transmitter should program.

Circuit/System Testing

1. Verify that the transmitter is the correct transmitter for the vehicle.
 - If not correct, replace the transmitter.
2. Place the transmitter on the test pad of the **J 43241** keyless entry tester and press each button of the transmitter one at a time. The tester should sound a tone and illuminate a green light when each button is pressed.
 - If one or more buttons does not sound the tone and illuminate the green light, replace the transmitter battery and retest with the **J 43241** keyless entry tester. If the condition continues after battery replacement, replace the transmitter.
3. Attempt to program the transmitter, refer to **Remote Control Door Lock Transmitter Learn (without ATH)**, (without ATH) or **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia)**, **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - Canada and Europe)** (with ATH). The transmitter should program.
 - If the transmitter does not program, replace the RCDLR.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for RCDLR replacement, setup, and programming

DTC B3109, B3110, B3111, OR B3112: KEYLESS ENTRY TRANSMITTER 1-4 LOW BATTERY

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 B3109 00

Keyless Entry Transmitter 1 Low Battery

DTC B3110 00

Keyless Entry Transmitter 2 Low Battery

DTC B3111 00

Keyless Entry Transmitter 3 Low Battery

DTC B3112 00

Keyless Entry Transmitter 4 Low Battery

Circuit/System Description

Without RPO ATH

With each press of a keyless entry transmitter button, a message containing the current battery state of the transmitter is sent to the remote control door lock receiver (RCDLR) along with the commanded keyless entry function.

With RPO ATH

When starting the vehicle, a message containing the current battery state of the transmitter is sent to the remote control door lock receiver (RCDLR).

Conditions for Running the DTC

Without RPO ATH

A keyless transmitter button is pressed.

With RPO ATH

Ignition ON.

Conditions for Setting the DTC

The DTC sets after 3 consecutive low battery signals from the same programmed transmitter.

Action Taken When the DTC Sets

The keyless entry system is inoperative.

Conditions for Clearing the DTC

The DTC is cleared when a normal transmitter voltage signal is received from the programmed transmitter that set the DTC.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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

Verify none of the following DTCs are set:

- DTC B3109
 - DTC B3110
 - DTC B3111
 - DTC B3112
- If any of the DTCs are set, replace the battery in the appropriate keyless entry transmitter. Operate the transmitter 3 consecutive times. If the DTC resets, replace the keyless entry transmitter.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Remote Control Door Lock Transmitter Learn (without ATH)**
- **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia), Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - Canada and Europe)**

DTC B3119: KEYLESS ENTRY ANTENNA 1 PERFORMANCE - LF DOOR ANTENNA

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 B3119 00

Keyless Entry Antenna 1 Performance - LF Door Antenna

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Keyless Entry Antenna Signal - LF Door	B3119 00	B3119 00	B3119 00	-
Keyless Entry Antenna Low Reference - LF Door	-	B3119 05	-	-
Keyless Entry Antenna Signal - RF Door	B3120 00	B3120 00	B3120 00	-
Keyless Entry Antenna Low Reference - RF Door	-	B3120 05	-	-

Keyless Entry Antenna Signal - Rear Compartment	B3121 00	B3121 00	B3121 05	-
Keyless Entry Antenna Low Reference - Rear Compartment	-	B3121 00	-	-
Keyless Entry Antenna Signal - Console Passive	B3123 00	B3123 00	B3123 00	-
Keyless Entry Antenna Low Reference - Console Passive	-	B3123 00	-	-
Keyless Entry Antenna Ignition - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Data Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Clock Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Low Reference - Console Active	-	B3122 00	-	-

Circuit/System Description

The LF door handle antenna is located in the left front door handle assembly and is used to establish low frequency (LF) communications with the keyless entry transmitter. As a vehicle with locked doors is approached with a keyless entry transmitter, known as an electronic key, and the exterior door handle is activated, the keyless entry antenna broadcasts a challenge to the transmitter in an approximately 1 meter range. If the response from the transmitter via radio frequency (RF) is valid, the locked door will be passively unlocked/unlatched and allow the door to be opened.

Conditions for Running the DTC

The left front door handle is pulled.

Conditions for Setting the DTC

An improper current level is seen on the keyless entry antenna - signal (4) circuit.

Action Taken When the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 50 malfunction free ignition cycles.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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 harness connector at the LF door handle antenna.
2. Ignition ON, verify a test lamp does not illuminate between the signal circuit terminal A and ground.
 - If the test lamp illuminates, test the signal circuit for a short to voltage. If the circuit tests normal, replace the RCDLR.
3. Install a DMM between the signal circuit terminal A and the low reference circuit terminal B. Set the DMM to capture AC voltage using the MIN MAX function.
4. Perform the Driver Front Exterior Zone special functions test. Verify the DMM captured an AC voltage signal.
 - If an AC voltage was not captured, test the signal circuit and the low reference circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the RCDLR.
5. If all circuits test normal, test or replace the LF door handle assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Door Outside Handle Replacement (Front Door with ATH) , Front Side Door Outside Handle Replacement (Front and Rear Doors with ATH) , Front Side Door Outside Handle Replacement (Without ATH)**
- **Control Module References** for RCDLR replacement, setup, and programming

DTC B3120: KEYLESS ENTRY ANTENNA 2 PERFORMANCE - RF DOOR ANTENNA

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 B3120 00

Keyless Entry Antenna 2 Performance - RF Door Antenna

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Keyless Entry Antenna Signal - LF Door	B3119 00	B3119 00	B3119 00	-
Keyless Entry Antenna Low Reference - LF Door	-	B3119 005	-	-
Keyless Entry Antenna Signal - RF Door	B3120 00	B3120 00	B3120 00	-
Keyless Entry Antenna Low Reference - RF Door	-	B3120 05	-	-
Keyless Entry Antenna Signal - Rear Compartment	B3121 00	B3121 00	B3121 05	-
Keyless Entry Antenna Low Reference - Rear Compartment	-	B3121 00	-	-
Keyless Entry Antenna Signal - Console Passive	B3123 00	B3123 00	B3123 00	-
Keyless Entry Antenna Low Reference - Console Passive	-	B3123 00	-	-
Keyless Entry Antenna Ignition - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Data Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Clock Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Low Reference - Console Active	-	B3122 00	-	-

Circuit/System Description

The RF door handle antenna is located in the right front door handle assembly and is used to establish low frequency (LF) communications with the keyless entry transmitter. As a vehicle with locked doors is approached with a keyless entry transmitter, known as an electronic key, and the exterior door handle is activated, the keyless entry antenna broadcasts a challenge to the transmitter in an approximately 1 meter range. If the response from the transmitter via radio frequency (RF) is valid, the locked door will be passively unlocked/unlatched and allow the door to be opened.

Conditions for Running the DTC

The right front door handle is pulled.

Conditions for Setting the DTC

An improper current level is seen on the keyless entry antenna - signal (5) circuit.

Action Taken When the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 50 malfunction free ignition cycles.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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 harness connector at the RF door handle antenna.
2. Ignition ON, verify a test lamp does not illuminate between the signal circuit terminal A and ground.
 - If the test lamp illuminates, test the signal circuit for a short to voltage. If the circuit tests normal, replace the RCDLR.
3. Install a DMM between the signal circuit terminal A and the low reference circuit terminal B. Set the DMM to capture AC voltage using the MIN MAX function.
4. Perform the Passenger Front Exterior Zone special functions test. Verify the DMM captured an AC voltage signal.
 - If an AC voltage was not captured, test the signal circuit and the low reference circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the RCDLR.
5. If all circuits test normal, test or replace the RF door handle assembly.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Front Side Door Outside Handle Replacement (Front Door with ATH) , Front Side Door Outside Handle Replacement (Front and Rear Doors with ATH) , Front Side Door Outside Handle Replacement (Without ATH)**
- **Control Module References** for RCDLR replacement, setup, and programming

DTC B3121: KEYLESS ENTRY ANTENNA 3 PERFORMANCE - REAR COMPARTMENT ANTENNA

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 B3121 00

Keyless Entry Antenna 3 Performance - Rear Compartment Antenna

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Keyless Entry Antenna Signal - LF	B3119 00	B3119 00	B3119 00	-

Door				
Keyless Entry Antenna Low Reference - LF Door	-	B3119 05	-	-
Keyless Entry Antenna Signal - RF Door	B3120 00	B3120 00	B3120 00	-
Keyless Entry Antenna Low Reference - RF Door	-	B3120 05	-	-
Keyless Entry Antenna Signal - Rear Compartment	B3121 00	B3121 00	B3121 05	-
Keyless Entry Antenna Low Reference - Rear Compartment	-	B3121 00	-	-
Keyless Entry Antenna Signal - Console Passive	B3123 00	B3123 00	B3123 00	-
Keyless Entry Antenna Low Reference - Console Passive	-	B3123 00	-	-
Keyless Entry Antenna Ignition - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Data Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Clock Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Low Reference - Console Active	-	B3122 00	-	-

Circuit/System Description

The rear compartment keyless entry antenna is used to establish low frequency (LF) communications with the keyless entry transmitter. As a vehicle with a closed rear compartment lid is approached with a keyless entry transmitter, known as an electronic key, and the rear compartment lid release switch is pressed, the keyless entry antenna transmitter broadcasts a challenge to the transmitter in an approximate 1 meter range. If the response from the transmitter via radio frequency (RF) is valid, the latched rear compartment will be passively unlocked/unlatched, allowing the rear compartment area to be opened.

Conditions for Running the DTC

The rear compartment lid release switch is pressed.

Conditions for Setting the DTC

An improper current level is seen on the keyless entry antenna - signal 3 circuit.

Action Taken When the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 50 malfunction free ignition cycles.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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 harness connector at the rear compartment keyless entry antenna.
2. Ignition ON, verify a test lamp does not illuminate between the signal circuit terminal A and ground.
 - If the test lamp illuminates, test the signal circuit for a short to voltage. If the circuit tests normal, replace the RCDLR.
3. Install a DMM between the signal circuit terminal A and the low reference circuit terminal B. Set the DMM to capture AC voltage using the MIN MAX function.
4. Press the rear compartment lid release switch. Verify the DMM captured an AC voltage signal.
 - If an AC voltage was not captured, test the signal circuit and the low reference circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the RCDLR.
5. If all circuits test normal, test or replace the rear compartment keyless entry antenna.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for RCDLR replacement, setup, and programming

DTC B3122: KEYLESS ENTRY ANTENNA 4 PERFORMANCE - CONSOLE ACTIVE ANTENNA

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 B3122 00

Keyless Entry Antenna 4 Performance - Console Active Antenna

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Keyless Entry Antenna Signal - LF Door	B3119 00	B3119 00	B3119 00	-
Keyless Entry Antenna Low Reference - LF Door	-	B3119 05	-	-
Keyless Entry Antenna Signal - RF Door	B3120 00	B3120 00	B3120 00	-
Keyless Entry Antenna Low Reference - RF Door	-	B3120 05	-	-
Keyless Entry Antenna Signal - Rear Compartment	B3121 00	B3121 00	B3121 05	-
Keyless Entry Antenna Low Reference - Rear Compartment	-	B3121 00	-	-
Keyless Entry Antenna Signal - Console Passive	B3123 00	B3123 00	B3123 00	-
Keyless Entry Antenna Low Reference - Console Passive	-	B3123 00	-	-
Keyless Entry Antenna Ignition - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Data Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Clock Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Low Reference - Console Active	-	B3122 00	-	-

Circuit/System Description

The console active antenna is located in the center console and is used to establish low frequency (LF) communications with the keyless entry transmitter. The keyless entry console active antenna is only used when the console passive antenna was unable to locate a transmitter within the interior of the vehicle. This may be due to a keyless entry transmitter battery being low or RF/LF interference.

When a valid transmitter is placed into the pocket located in the center console, and either the brake pedal is depressed or the ignition control knob is pressed, the console active antenna broadcasts a challenge to the transmitter. This causes a low frequency coupling to occur between the transmitter and the console active antenna. If the response from the transmitter is a valid response, and all of the security requirements are met, the vehicle's engine will start, or be allowed to go into accessory mode.

Conditions for Running the DTC

The console active antenna is activated.

Conditions for Setting the DTC

An internal failure is seen at the console active antenna.

Action Taken When the DTC Sets

- The security indicator will be illuminated.
- The Driver Information Center will display "Service Keyless Start".

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 50 malfunction free ignition cycles.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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 harness connector at the console active antenna.
2. Ignition OFF, test for less than 20 ohms between the low reference circuit terminal 5 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the RCDLR.
3. Ignition ON, test for B+ between the supply voltage circuit terminal 2 and ground while commanding the scan tool Active Antenna output control ON.
 - If not the specified value, test the supply voltage circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the RCDLR.
4. Ignition OFF, disconnect the X2 harness connector at the RCDLR.
5. Ignition ON, verify a test lamp does not illuminate between the following circuits and ground:
 - Signal circuit terminal B
 - Signal circuit terminal C
 - If the test lamp illuminates, test the appropriate signal circuit for a short to voltage.
6. Ignition OFF, test for infinite resistance between the following circuits and ground:
 - Signal circuit terminal B
 - Signal circuit terminal C
 - If less than the specified value, test the appropriate signal circuit for a short to ground.
7. Test for less than 2 ohms between the following signal circuits:
 - Terminal B at the RCDLR and terminal 3 at the console active antenna
 - Terminal C at the RCDLR and terminal 4 at the console active antenna
 - If greater than the specified range, test the appropriate signal circuit for an open/high resistance.
8. If all circuits test normal, test or replace the console active antenna.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Active), Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Passive)**
- **Control Module References** for RCDLR replacement, setup, and programming

DTC B3123: KEYLESS ENTRY ANTENNA 5 PERFORMANCE - CONSOLE PASSIVE ANTENNA

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 B3123 00

Keyless Entry Antenna 5 Performance - Console Passive Antenna

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Keyless Entry Antenna Signal - LF Door	B3119 00	B3119 00	B3119 00	-
Keyless Entry Antenna Low Reference - LF Door	-	B3119 05	-	-
Keyless Entry Antenna Signal - RF Door	B3120 00	B3120 00	B3120 00	-
Keyless Entry Antenna Low Reference - RF Door	-	B3120 05	-	-
Keyless Entry Antenna Signal - Rear Compartment	B3121 00	B3121 00	B3121 05	-
Keyless Entry Antenna Low Reference - Rear Compartment	-	B3121 00	-	-
Keyless Entry Antenna Signal - Console Passive	B3123 00	B3123 00	B3123 00	-
Keyless Entry Antenna Low Reference - Console Passive	-	B3123 00	-	-
Keyless Entry Antenna Ignition - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Data Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Clock Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Low Reference - Console Active	-	B3122 00	-	-

Circuit/System Description

The console passive antennas is located in the center console and is used to establish low frequency (LF) communications with the keyless entry transmitter. The console antennas is used to determine transmitter placement within the vehicle. When a valid keyless entry transmitter is within the passenger compartment, the console antenna broadcasts a challenge within the passenger compartment to the transmitter. If the response from the transmitter via radio frequency (RF) is a valid response, the antenna will determine there is a fob within the vehicle. If no response is received, the antenna determines that no fob is in the vehicle.

Conditions for Running the DTC

A transmitter validation is requested.

Conditions for Setting the DTC

An improper current level is seen on the keyless entry antenna - signal (2) circuit.

Action Taken When the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 50 malfunction free ignition cycles.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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 harness connector at the console passive antenna.
2. Place a valid keyless entry transmitter in the pocket located in the center console. This will allow the console active antenna to authenticate the keyless entry transmitter and allow the ignition to be turned on.
3. Ignition ON, verify a test lamp does not illuminate between the signal circuit terminal A and ground.
 - If the test lamp illuminates, test the signal circuit for a short to voltage. If the circuit tests normal, replace the RCDLR.
4. Connect a DMM, set to capture AC voltage using the MIN MAX function, between the signal circuit terminal A and the low reference circuit terminal B.
5. Attempt to start the vehicle. Verify the DMM captured an AC voltage signal.
 - If an AC voltage was not captured, test the signal circuit and the low reference circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the RCDLR.
6. If all circuits test normal, test or replace the console passive antenna.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Active)**, **Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Passive)**
- **Control Module References** for RCDLR replacement, setup, and programming

DTC B3124: KEYLESS ENTRY ANTENNA 6PERFORMANCE - HEADLINER ANTENNA

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 B3124 00

Keyless Entry Antenna 6Performance - Headliner Antenna

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Keyless Entry Antenna Signal - LF Door	B3119 00	B3119 00	B3119 00	-

Keyless Entry Antenna Low Reference - LF Door	-	B3119 05	-	-
Keyless Entry Antenna Signal - RF Door	B3120 00	B3120 00	B3120 00	-
Keyless Entry Antenna Low Reference - RF Door	-	B3120 05	-	-
Keyless Entry Antenna Signal - Rear Compartment	B3121 00	B3121 00	B3121 05	-
Keyless Entry Antenna Low Reference - Rear Compartment	-	B3121 00	-	-
Keyless Entry Antenna Signal - Console Passive	B3123 00	B3123 00	B3123 00	-
Keyless Entry Antenna Low Reference - Console Passive	-	B3123 00	-	-
Keyless Entry Antenna Signal - Headliner	B2124 00	B2124 00	B2124 00	-
Keyless Entry Antenna Low Reference - Headliner	-	B2124 00	-	-
Keyless Entry Antenna Ignition - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Data Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Clock Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Low Reference - Console Active	-	B3122 00	-	-

Circuit/System Description

The headliner antenna is located in the headliner near the rear of the vehicle and is used to establish low frequency (LF) communications with the keyless entry transmitter. The headliner antenna is used to determine transmitter placement within the vehicle. When a valid keyless entry transmitter is within the passenger compartment, the console and headliner antenna broadcast a challenge within the passenger compartment to the transmitter. If the response from the transmitter via radio frequency (RF) is a valid response, the antenna will determine there is a fob within the vehicle. If no response is received, the antenna determines that no fob is in the vehicle.

Conditions for Running the DTC

A transmitter validation is requested.

Conditions for Setting the DTC

An improper current level is seen on the keyless entry antenna - signal (2) circuit.

Action Taken When the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting the DTC are no longer present.
- A history DTC will clear after 50 malfunction free ignition cycles.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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 harness connector at the headline antenna.
2. Place a valid keyless entry transmitter in the pocket located in the center console.
3. Ignition ON, verify a test lamp does not illuminate between the signal circuit terminal A and ground.
 - If the test lamp illuminates, test the signal circuit for a short to voltage. If the circuit tests normal, replace the RCDLR.
4. Connect a DMM, set to capture AC voltage using the MIN MAX function, between the signal circuit terminal A and the low reference circuit terminal B.
5. Attempt to start the vehicle. Verify the DMM captured an AC voltage signal.
 - If an AC voltage was not captured, test the signal circuit and the low reference circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the RCDLR.

6. If all circuits test normal, test or replace the headliner antenna.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ignition Lock Key Transmitter Antenna Replacement - Headliner (Wagon)**
- **Control Module References** for RCDLR replacement, setup, and programming

DTC B3601: IGNITION SWITCH KEY CAPTURE SOLENOID

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 B3601 01

Ignition Switch Key Capture Solenoid Circuit Short to Battery

DTC B3601 02

Ignition Switch Key Capture Solenoid Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition Switch Key Capture Solenoid Control	B3601 02	1	B3601 01	-
Ignition Switch Key Capture Solenoid Ground	-	1	-	-
1. Ignition cannot be turned ON or OFF				

Circuit/System Description

The remote control door lock receiver (RCDLR) applies voltage to the key capture solenoid under specific conditions to allow the ignition to be turned ON or OFF.

Conditions for Running the DTC

This DTC runs in all ignition modes

Conditions for Setting the DTC

B3601 01

The RCDLR detects a voltage level on the control circuit greater than 8 volts when the key capture solenoid is commanded OFF.

B3601 02

The RCDLR detects a voltage level on the control circuit less than 2 volts when the key capture solenoid is commanded ON.

Action Taken When the DTC Sets

- The key capture solenoid output is disabled.
- SERVICE KEYLESS START SYSTEM is displayed on the DIC.

Conditions for Clearing the DTC

- A current DTC will clear when the condition for setting the DTC is no longer present.
- A history DTC will clear after 40 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Column Lock Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Immobilizer Description and Operation (with ATH) , Immobilizer Description and Operation (without ATH)

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. With a valid keyless entry transmitter in the vehicle, observe the scan tool Key Capture Solenoid Command parameter while pressing and releasing the ignition mode switch. The parameter should cycle between Active and Inactive.
2. Command the Key Capture Solenoid ON and OFF with the scan tool while attempting to cycle the igniting from OFF to ON. The ignition knob should rotate when the solenoid is commanded ON and should not rotate when the solenoid is commanded OFF.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the key capture solenoid.
2. Test for less than 5 ohms between the ground circuit terminal 1 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal 2 and the ground circuit terminal 1.
4. Command the Key Capture Solenoid ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for short to voltage. If the circuit tests normal, replace the RCDLR.
 - If the test lamp is always OFF, test the control circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the RCDLR.
5. If all circuits tests normal, test or replace the key capture solenoid.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for RCDLR replacement, setup, and programming

SYMPTOMS - REMOTE FUNCTIONS

NOTE: The following steps must be completed before using the symptom tables.

1. Perform **Diagnostic System Check - Vehicle** before using the Symptom Tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Keyless Entry System Description and Operation (without ATH)**, **Keyless Entry System Description and Operation (with ATH)**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Keyless Entry 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

Faulty electrical connections, wiring, terminals, connectors, poor voltage and ground connections, temperature sensitivity, electromagnetic interference, electrical noise and/or incorrect control module installed may be the cause of intermittent conditions. 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:

- **Garage Door Opener Malfunction**
- **Electronic Key Not Detected**
- **Keyless Entry System Malfunction (Passive), Keyless Entry System Malfunction (Active)**
- **Remote Vehicle Start Malfunction**

GARAGE DOOR OPENER 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.

Circuit/System Description

The garage door opener (GDO) is a transmitter operating between 288 and 399 MHz. The GDO has 3 buttons that may be programmed for individual transmitter/receiver combinations to control up to 3 GDOs, security gates, and lighting systems. Each button represents a transmitter code section of the transmitter, which operates separately from any other button, and may be considered a separate transmitter.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Garage Door Opener 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

Special Tools

J 41540 Universal Home Remote Tester

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the GDO.
2. Ignition OFF, test for less than 10 ohms between the ground circuit terminal 3 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.

NOTE: **This step will clear any learned transmitters from the GDO. This will require reprogramming by the customer to reestablish GDO functionality.**

4. Ignition ON, hold the two outer buttons on the GDO for 30 seconds. After 20 seconds, the LEDs will flash indicating that all learned transmitter values have been cleared. After an additional 10 seconds, the LEDs will flash again indicating it has entered the diagnostic mode. Place the **J 41540** universal home remote tester near the GDO and individually press each button of the GDO. The tester should indicate when each button is pressed.
 - If one or more of the buttons does not respond when each button is pressed, replace the GDO.
5. Instruct the customer to program the GDO. Refer to the vehicle owners manual. A possible rolling code or incompatibility with the GDO receiver will prevent programming.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for GDO replacement, setup, and programming

ELECTRONIC KEY NOT DETECTED

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
Keyless Entry Antenna Signal - Console Passive	B3123 00	B3123 00	B3123 00	-
Keyless Entry Antenna Low Reference - Console Passive	-	B3123 00	-	-
Keyless Entry Antenna Ignition - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Data Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Clock Signal - Console Active	B3122 00	B3122 00	B3122 00	-
Keyless Entry Antenna Low Reference - Console Active	-	B3122 00	-	-

Circuit/System Description

When a transmitter authentication is requested, the console passive antenna broadcasts a challenge within the passenger compartment to the transmitter. If the response from the transmitter via radio frequency (RF) is a valid response, the RCDLR determines there is a transmitter within the vehicle. If no response is received, the RCDLR determines that no transmitter is in the vehicle, and ELECTRONIC KEY NOT DETECTED will be displayed on the DIC.

Transmitter authentication occurs during any of the following situation:

- When the vehicle is off and the ignition control knob is pressed in.
- When the vehicle is off and the brake pedal is pressed (vehicle must be awake)
- When the vehicle is running and any door is opened and then closed.

Diagnostic Aids

A low transmitter battery or radio frequency (RF) interference from aftermarket devices such as 2-way radios, power inverters, cellular phone chargers, computers, etc. may cause a system malfunction. High RF traffic areas, such as gas stations which use pay-at-the-pump RF transponders, may also cause interference that could lead to a malfunction.

Conditions caused by external influences such as these are considered to be normal. Following this diagnostic will not diagnose an RF interference condition. If RF interference is suspected, question the customer about the

conditions or location where the ELECTRONIC KEY NOT DETECTED condition occurs.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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

NOTE: This condition may be caused by low vehicle battery voltage. If the battery is not sufficiently charged (above 10 volts), the system will have difficulties detecting the fob and the ELECTRONIC KEY NOT DETECTED message will be displayed. Correct the low battery voltage condition to eliminate this condition.

1. Verify DTC B3119, B3120, B3121, B3122, or B3123 is not set.
 - If any of the DTCs are set, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. With the vehicle locked, attempt to passively unlock and enter the vehicle by approaching the vehicle with a valid transmitter and pulling the exterior door handle. The door should unlock and open.
 - If unable to enter the vehicle passively, refer to **Keyless Entry System Malfunction (Passive), Keyless Entry System Malfunction (Active)**.
3. Place the transmitter in the console active antenna pocket and attempt to start the vehicle. The vehicle should start.
 - If the vehicle does not start, perform the **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia), Remote Control Door Lock**

and Theft Deterrent Transmitter Programming (with ATH - Canada and Europe) procedure.

4. While placing the keyless entry transmitter in various locations within the vehicle interior, attempt to start the vehicle. The ELECTRONIC KEY NOT DETECTED message should be displayed on the DIC.
 - If the message is not displayed, inspect for any sources of RF interference such as cell phone chargers, power supplies, etc. that would interrupt transmitter and antenna communication. If inspect does not reveal any items causing RF interference, contact the customer and question the customer about the conditions or location where the ELECTRONIC KEY NOT DETECTED condition occurs. Discuss any devices that are normally kept in the vehicle, such as a laptop or cell phone charger, which may have been removed when the vehicle was brought in for service. It may be necessary to explain to the customer how RF interference degrades the performance of the system.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the console passive antenna.
2. Install a DMM between the signal circuit terminal A and the low reference circuit terminal B. Set the DMM to capture AC voltage using the MIN MAX function.
3. Attempt to start the vehicle. Verify the DMM captured an AC voltage signal.
 - If an AC voltage was not captured, test the signal circuit and the low reference circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the RCDLR.
4. If all circuits test normal, test or replace the console passive antenna.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Active), Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Passive)**
- **Control Module References** for RCDLR replacement, setup, and programming

KEYLESS ENTRY SYSTEM MALFUNCTION (ACTIVE)

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.

Circuit/System Description

The active keyless entry system is considered to be the device to control the following: door locking/unlocking, trunk access, and panic function. The keyless entry system will unlock the vehicle doors or open the rear compartment when a corresponding button on the keyless entry transmitter is pressed. This is accomplished by the keyless entry transmitter sending a radio frequency signal to the external RF antenna located in the back glass. This antenna is connected via coax cable to the remote control door lock receiver (RCDLR). The RCDLR interprets the signal and activates the requested function via serial data message. Poor performance of the

system may be due to:

- Insufficient connection of the external RF Antenna to the RCDLR
- Low transmitter battery
- Radio Frequency (RF) interference from aftermarket devices such as 2-way radios, power inverters, cellular phone chargers, computers, etc
- High RF traffic areas, such as gas stations which use pay-at-the-pump RF transponders

Diagnostic Aids

Unwanted or inadvertent door lock/unlock activation may actually be triggered by the OnStar® Remote Link Apps. Customer may be unaware of account usage, contact Technical Assistance Center (TAC) if root cause cannot be diagnosed to vehicle.

For the **J 43241** keyless entry tester , inspect the keyless entry transmitter part number to determine that it is the correct model for the vehicle. A wrong model transmitter may pass the test, but it will not activate the vehicle remote system.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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

Special Tools

J 43241 Keyless Entry Tester

Circuit/System Verification

Attempt to program the keyless entry transmitter, refer to **Remote Control Door Lock Transmitter Learn (without ATH)**, (without ATH) or **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia)**, **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - Canada and Europe)** (with ATH). The transmitter should program.

Circuit/System Testing

1. Verify that the transmitter is the correct transmitter for the vehicle.
 - If not the correct transmitter, replace the transmitter.
2. Verify the scan tool FOB Programmed parameter for the appropriate transmitter is Yes.
 - If not the specified value, program the transmitter. Refer to refer to **Remote Control Door Lock Transmitter Learn (without ATH)**, (without ATH) or **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia)**, **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - Canada and Europe)** (with ATH).
3. Place the transmitter on the test pad of the J 43241 keyless entry tester and press each transmitter button one at a time. The tester should sound a tone and illuminate a green light with each button press.
 - If one or more buttons does not sound the tone and illuminate the green light, replace the transmitter battery and retest with the J 43241 keyless entry tester. If the condition continues after battery replacement, replace the transmitter.
4. Inspect the external RF antenna connection at the RCDLR. First, gently pull on the coax connector at the module. If the coax comes out, then it was not seated properly. Remove and carefully inspect the coax connection for bent blades or a bent center pin. Fix coax connection if necessary and re-seat connector until a "click" is heard. Gently pull on the coax connection to make sure it is seated properly.
5. Operate the transmitter while observing the scan tool Fob Function parameter for the appropriate transmitter. The parameter should correspond with the function selected on the transmitter.
 - If the parameter does not match the function selected on the transmitter, replace the transmitter.
6. Attempt to program the transmitter, refer to refer to **Remote Control Door Lock Transmitter Learn (without ATH)**, (without ATH) or **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia)**, **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - Canada and Europe)** (with ATH). The transmitter should program.
 - If the transmitter does not program, test the keyless entry antenna for an open/high resistance. If the circuit tests normal, replace the RCDLR.

Repair Instructions

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

- **Remote Control Door Lock and Theft Deterrent Transmitter Programming (with ATH - N America and Asia)**, **Remote Control Door Lock and Theft Deterrent Transmitter Programming**

(with ATH - Canada and Europe)

- **Control Module References** for RCDLR replacement, programming and setup

KEYLESS ENTRY SYSTEM MALFUNCTION (PASSIVE)

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
Keyless Entry Antenna - Signal (4)	B3119 02	B3119 05	B3119 05	-
Keyless Entry Antenna - Low Reference (4)	-	B3119 05	-	-
Keyless Entry Antenna - Signal (5)	B3120 02	B3120 05	B3120 05	-
Keyless Entry Antenna - Low Reference (5)	-	B3120 05	-	-
Keyless Entry Antenna - Signal (3)	B3121 02	B3121 05	B3121 05	-
Keyless Entry Antenna - Low Reference (3)	-	B3121 05	-	-
Keyless Entry Antenna - Signal (2)	B3123 02	B3123 04	B3123 04	-
Keyless Entry Antenna - Low Reference (2)	-	B3123 04	-	-
Keyless Entry Antenna - Signal (1)	B3123 02	B3123 04	B3123 04	-
Keyless Entry Antenna - Low Reference (1)	-	B3123 04	-	-
Keyless Entry Active Antenna Supply Voltage	B3122 04	B3122 04	B3122 04	-
Keyless Entry Active Antenna Data Signal	B3122 04	B3122 04	B3122 04	-
Keyless Entry Active Antenna Clock Signal	B3122 04	B3122 04	B3122 04	-
Keyless Entry Active Antenna Low Reference	-	B3122 04	-	-

Circuit/System Description

The passive portion of the keyless entry system is considered to be the starting and entry functions that do not require any buttons on the keyless entry transmitter to be pressed. The passive keyless entry antennas are used as short range low frequency (LF) transmitters. As an exterior door handle is pulled on a locked door, the keyless entry antenna transmitter broadcasts a challenge to the keyless entry transmitter that extends

approximately 1 meter. If the response from the keyless entry transmitter via radio frequency (RF) is valid, the locked door will be passively unlocked/unlatched and allow the door to be opened. The front doors will open with one pull of the front door handle. The rear doors will unlock with the first pull of the door handle and unlatch with the second pull of the door handle. Similarly, when the start/stop button is pressed, the interior keyless entry antennas sends a challenge to the keyless entry transmitter to determine whether it is inside the vehicle. If the response from the transmitter is valid, the vehicle will start.

When the keyless entry transmitter responds, it sends a radio frequency signal to the external RF antenna located in the back glass. This antenna is connected via coax cable to the remote control door lock receiver (RCDLR). The RCDLR interprets the signal and activates the requested function via serial data message. Poor performance of the system may be due to:

- Insufficient connection of the external RF Antenna to the RCDLR
- Low transmitter battery
- Radio Frequency (RF) interference from aftermarket devices such as 2-way radios, power inverters, cellular phone chargers, computers, etc
- High RF traffic areas, such as gas stations which use pay-at-the-pump RF transponders

Diagnostic Aids

Unwanted or inadvertent door lock/unlock activation may actually be triggered by the OnStar® Remote Link Apps. Customer may be unaware of account usage, contact Technical Assistance Center (TAC) if root cause cannot be diagnosed to vehicle.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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

Special Tools

J 43241 Keyless Entry Tester

Circuit/System Verification

1. Ignition ON, observe the scan tool Ext. Driver Door Handle Switch, Ext. Psgr. Door Handle Switch, and Trunk Release Switch parameters while operating their respective release handle/touch pad. The parameter should change between Active and Inactive as commanded.
 - If the parameter does not cycle between the specified values, refer to **Power Door Latch System Malfunction (Passive Entry)**.
2. With the vehicle locked, attempt to passively unlock and access the vehicle at the left door, right door, and rear compartment by approaching the vehicle with a valid transmitter and operating their respective release handle/touch pad. Each door and the rear compartment should unlock/unlatch and open.
 - If both doors and the rear compartment do not unlock/unlatch and open, refer to Passive Transmitter Malfunction.
 - If only one door or the rear compartment does not unlock/unlatch and open, refer to Antenna Circuit Malfunction.

Circuit/System Testing

Passive Transmitter Malfunction

1. Place the keyless entry transmitter on the **J 43241** keyless entry tester and approach the vehicle. Operate the release handle/touch pad. Verify the **J 43241** keyless entry tester sounds a tone.
 - If the tone does not sound, press each transmitter button one at a time. If the tone still does not sound, replace the transmitter battery and retest with the **J 43241** keyless entry tester. If the condition continues after battery replacement, replace the keyless entry transmitter.
2. If all circuits test normal, inspect the external antenna connection at the RCDLR. First, gently pull on the coax connector at the module. If the coax comes out, then it wasn't seated properly. Remove and carefully inspect the coax connection for bent blades or a bent center pin. Fix coax connection if necessary and re-seat connector until a "click" is heard. Gently pull on the coax connection to make sure it is seated properly.
3. If all circuits test normal, test or replace the RCDLR.

Antenna Circuit Malfunction

1. Ignition OFF, disconnect the harness connector at the inoperative keyless entry antenna.
2. Ignition ON, verify a test lamp does not illuminate between the signal circuit terminal 1 (door handle) or the signal circuit terminal A (rear compartment) and ground.
 - If the test lamp illuminates, test the signal circuit for a short to voltage. If the circuit tests normal,

replace the RCDLR.

3. Install a DMM between the signal circuit terminal 1 (door handle) or the signal circuit terminal A (rear compartment) and the low reference circuit terminal 2 (door handle) or the low reference circuit terminal B (rear compartment). Set the DMM to capture AC voltage using the MIN MAX function.
4. Operate the release handle/touch pad. Verify the DMM captured and AC voltage signal.
 - If an AC voltage was not captured, test the signal circuit and the low reference circuit for a short to ground or an open/high resistance. If the circuits test normal, replace the RCDLR.
5. If all circuits test normal, test or replace the keyless entry antenna.

Repair Instructions

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

- **Front Side Door Outside Handle Replacement (Front Door with ATH) , Front Side Door Outside Handle Replacement (Front and Rear Doors with ATH) , Front Side Door Outside Handle Replacement (Without ATH)**
- **Control Module References** for RCDLR replacement, programming and setup

REMOTE VEHICLE START MALFUNCTION

Diagnostic Instructions

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

Circuit/System Description

Remote vehicle start (RVS) begins as an RF message received by the remote control door lock receiver (RCDLR) from a keyless entry transmitter. The RVS request is sent by the RCDLR to the body control module (BCM) via serial data. The BCM monitors system conditions such as content theft deterrent (CTD), hood ajar status, and body DTCs to determine if an RVS event will occur. If conditions are determined to be acceptable, the RVS message is sent to the engine control module (ECM). The ECM monitors system conditions such as engine control parameters and vehicle theft deterrent (VTD) to determine if engine starting will be allowed. If conditions are acceptable, the ECM will initiate engine starting. During the engine run time in a RVS attempt, before the operator enters the vehicle, the ECM may discontinue engine operation if system conditions require it or a message is received from the BCM requesting the engine be turned OFF.

Diagnostic Aids

Unwanted or inadvertent remote start activation may actually be triggered by the OnStar® Remote Link Apps. Customer may be unaware of account usage, contact Technical Assistance Center (TAC) if root cause cannot be diagnosed to vehicle.

NOTE: If the vehicle has a current vehicle DTC that illuminates the malfunction indicator lamp (MIL), the cause of the DTC must be diagnosed before

proceeding with the Remote Vehicle Start Inoperative diagnostic.

The RVS system will not operate if any of the following conditions are present:

- A current vehicle DTC that illuminates the malfunction indicator lamp (MIL)
- More than 2 remote starts have been attempted.
- The hazard switch is in the ON position.
- A current hazard switch DTC is set.
- The vehicle hood is ajar.
- A current hood ajar DTC is set.
- The CTD system detects an alarm trigger.
- Excessive engine RPM
- Excessive coolant temperature
- Accelerator pedal position greater than 0 percent
- Vehicle not in park
- Vehicle theft deterrent malfunction
- A current automatic transmission shift lock control system DTC is set.
- A vehicle speed sensor signal is detected by the ECM.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Keyless Entry System Description and Operation (without ATH), Keyless Entry System Description and Operation (with ATH)

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. Verify that RVS is enabled through vehicle personalization.
 - If RVS is not enabled, use vehicle personalization to turn on RVS functionality. Refer to the vehicle owners manual.
2. Verify that the keyless entry functions operate with all available keyless entry transmitters.
 - If the keyless entry system does not function properly, refer to **Remote Control Door Lock Transmitter Learn (without ATH)**.
3. Observe the scan tool ECM and BCM RVS Disable History parameters, Verify that no RVS Disable History items are present.
 - If RVS Disable History items are present, refer to the appropriate subsection in which the failure occurred.
4. Verify the scan tool BCM Current CTD Trigger parameter displays None.
 - If not specified value, refer to **Content Theft Deterrent Malfunction** .

REPAIR INSTRUCTIONS

IGNITION LOCK KEY TRANSMITTER ANTENNA REPLACEMENT (COUPE)

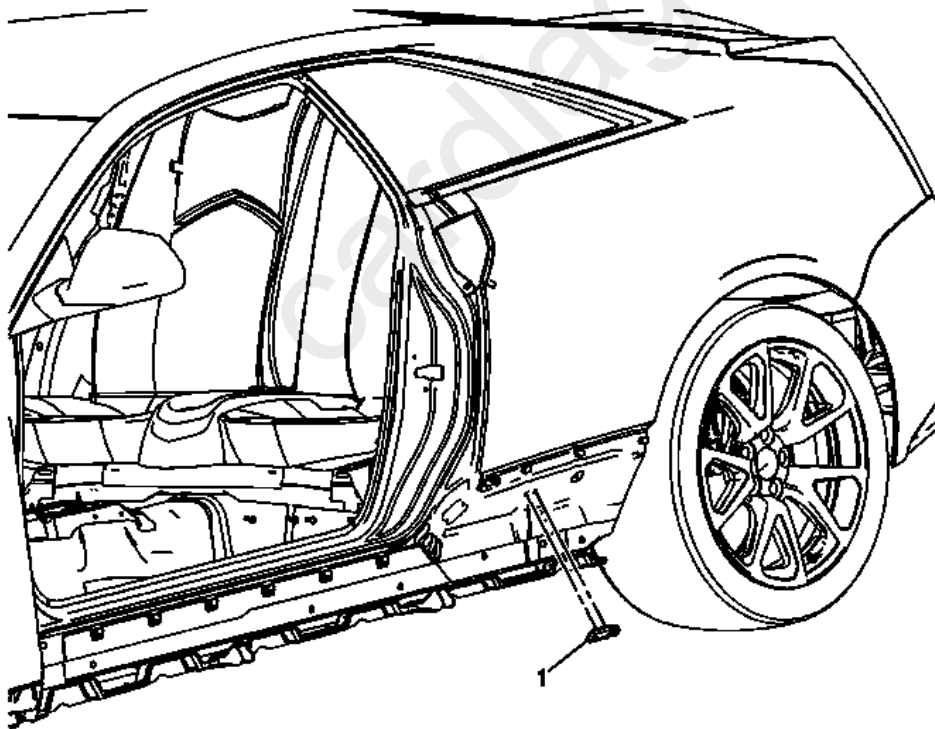


Fig. 4: Ignition Lock Key Transmitter Antenna (Coupe)
Courtesy of GENERAL MOTORS COMPANY

Ignition Lock Key Transmitter Antenna Replacement (Coupe)

Callout	Component Name
Preliminary Procedure Remove the rocker panel molding. Refer to <u>Rocker Panel Molding Replacement (Coupe)</u> .	
1	Ignition Lock Key Transmitter Antenna Procedure 1. Disconnect the electrical connector. 2. Unsnap the ignition lock key transmitter antenna from the body side outer frame.

IGNITION LOCK KEY TRANSMITTER ANTENNA REPLACEMENT - FLOOR CONSOLE (PASSIVE)

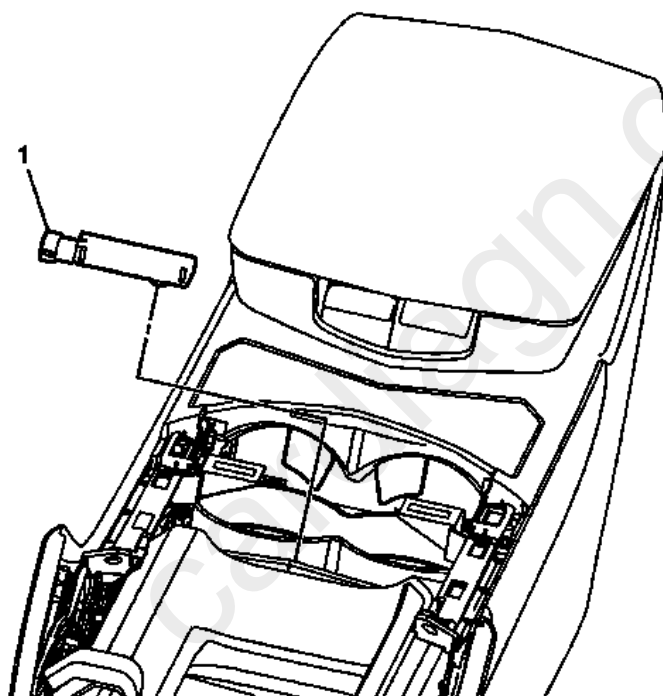


Fig. 5: Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Passive)
Courtesy of GENERAL MOTORS COMPANY

Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Passive)

Callout	Component Name
Preliminary Procedure Remove the cup holder. Refer to <u>Front Floor Console Cup Holder Replacement</u> .	
1	Ignition Lock Key Transmitter Antenna Procedure

1. Disconnect the electrical connectors.
2. Unsnap the ignition lock key transmitter antenna from the floor console.

IGNITION LOCK KEY TRANSMITTER ANTENNA REPLACEMENT - FLOOR CONSOLE (ACTIVE)

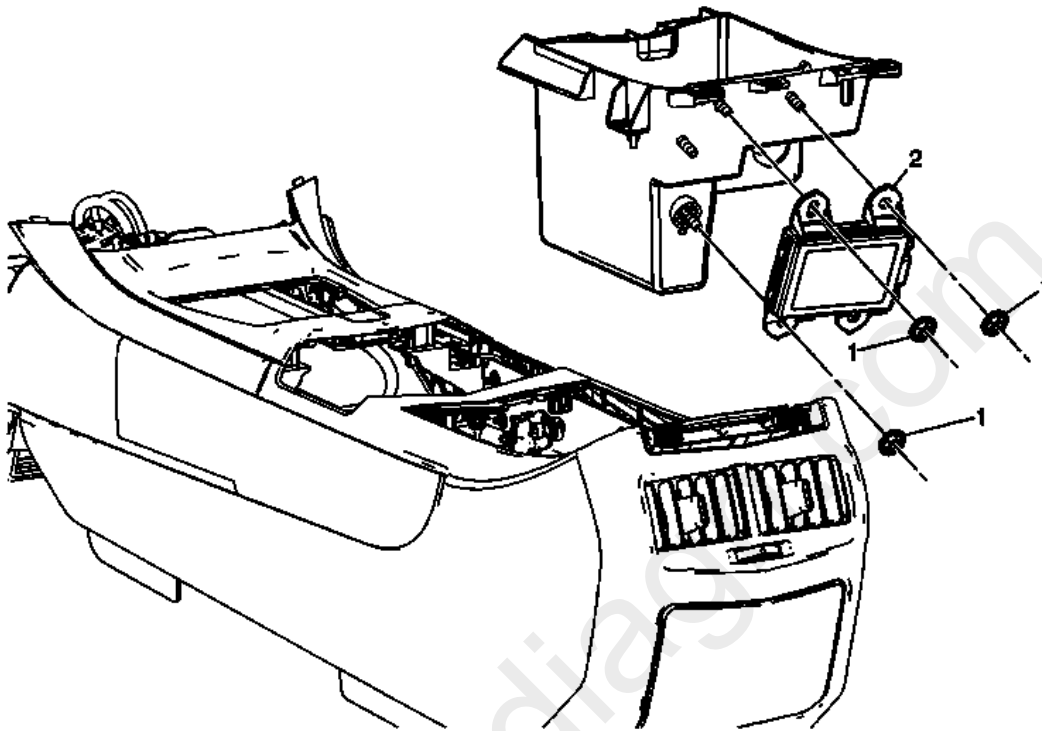


Fig. 6: Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Active)
 Courtesy of GENERAL MOTORS COMPANY

Ignition Lock Key Transmitter Antenna Replacement - Floor Console (Active)

Callout	Component Name
Preliminary Procedure Remove the front floor console compartment. Refer to <u>Front Floor Console Compartment Replacement</u> .	
1	Ignition Lock Key Transmitter Antenna Nut (Qty: 3) Procedure Tighten until fully seated but do not strip.
2	Ignition Lock Key Transmitter Antenna Procedure 1. Disconnect the electrical connectors. 2. For programming and set up information, refer to <u>Control Module References</u> .

IGNITION LOCK KEY TRANSMITTER ANTENNA REPLACEMENT - HEADLINER (WAGON)

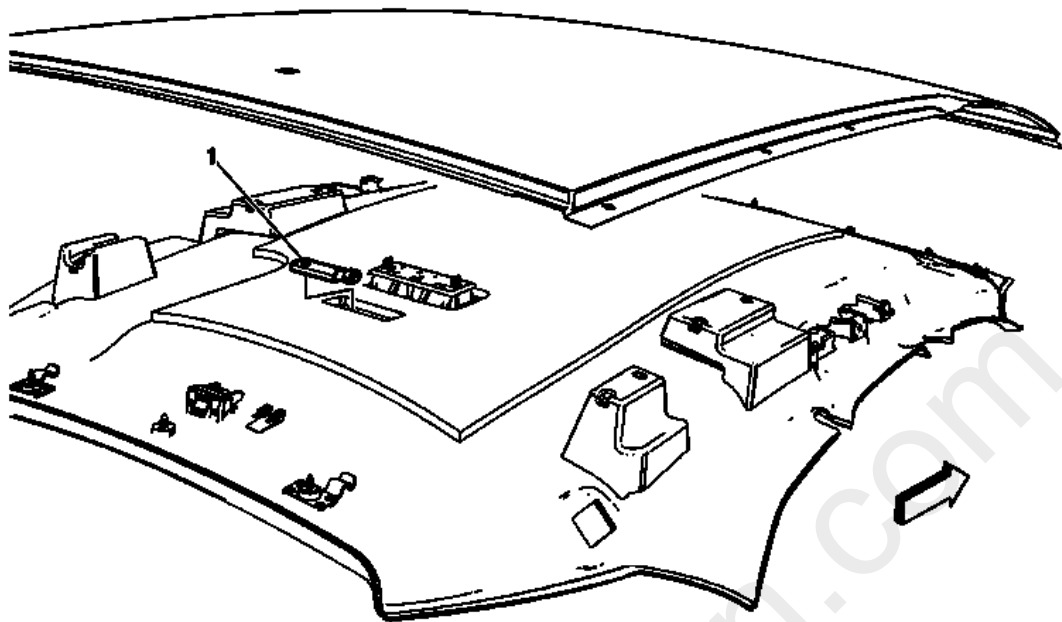


Fig. 7: Ignition Lock Key Transmitter Antenna - Headliner (Wagon)
Courtesy of GENERAL MOTORS COMPANY

Ignition Lock Key Transmitter Antenna Replacement - Headliner (Wagon)

Callout	Component Name
Preliminary Procedure Lower the rear of the headliner trim panel. Refer to <u>Headlining Trim Panel Replacement (Wagon)</u> .	
1	Ignition Lock Key Transmitter Antenna Procedure Disconnect the electrical connector.

REMOTE CONTROL DOOR LOCK RECEIVER REPLACEMENT (WAGON)

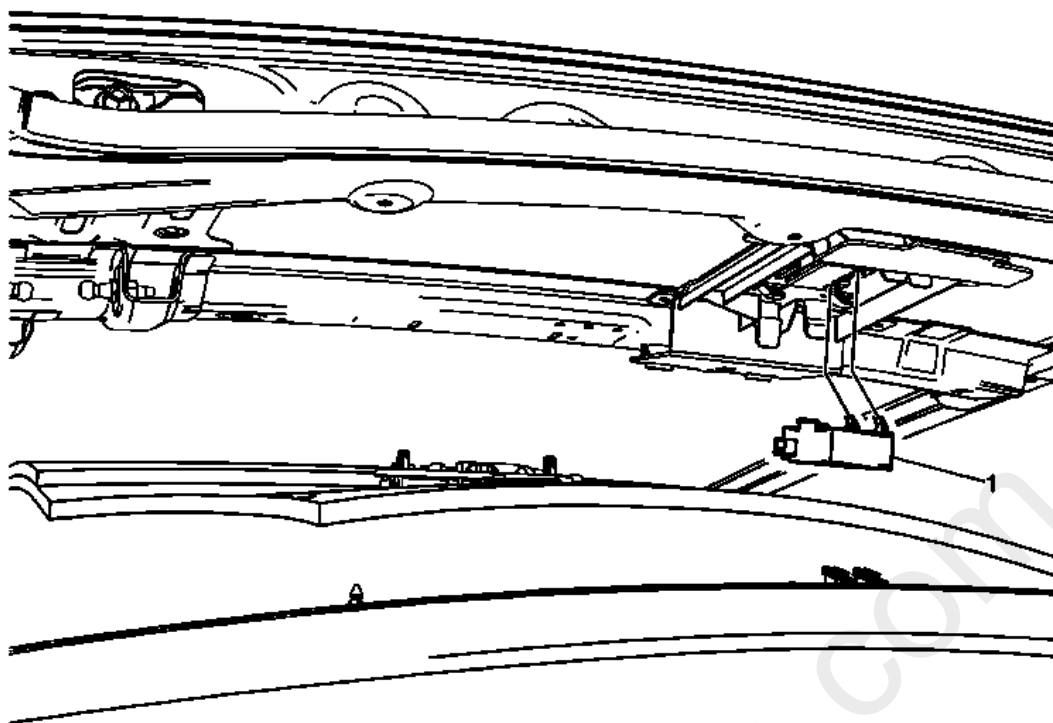


Fig. 8: Remote Control Door Lock Receiver (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Remote Control Door Lock Receiver Replacement (Wagon)

Callout	Component Name
Preliminary Procedure	
Lower the rear of the headlining trim panel. Refer to <u>Headlining Trim Panel Replacement (Wagon)</u> .	
1	Remote Control Door Lock Receiver Procedure 1. Disconnect the electrical connectors. 2. Unsnap the receiver from the headliner. 3. For programming and set up, refer to <u>Control Module References</u>

REMOTE CONTROL DOOR LOCK RECEIVER REPLACEMENT (COUPE)

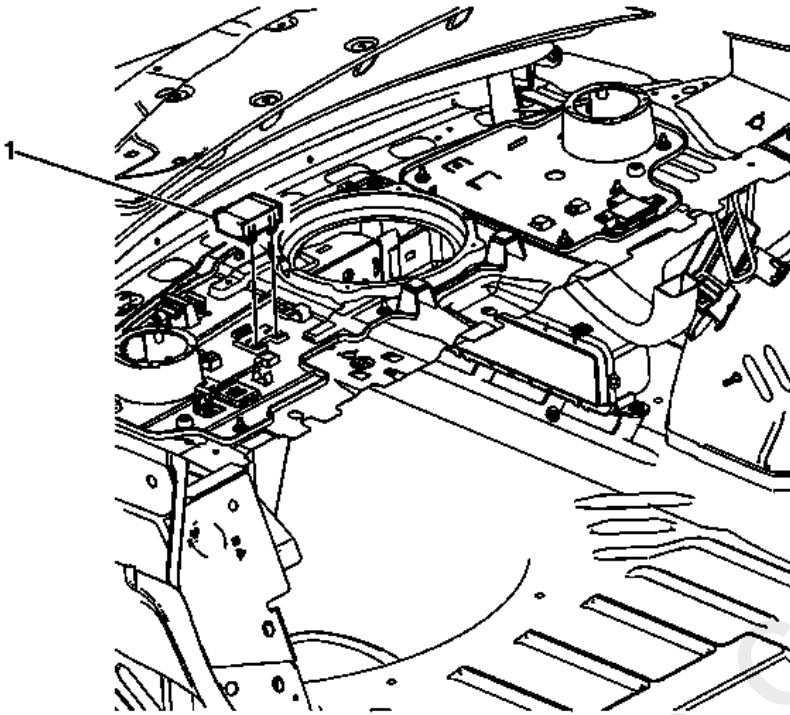


Fig. 9: Remote Control Door Lock Receiver Replacement
 Courtesy of GENERAL MOTORS COMPANY

Remote Control Door Lock Receiver Replacement (Coupe)

Callout	Component Name
Preliminary Procedure Remove the rear window shelf trim panel. Refer to <u>Rear Window Panel Trim Replacement (Coupe)</u> .	
1	Remote Control Door Lock Receiver Procedure 1. Disconnect the electrical connectors. 2. Unsnap the receiver from the panel. 3. For programming and set up, refer to <u>Control Module References</u>

REMOTE CONTROL DOOR LOCK AND THEFT DETERRENT RECEIVER REPLACEMENT (WAGON)

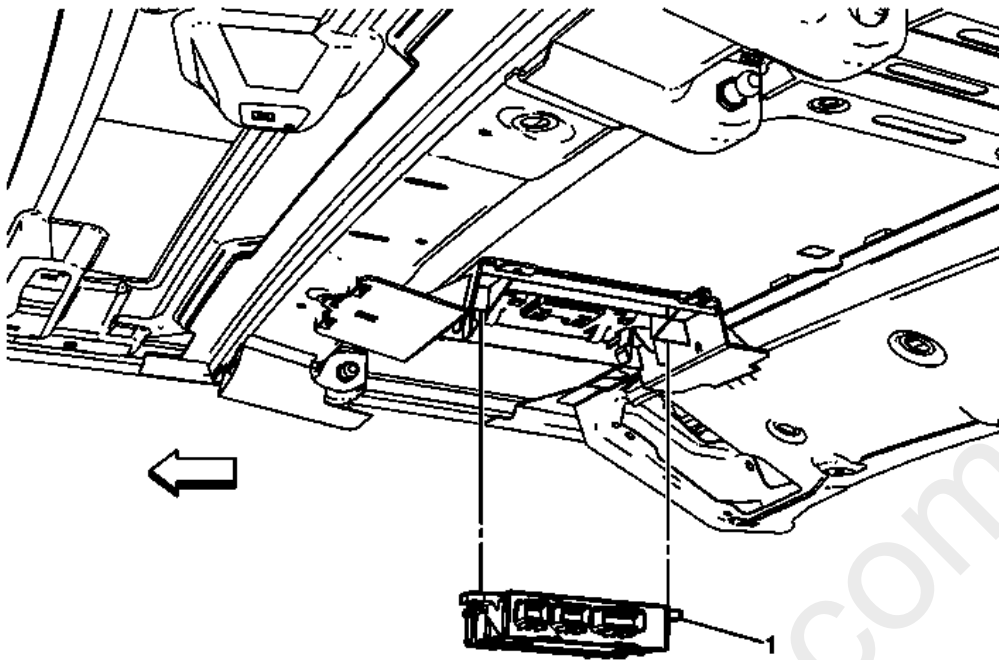


Fig. 10: Remote Control Door Lock And Theft Deterrent Receiver (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Remote Control Door Lock and Theft Deterrent Receiver Replacement (Wagon)

Callout	Component Name
Preliminary Procedure 1. Remove the center pillar upper trim panel. Refer to <u>Center Pillar Upper Trim Panel Replacement (Wagon)</u> 2. Remove the body side window front garnish molding. Refer to <u>Body Side Window Front Garnish Molding Replacement (Wagon)</u> 3. Lower the rear of the headlining trim panel. Refer to <u>Headlining Trim Panel Replacement (Wagon)</u>.	
1	Remote Control Door Lock and Theft Deterrent Receiver Procedure 1. Disconnect the electrical connectors. 2. Unsnap the receiver from the headliner. 3. For programming and set up, refer to <u>Control Module References</u>

REMOTE CONTROL DOOR LOCK AND THEFT DETERRENT RECEIVER REPLACEMENT (COUPE)

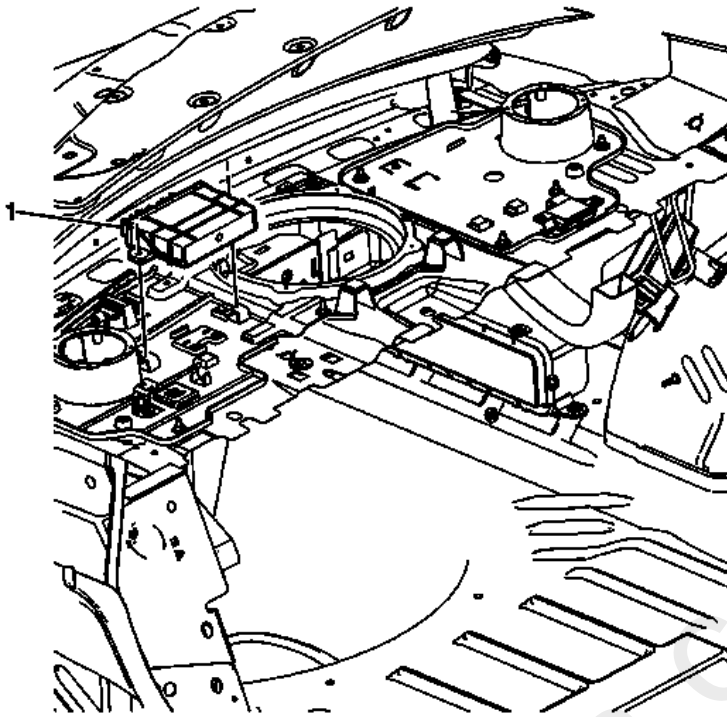


Fig. 11: Remote Control Door Lock and Theft Deterrent Receiver (Coupe)
 Courtesy of GENERAL MOTORS COMPANY

Remote Control Door Lock and Theft Deterrent Receiver Replacement (Coupe)

Callout	Component Name
Preliminary Procedure Remove the rear window shelf trim panel. Refer to <u>Rear Window Panel Trim Replacement (Coupe)</u> .	
1	Remote Control Door Lock and Theft Deterrent Receiver Procedure 1. Disconnect the electrical connectors. 2. Unsnap the receiver from the panel. 3. For programming and set up, refer to <u>Control Module References</u>

GARAGE DOOR OPENER TRANSMITTER REPLACEMENT

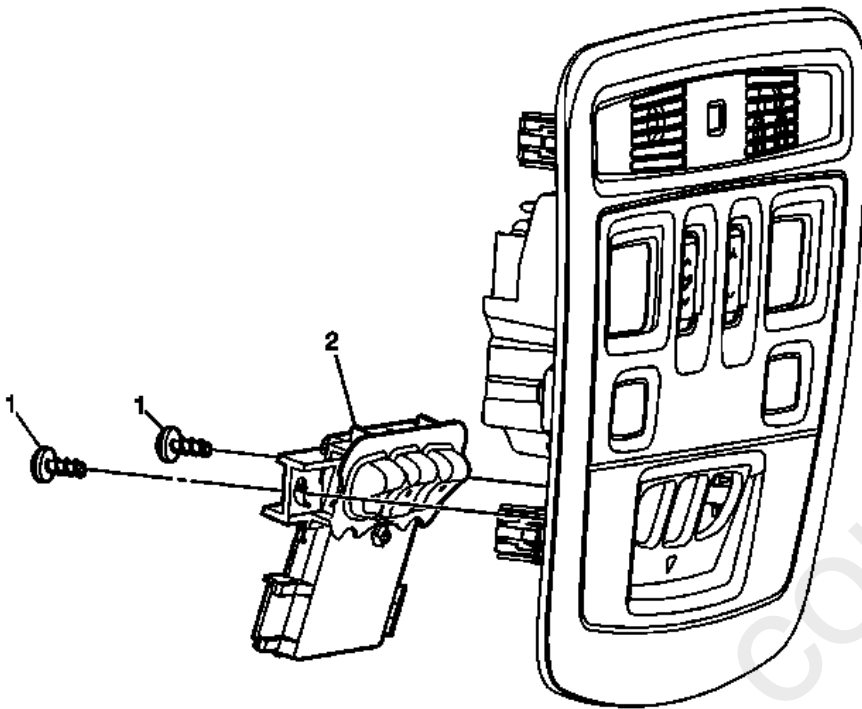


Fig. 12: Garage Door Opener
Courtesy of GENERAL MOTORS COMPANY

Garage Door Opener Transmitter Replacement

Callout	Component Name
Preliminary Procedure Remove the roof console. Refer to <u>Roof Console Replacement</u> .	
1	Garage Door Opener Bolt/Screws (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Garage Door Opener Procedure 1. Disconnect the electrical connectors. 2. Refer to <u>Control Module References</u> for programming and set-up procedures.

REMOTE CONTROL DOOR LOCK TRANSMITTER LEARN (WITHOUT ATH)

Next Available Slot

NOTE:

- On some vehicles, keyless entry transmitters may also be programmed using the driver information center (DIC). Refer to the vehicle owners manual for information.
- Do not operate or program the transmitters in the vicinity of other vehicles that are in the keyless entry program mode. This prevents the programming of the transmitters to the incorrect vehicle.

This procedure will program keyless entry transmitters in sequential order. If two transmitters are currently learned to the vehicle as transmitters 1 and 2, using this procedure will learn the next transmitter as transmitter 3, and so on.

1. With a scan tool, access the Remote Control Door Lock Receiver Module Setup menu. Select Program Key Fobs.
2. Select Next Available Slot. The vehicle chime will sound two times to indicate programming mode has been entered. Follow the on-screen instructions. After each transmitter has been programmed, the vehicle chime will sound to confirm the programming.
3. When all the desired transmitters have been programmed, cycle the ignition from ON to OFF, exit the vehicle, and operate the transmitter functions in order to verify correct system operation.

Invalidate All Fobs**NOTE:**

- On some vehicles, keyless entry transmitters may also be programmed using the driver information center (DIC). Refer to the vehicle owners manual for information.
- All transmitters which are to be recognized by the remote control door lock receiver (RCDLR) must be programmed in a single programming sequence. Once the Invalidate All Fobs selection is made, all learned transmitters are erased. If all existing transmitters associated with the vehicle are not learned at this time, they will become inoperative and require additional programming.
- Do not operate or program the transmitters in the vicinity of other vehicles that are in the keyless entry program mode. This prevents the programming of the transmitters to the incorrect vehicle.

This procedure will first erase all known keyless entry transmitters. After all transmitters are erased, the procedure will begin to program keyless entry transmitters in sequential order, beginning with transmitter 1.

1. With a scan tool, access the Remote Control Door Lock Receiver Module Setup menu. Select Program Key Fobs.
2. Select Invalidate All Fobs. This will erase all learned transmitters and prepare the RCDLR to learn new transmitters. Follow the on-screen instructions. After each transmitter has been programmed, the vehicle chime will sound to confirm the programming.
3. When all the desired transmitters have been programmed, cycle the ignition from ON to OFF, exit the vehicle, and operate the transmitter functions in order to verify correct system operation.

Transmitter Slot Programming

Transmitter slot programming allows a single transmitter to be programmed into a specific slot without affecting any of the other programmed transmitters. By using slot programming, the transmitter originally programmed to a specific slot is erased and the new transmitter is learned in its place.

1. Install a scan tool.
2. Turn ON the ignition with the engine OFF.
3. With the scan tool, select Body.
4. Select Remote Control Door Lock Receiver (RCDLR).
5. Select Module Setup.
6. Select Program Key Fobs.
7. Select the key fob desired to be programmed.
8. Follow the scan tool on screen instructions.
9. Remove the scan tool.
10. Exit the vehicle. Operate all functions on transmitters to verify correct system operation.

REMOTE CONTROL DOOR LOCK AND THEFT DETERRENT TRANSMITTER PROGRAMMING (WITH ATH - CANADA AND EUROPE)

NOTE: Do not operate or program the transmitters in the vicinity of other vehicles that are in the keyless entry program mode. This will prevent the programming of the transmitters to the incorrect vehicle.

There are 2 methods for programming keyless entry transmitters. Up to 4 transmitters may be programmed to the remote control door lock receiver (RCDLR). Each programmed transmitter is given a position of #1-#4 in the RCDLR memory.

The transmitter with #1 on top of it must be programmed first, and transmitter with #2 on top of it must be programmed second; either transmitter may be programmed as the third or fourth transmitter. If replacing a transmitter, ensure that the proper transmitter with the correct number on top of it gets ordered.

A "known" transmitter is one that has already been programmed to the vehicle. It is very important that the transmitter which is to be programmed is NOT placed into the console transmitter pocket until the DIC correctly displays the transmitter number that you wish to program to.

Method 1 - Adding, Replacing, or Invalidating Transmitters (Known Transmitter Available)

This procedure will add or replace transmitters. This procedure requires that you have two known transmitters available, a replacement transmitter, and a scan tool.

Method 1 is also used for the initial programming of transmitters to a new replacement RCDLR. In this instance, the new RCDLR comes ready to learn the first transmitters introduced. Perform the learn procedure as outlined, with the exception that the new RCDLR does not require a known transmitter be placed within the interior of the vehicle.

NOTE: This procedure is not available when the maximum number of transmitters (4) have been programmed. If 4 transmitters are programmed to this RCDLR and this method is attempted, the driver information center (DIC) will display **MAXIMUM # ELECTRONIC KEYS LEARNED** and the programming procedure will exit. Method 2 must be used in this instance.

1. The vehicle must be OFF.
2. Place two known transmitters and any new transmitter(s) to be programmed in the cupholder inside the vehicle. **DO NOT PLACE ANY TRANSMITTERS IN THE CONSOLE POCKET AT THIS TIME.**
3. Use scan tool to access the following:
 - Vehicle Control Systems
 - Computer/Integrating Systems
 - Module Setup
 - Remote Control Door Lock Receiver
 - Program Key Fobs
4. Select the transmitter position you wish to program:

NOTE: Selecting Invalidate All transmitters will erase any known transmitters and will cause the DIC to prompt **READY FOR transmitter 1**, requiring all transmitters to be relearned to the vehicle.

- Invalidate All transmitters
 - Next Available Slot
 - Program Key Fob 1
 - Program Key Fob 2
 - Program Key Fob 3
 - Program Key Fob 4
5. After making the selection, a beep should be heard. If a beep is not heard or the DIC displays **ELECTRONIC KEY NOT DETECTED**, a valid transmitter was not found. Ensure that a valid transmitter has been placed in the cupholder and repeat step 4.
 6. The scan tool will be displaying the current transmitter programming status. Press the **PROGRAM** soft key on the scan tool to continue with programming. The DIC should respond by displaying: **READY TO LEARN ELECTRONIC KEY #X** (X = 1, 2, 3 or 4, depending on the selected position).
 7. With the DIC displaying the correct transmitter position that is to be programmed, place the new/replacement transmitter in the console pocket with the buttons facing forward and keychain provision facing up.
 8. A beep will occur once the transmitter has been learned.
 9. Depending on the option chosen above, the DIC may display a prompt asking that another transmitter be programmed. If programming additional transmitters, repeat steps 6 and 7, or press the **EXIT** soft key on the scan tool.

NOTE: Newly programmed transmitters will not function until program mode has

been exited (DIC is blank). This must be done prior to pressing the trunk release button in the next step.

10. Press and hold the transmitter trunk release or liftgate release button for one second on each transmitter that was programmed to finalize the programming and confirm system operation. Multiple button presses may be required before the trunk or liftgate responds.

Method 2 - Service Programming System Transmitter Programming

This procedure is a 10-minute relearn procedure using the Techline Terminal with SPS software. Once the 10-minute timer has expired, the transmitters can be programmed to particular positions or all known transmitters can be erased. A scan tool, Techline Terminal, and a replacement transmitter are required to perform this procedure.

1. Ignition ON, connect a scan tool to the vehicle in the pass-thru arrangement.
2. Insure that all power consuming devices are turned OFF on the vehicle.
3. On the Techline Terminal, select Service Programming System and follow the Techline Terminal on-screen instructions, using the Pass-Thru method. Select "VTD Vehicle Theft Deterrent Learn" under Component Replacement. Ensure that "Prepare RCDLR for transmitter programming" is used.
4. At this point the scan tool must remain connected for the duration of the 10 minute relearn procedure.
5. When the 10 minute relearn procedure has completed, turn the vehicle OFF.
6. With the scan tool still connected, access the following:
 - Vehicle Control Systems
 - Computer/Integrating Systems
 - Module Setup
 - Remote Control Door Lock Receiver
 - Program Key Fobs
7. Select the transmitter position you wish to program:

NOTE: **Selecting Invalidate All transmitters will erase any known transmitters and will cause the DIC to prompt READY FOR transmitter 1, requiring all transmitters to be relearned to the vehicle.**

- Invalidate All transmitters
 - Next Available Slot
 - Program Key Fob 1
 - Program Key Fob 2
 - Program Key Fob 3
 - Program Key Fob 4
8. After making the selection, a beep should be heard. If a beep is not heard or the DIC displays ELECTRONIC KEY NOT DETECTED, a valid transmitter was not found. Ensure that a valid transmitter has been placed in the cupholder and repeat step 4.

9. The scan tool will be displaying the current transmitter programming status. Press the PROGRAM soft key on the scan tool to continue with programming. The DIC should respond by displaying: READY TO LEARN ELECTRONIC KEY #X (X = 1, 2, 3 or 4, depending on the selected position).
10. With the DIC displaying the correct transmitter position that is to be programmed, place the new/replacement transmitter in the console pocket with the buttons facing forward and keychain provision facing up.
11. A beep will occur once the transmitter has been learned.
12. Depending on the option chosen above, the DIC may display a prompt asking that another transmitter be programmed. If programming additional transmitters, repeat steps 9 and 10, or press the EXIT soft key on the scan tool.

NOTE: **Newly programmed transmitters will not function until program mode has been exited (DIC is blank). This must be done prior to pressing the trunk release button in the next step.**

13. Press and hold the transmitter trunk release or liftgate release button for one second on each transmitter that was programmed to finalize the programming and confirm system operation. Multiple button presses may be required before the trunk or liftgate responds.

REMOTE CONTROL DOOR LOCK AND THEFT DETERRENT TRANSMITTER PROGRAMMING (WITH ATH - N AMERICA AND ASIA)

NOTE: **Do not operate or program the transmitters in the vicinity of other vehicles that are in the keyless entry program mode. This will prevent the programming of the transmitters to the incorrect vehicle.**

There are 3 methods for programming keyless entry transmitters. Up to 4 transmitters may be programmed to the remote control door lock receiver (RCDLR). Each programmed transmitter is given a position of #1-#4 in the RCDLR memory.

The transmitter with #1 on top of it must be programmed first, and transmitter with #2 on top of it must be programmed second; either transmitter may be programmed as the third or fourth transmitter. If replacing a transmitter, ensure that the proper transmitter with the correct number on top of it gets ordered.

A "known" transmitter is one that has already been programmed to the vehicle. It is very important that the transmitter which is to be programmed is NOT placed into the console transmitter pocket until the DIC correctly displays the transmitter number that you wish to program to.

Method 1 - Adding, Replacing, or Invalidating Transmitters (Known Transmitter Available)

This procedure will add or replace transmitters. This procedure requires that you have a known good transmitter available, a replacement transmitter, and a scan tool.

Method 1 is also used for the initial programming of transmitters to a new replacement RCDLR. In this instance, the new RCDLR comes ready to learn the first transmitters introduced. Perform the learn procedure as outlined, with the exception that the new RCDLR does not require a known good transmitter be placed within

the interior of the vehicle.

NOTE: This procedure is not available when the maximum number of transmitters (4) have been programmed. If 4 transmitters are programmed to this RCDLR and this method is attempted, the driver information center (DIC) will display **MAXIMUM # ELECTRONIC KEYS LEARNED** and the programming procedure will exit. Method 2 or 3 must be used in this instance.

1. The vehicle must be OFF.
2. Place a known transmitter and any new transmitter(s) to be programmed in the cupholder inside the vehicle. **DO NOT PLACE ANY TRANSMITTERS IN THE CONSOLE POCKET AT THIS TIME.**
3. Use scan tool to access the following:
 - Vehicle Control Systems
 - Computer/Integrating Systems
 - Module Setup
 - Remote Control Door Lock Receiver
 - Program Key Fobs
4. Select the transmitter position you wish to program:

NOTE: Selecting Invalidate All transmitters will erase any known transmitters and will cause the DIC to prompt **READY FOR transmitter 1**, requiring all transmitters to be relearned to the vehicle.

- Invalidate All transmitters
 - Next Available Slot
 - Program Key Fob 1
 - Program Key Fob 2
 - Program Key Fob 3
 - Program Key Fob 4
5. After making the selection, a beep should be heard. If a beep is not heard or the DIC displays **ELECTRONIC KEY NOT DETECTED**, a valid transmitter was not found. Ensure that a valid transmitter has been placed in the cupholder and repeat step 4.
 6. The scan tool will be displaying the current transmitter programming status. Press the **PROGRAM** soft key on the scan tool to continue with programming. The DIC should respond by displaying: **READY TO LEARN ELECTRONIC KEY #X** (X = 1, 2, 3 or 4, depending on the selected position).
 7. With the DIC displaying the correct transmitter position that is to be programmed, place the new/replacement transmitter in the console pocket with the buttons facing forward and keychain provision facing up.
 8. A beep will occur once the transmitter has been learned.
 9. Depending on the option chosen above, the DIC may display a prompt asking that another transmitter be programmed. If programming additional transmitters, repeat steps 6 and 7, or press the **EXIT** soft key on the scan tool.

NOTE: Newly programmed transmitters will not function until program mode has been exited (DIC is blank). This must be done prior to pressing the trunk release button in the next step.

10. Press and hold the transmitter trunk release or liftgate release button for one second on each transmitter that was programmed to finalize the programming and confirm system operation. Multiple button presses may be required before the trunk or liftgate responds.

Method 2 - Erasing/Adding Transmitters (No Known Transmitter Available)

This procedure will first erase all known transmitters. The procedure will then program a single transmitter or multiple transmitters. Method 2 is a series of three 10-minute key cycles, for a total of 30 minutes. This procedure requires that you have a replacement transmitter and the vehicle's mechanical key.

NOTE: Do not place any known good transmitters within 10 feet of the vehicle when programming with Method 2. If the RCDLR recognizes a known good transmitter during Method 2 programming, the programming mode will resort to Method 1.

1. The vehicle must be OFF.
2. Insert the vehicle key in the lock cylinder located in the driver door handle (Wagon) or above the license plate (coupe) and cycle the key 5 times within 5 seconds.
3. The DIC will display a message: PRESS START CONTROL TO LEARN.
4. Press in on the start control knob.
5. The DIC will display a message: WAIT 10 MINUTES, and then begin to count down from 10 to 0, one minute at a time.

NOTE: Once the timer has expired, it is necessary to proceed to the next step within 5 minutes. Failure to do so will result in the exiting of the program mode and the procedure will have to be restarted at step 1.

6. When the counter reaches 0, DIC will display: PRESS START CONTROL TO LEARN.
7. Repeat steps 4-6 two more times, for a total of 30 minutes.
8. At the end of the 30 minute cycle, a beep will occur and the DIC will display: READY FOR ELECTRONIC KEY 1. At this time all previously known transmitters have been erased.
9. Place the new/replacement transmitter in the console bin pocket with the buttons facing forward and keychain provision facing up. When transmitter 1 is programmed, a beep will be heard and the DIC will display: READY FOR ELECTRONIC KEY 2.
10. Additional transmitters can be programmed by taking transmitter 2 out of the pocket and inserting transmitter 3. If desired, up to 4 transmitters can be programmed. Once 4 transmitters have been learned, the DIC will display a message: MAX ELECTRONIC KEYS LEARNED, and automatically exit the program mode.
11. If learning less than 4 transmitters, press in on the start control knob to exit the program mode.

NOTE: Newly programmed transmitters will not function until program mode has

been exited (DIC is blank). This must be done prior to pressing the trunk release button in the next step.

12. Press and hold the transmitter trunk release or liftgate release button for one second on each transmitter that was programmed to finalize the programming and confirm system operation. Multiple button presses may be required before the trunk or liftgate responds.

Method 3 - Service Programming System Transmitter Programming

This procedure is a 10-minute relearn procedure using the Techline Terminal with SPS software. Once the 10-minute timer has expired, the transmitters can be programmed to particular positions or all known transmitters can be erased. A scan tool, Techline Terminal, and a replacement transmitter are required to perform this procedure.

1. Ignition ON, connect a scan tool to the vehicle in the pass-thru arrangement.
2. Insure that all power consuming devices are turned OFF on the vehicle.
3. On the Techline Terminal, select Service Programming System and follow the Techline Terminal on-screen instructions, using the Pass-Thru method. Select "VTD Vehicle Theft Deterrent Learn" under Component Replacement. Ensure that "Prepare RCDLR for transmitter programming" is used.
4. At this point the scan tool must remain connected for the duration of the 10 minute relearn procedure.
5. When the 10 minute relearn procedure has completed, turn the vehicle OFF.
6. With the scan tool still connected, access the following:
 - Vehicle Control Systems
 - Computer/Integrating Systems
 - Module Setup
 - Remote Control Door Lock Receiver
 - Program Key Fobs
7. Select the transmitter position you wish to program:

NOTE: **Selecting Invalidate All transmitters will erase any known transmitters and will cause the DIC to prompt READY FOR transmitter 1, requiring all transmitters to be relearned to the vehicle.**

- Invalidate All transmitters
 - Next Available Slot
 - Program Key Fob 1
 - Program Key Fob 2
 - Program Key Fob 3
 - Program Key Fob 4
8. After making the selection, a beep should be heard. If a beep is not heard or the DIC displays ELECTRONIC KEY NOT DETECTED, a valid transmitter was not found. Ensure that a valid transmitter has been placed in the cupholder and repeat step 4.

9. The scan tool will be displaying the current transmitter programming status. Press the PROGRAM soft key on the scan tool to continue with programming. The DIC should respond by displaying: READY TO LEARN ELECTRONIC KEY #X (X = 1, 2, 3 or 4, depending on the selected position).
10. With the DIC displaying the correct transmitter position that is to be programmed, place the new/replacement transmitter in the console pocket with the buttons facing forward and keychain provision facing up.
11. A beep will occur once the transmitter has been learned.
12. Depending on the option chosen above, the DIC may display a prompt asking that another transmitter be programmed. If programming additional transmitters, repeat steps 9 and 10, or press the EXIT soft key on the scan tool.

NOTE: Newly programmed transmitters will not function until program mode has been exited (DIC is blank). This must be done prior to pressing the trunk release button in the next step.

13. Press and hold the transmitter trunk release or liftgate release button for one second on each transmitter that was programmed to finalize the programming and confirm system operation. Multiple button presses may be required before the trunk or liftgate responds.

DESCRIPTION AND OPERATION

GARAGE DOOR OPENER DESCRIPTION AND OPERATION

The garage door opener (GDO) is fixed and rolling code capable. Rolling code is a system that allows the code that the customer's receiver receives from the GDO to change every time the GDO is used within operating range of the receiver. Rolling code programming requires the customer to push a learn/program button on the GDO receiver at their home. This button is usually located on the receiver unit under a cover (light cover) on one end of the unit. The customer must follow the GDO manufacturer's instructions to program/learn the receiver to accept the Universal Home Remote System as an authorized opener for their unit. When the receiver and the GDO are initially programmed together, a code is established and a new code is created for every new transmission. The software in the receiver recognizes the GDO and accepts the new code.

The GDO is compatible with most, but not all types and brands of transmitters. If a problem should occur with a compatibility conflict with a transmitter, refer to 1-866-572-2728.

The GDO is a transmitter operating between 288-399 MHz. The power and range of the transmitter is limited to comply with laws governing the generation of radio frequency interference (RFI). The transmitter is programmed by the user to accept the signal generated by the user's transmitters.

The GDO has 3 buttons that may be programmed for individual transmitter/receiver combinations to control up to 3 GDOs, security gates, lighting systems, etc. Each button represents a transmitter code section of the transmitter, which operates separately from any other button, and may be considered a separate transmitter. Operation consists of simply pressing a button to activate the corresponding transmitter.

KEYLESS ENTRY SYSTEM DESCRIPTION AND OPERATION (WITH ATH)

Keyless Entry System Description and Operation - Active

The keyless entry system is a vehicle entry device. The keyless entry system is used in conjunction with the door locks to unlock the vehicle. Keyless entry will lock/unlock a door or open the rear compartment lid when a corresponding button on the keyless entry transmitter is pressed. This is accomplished by the transmitter sending a radio frequency to the remote control door lock receiver (RCDLR). The RCDLR interprets the signal and activates the requested function via a serial data message. A low transmitter battery or radio frequency (RF) interference from aftermarket devices, such as 2-way radios, power inverters, computers, etc., may cause a system malfunction. High RF traffic areas, such as gas stations that use pay-at-the-pump RF transponders, may also cause interference that could lead to a malfunction. Keyless entry allows you to operate the following features:

- Door lock/unlock
- Rear compartment lid release
- Illuminated entry lamps
- Panic alarm/Vehicle locator
- Remote vehicle start

Keyless Entry System Description and Operation - Passive

Passive keyless entry allows entry to a locked vehicle without pressing any buttons on the keyless entry transmitter. You must only have the transmitter with you. This passive system is also part of the vehicle starting system. It allows you to start and run the vehicle having only the transmitter as your key. The passive entry and starting system use low frequency antennas in 4 different areas on the vehicle to determine the location of the transmitter. When passively opening a locked door or the rear compartment lid, you must have a programmed transmitter with you in your pocket, purse, or briefcase. As a customer opens the door handle or presses rear compartment touch pad, the low frequency antenna sends out a challenge to the keyless entry transmitter. The transmitter must be in a one meter range of the door or rear compartment lid in order to receive the challenge. If the challenge is met, the transmitter will respond, allowing the door to be unlocked and opened. Passive entry allows you to operate the following features:

- Passive door unlock/unlatch
- Passive rear compartment lid release
- Illuminated entry lamps
- Vehicle starting

The keyless entry system has the following components:

- Keyless entry transmitters
- LH and RH door antennas (part of the door handle assembly)
- Rear compartment antenna
- Console passive antenna
- Console active antenna
- Body Control Module (BCM)

- Remote Control Door Lock Receiver (RCDLR)

Keyless Entry Transmitters

The keyless entry transmitters are used to passively or actively lock and unlock the vehicle doors.

By operating either of the front exterior door handles, a nearby programmed transmitters is challenged by a keyless entry antenna. The transmitter will passively send an RF signal to the RCDLR via the door antennas; the RCDLR will then interpret this communication and either allow entry into the vehicle or deny it.

The vehicle comes with two transmitters. Each transmitter will have a number on top of it, "1" or "2", and each number corresponds to a separate driver of the vehicle

Door Antennas

The keyless entry door antennas are used to transmit low frequency communications to the keyless entry transmitters.

The keyless entry door antennas are molded into the vehicles LF and RF exterior door handles. The antennas are serviced as part of the door handle assembly. The antennas are controlled by the RCDLR. When the exterior door handle is operated, the respective antennas sends out a challenge to the keyless entry transmitter which begins the passive entry communications.

Rear Compartment Antenna

The rear compartment antenna is used to transmit low frequency communication to the keyless entry transmitters for entry to rear compartment.

The rear compartment antenna is located under the rear fascia and is accessed from under the vehicle. The antenna is controlled by the RCDLR. When the rear compartment touch pad is pressed, the antenna sends out a challenge to the keyless entry transmitter which begins the passive entry communications.

Console Passive Antenna

The keyless entry console passive antenna is used for both keyless entry and vehicle starting functions. In their keyless entry function, they are used to locate any keyless entry transmitters within the vehicle. In the antenna's vehicle starting function, the antenna transmit and receive the needed communications with the keyless entry transmitter to enable vehicle starting.

Console Active Antenna

The keyless entry console active antenna is located in the center console. It has a small pocket next to it where the key fob can be inserted if the key fobs battery is dead, weak, or the RF signal is being interrupted.

The purpose of the console active antenna is to send a low frequency RF challenge to a programmed key fob when the start button is pressed. The console active antenna is controlled by the RCDLR.

OnStar® Remote Link

A vehicle operator may have the ability to perform some of the keyless entry functions using applications on personal devices such as smart phones. Refer to **OnStar Description and Operation** .

Remote Control Door Lock Receiver (RCDLR)

The RCDLR is a multi-function module which controls all the vehicles antennas for passive keyless entry functions. The RCDLR also acts as the receiver for active keyless entry and tire pressure monitoring (TPM) functions, as well as controlling all immobilizer functions.

Unlock Driver Door Only - Active

Momentarily press the transmitter UNLOCK button in order to perform the following functions:

- Unlock only the driver door
- Illuminate the interior lamps for a determined length of time, or until the ignition is turned ON
- Flash the exterior lights, if enable through personalization
- Disarm the Content Theft Deterrent (CTD) system
- Deactivate the CTD system when in the alarm mode

Unlock All Doors - Second Operation - Active

Momentarily press the transmitter UNLOCK button a second time, within 5 seconds of the first press, to perform the following function:

Unlock the remaining doors

Unlock Driver Door Only - Passive

If enabled through personalization, approach the driver door with a valid keyless entry transmitter and pull the door handle to perform the following functions:

- Unlock only the driver door when door handle is operated
- Disarm the CTD system, if equipped
- Deactivate the CTD system when in the alarm mode

Unlock All Doors - Passive

If enabled through personalization, approach either front door with a valid keyless entry transmitter to perform the following functions:

- Unlock all vehicle doors when the approached door handle is operated
- Disarm the CTD system, if equipped
- Deactivate the CTD system when in the alarm mode

Lock All Doors - Active

Press the transmitter LOCK button to perform the following functions:

- Lock all vehicle doors
- Immediately turn off the interior lamps
- Flash the exterior lights, if enabled through personalization
- Chirp the horn, if enabled through personalization
- Arm the CTD system

Lock All Doors - Passive

If enabled through personalization, exit the vehicle with the keyless entry transmitter to perform the following functions:

- Lock all vehicle doors after a delay
- Flash the exterior lights, if enabled through personalization
- Chirp horn, if enabled through personalization
- Arm the CTD system

If more than one keyless entry transmitter is within a vehicle and the RCDLR detects that transmitter has been left in the vehicle after an exit, the transmitter left within the vehicle will be temporarily deactivated until the CTD system has been disarmed.

Rear Compartment Lid Release - Active

If the vehicle transaxle is in PARK or NEUTRAL and the ignition is in the OFF position, a single press of the transmitter rear compartment release button will open the rear compartment lid.

Rear Compartment Lid Release - Passive

Approach the rear of the vehicle with a valid keyless entry transmitter. Press the rear compartment lid release touch pad. The rear compartment lid will open.

A keyless entry transmitter left inside the truck will allow the trunk to be reopened at any time. This feature will not allow a customer to lock the transmitter in the trunk.

Vehicle Locator/Panic Alarm

A single press of the panic button performs the following functions. Some functions may be dependent on personalization settings:

- Pulses the horn three times
- Flashes the exterior lamps three times

A press and hold of the panic button performs the following functions:

- Illuminates the interior lamps

- Pulses the horn and flashes the parking lamps for 30 seconds or until the following conditions occur:
 - The panic button is pressed
 - The ignition switch is turned to the RUN position with a valid key

Remote Vehicle Start (RVS)

The remote vehicle start (RVS) function allows engine starting while not in the vehicle. It also allows the vehicle HVAC system and other vehicle systems to enable, providing a comfortable vehicle upon entry. RVS functions have an operating range of up to 195 feet, depending on conditions. The RVS sequence begins by pressing and releasing the lock button and then pressing and holding the RVS buttons on the keyless entry transmitter. The turn signal lamps will illuminate to indicate the vehicle has received the remote start request. Each time an RVS is performed, the vehicle doors are locked, however they may then be unlocked/locked with the transmitter or vehicle key at any time. Once activated, the engine is allowed to run for 10 minutes. The RVS time may be extended by an additional 10 minute by again pressing and releasing the lock button and then pressing and holding the RVS buttons on the transmitter. This feature is called a RVS continue and allows a maximum of 20 minutes of engine running. If the RVS continue is performed at 7 minutes into the initial 10 minute time-out, a total of 17 minutes of engine running would occur. The RVS event may be suspended at any time by pressing only the RVS button on the transmitter or by entering the vehicle and turning ON the hazard lamps.

In between ignition cycles, only two RVS events may occur or be attempted. Once two events or attempts have been made, future RVS events will be suspended until the vehicle is started using the ignition.

Enable/Disable RVS

Using the driver information center (DIC), RVS may be enabled or disabled as a part of vehicle personalization. Refer to the vehicle owners manual for more information.

Hood Ajar Switch

The hood switch provides status of the hood to the BCM for RVS purposes. The switch is integrated into the hood latch assembly. The hood ajar switch provides 2 separate inputs to the BCM. These separate inputs allow the BCM to actively monitor for a hood ajar switch fault.

RVS Circuit Description

The RCDLR receives a signal from the keyless entry transmitter indicating a RVS request. A message is then sent to the BCM which determines if a crank request message will be sent to the ECM to activate RVS. The BCM looks at the following inputs to verify the system is ready for an RVS event:

- Vehicle is not in valet mode
- All vehicle doors are closed
- Rear compartment lid is not ajar
- The hood is closed
- The doors are locked
- The hazard switch is OFF

- Battery reconnect has not occurred
- Vehicle power mode is correct.

When the BCM determines all conditions meet those required for an RVS event, a message is sent via serial data to the BCM. The ECM relies on the RVS message from BCM, to enable RVS when the crank request signal is received. If the ECM does not receive a valid RVS message, it will not ground the control circuit of the crank relay and start the engine. While the ECM is in RVS mode it will cut fuel to the engine if any of the following additional conditions occur:

- Vehicle speed is greater than 0.
- Transmission is not in P.
- Excessive engine coolant temperature
- Low oil pressure
- The malfunction indicator lamp (MIL) is commanded ON.
- Engine crank time is greater than 30 seconds.
- Excessive engine speed.
- Accelerator pedal position too high.
- Remote start timer equals 0.
- Immobilizer system indicates a theft attempt

Keyless Entry Personalization

Vehicle lock/unlock functions and remote vehicle start (RVS) settings may be personalized for the vehicle. For functional descriptions and programming instructions, refer to the vehicle owners manual.

Low Fob Battery Message

A LOW FOB BATTERY message may be seen on the DIC when the fob's battery voltage has been lower than 2.6 volts for three consecutive ignition cycles (OFF to ACC or OFF to RUN). The RCDLR monitors the voltage of each fob independently; however, if two fobs are present when starting the vehicle, the voltage will be monitored only on the fob that starts the vehicle. For example, if Fob 1 enters from the driver door and Fob 2 enters from the passenger door, the RCDLR will monitor only Fob 1. To determine the fob being monitored, check which driver ID is present when the vehicle is started. The driver ID will correspond with the fob being monitored.

Fob battery voltage may also be observed using the scan tool. The scan tool displays the actual battery signal voltage, as well as the low voltage signal. These parameters may be used to determine which fob has caused the LOW FOB BATTERY message to be displayed.

KEYLESS ENTRY SYSTEM DESCRIPTION AND OPERATION (WITHOUT ATH)

The keyless entry system is a vehicle entry device. The keyless entry system is used in conjunction with the body control module (BCM) to remotely activate certain vehicle features. Keyless entry will lock/unlock the doors/liftgate, operate the power liftgate (if equipped), or release the liftglass when a corresponding button on the keyless entry transmitter is pressed. This is accomplished by the transmitter sending a radio frequency to the

remote control door lock receiver (RCDLR). The RCDLR interprets the signal and activates the requested function via a serial data message to the BCM. A low transmitter or vehicle battery or radio frequency (RF) interference from aftermarket devices, such as 2-way radios, power inverters, computers, etc., may cause a system malfunction. High RF traffic areas may also cause interference that could lead to a malfunction. Keyless entry allows you to operate the following components:

- Door locks
- Liftgate lock
- Power liftgate, if equipped
- Liftglass, if equipped
- Remote vehicle starting, if equipped
- Illuminated entry lamps
- Vehicle locator/Panic alarm

The keyless entry system has the following components:

- Keyless entry transmitters
- Keyless entry antenna
- BCM
- RCDLR

Keyless Entry Transmitters

The keyless entry transmitters are used to lock and unlock the vehicle door while away from the immediate area of the vehicle. Vehicles without remote vehicle start will operate at a distance of up to 20 m (65 ft) away, except for Japanese and South Korean vehicles, which are limited to 4 m (16 feet). Vehicles with remote vehicle start will operate at a distance of up to 60 m (195 ft) away. Up to 8 transmitters may be programmed to a single vehicle. The vehicle comes with two transmitters. Each transmitter will have a number on top of it, "1" or "2", and each number corresponds to a separate driver of the vehicle.

Keyless Entry Antenna

The keyless entry antenna is used to receive radio frequency (RF) communications sent by the keyless entry transmitters. The keyless entry antenna also receives RF signals from the tire pressure monitoring (TPM) sensors located at each wheel.

A coax antenna lead connects the antenna to the remote control door lock receiver (RCDLR). When a transmitter button is present, the RF signal sent by the transmitter is received by the antenna and the communications are inputted to the RCDLR.

OnStar® Remote Link

A vehicle operator may have the ability to perform some of the keyless entry functions using applications on personal devices such as smart phones. Refer to **OnStar Description and Operation** .

Remote Control Door Lock Receiver (RCDLR)

The remote control door lock receiver (RCDLR) is a multifunction module that operates both the keyless entry system as well as the TPM system. When an RF message is received from a keyless entry transmitter, the RCDLR interprets this signal and will request via serial data that the body control module (BCM) perform the specific function, i.e. door lock, door unlock, or vehicle locate.

Unlock Driver Door Only

Momentarily press the transmitter UNLOCK button in order to perform the following functions:

- Unlock only the driver door.
- Illuminate the interior lamps for a determined length of time, or until the ignition is turned ON.
- Flash the exterior lights, if enabled through personalization.
- Disarm the content theft deterrent (CTD) system, if equipped.
- Deactivate the CTD system when in the alarm mode.

Unlock All Doors - Second Operation

Momentarily press the transmitter UNLOCK button a second time, within 5 seconds of the first press, to perform the following functions:

- Unlock the remaining doors.
- Unlock the liftgate, if equipped.

Lock All Doors

Press the transmitter LOCK button to perform the following functions:

- Lock all vehicle doors.
- Immediately turn OFF the interior lamps.
- Flash the exterior lights, if enabled through personalization.
- Chirp the horn, if enabled through personalization.
- Arm the CTD system, if equipped.

Liftglass Release, if equipped

Press the transmitter liftglass release button to perform the following function:

Open the liftglass.

Power Liftgate, if equipped

Press and hold the power liftgate button to perform the following functions:

- Open or close the liftgate using the power liftgate function.
- Flash the tail lamps.

- Sound the interior power liftgate chime.

Vehicle Locator/Panic Alarm

A single press of the panic button performs the following functions. Some functions may be dependent on personalization settings:

- Pulse the horn 3 times.
- Flash the exterior lamps 3 times.

A press and hold of the panic button performs the following functions:

- Illuminate the interior lamps.
- Pulse the horn and flash the exterior lamps for 30 seconds or until the following conditions occur:
 - The panic button is pressed.
 - The ignition switch is turned to the RUN position with a valid key.

Remote Vehicle Start (RVS), if equipped

The remote vehicle start (RVS) function allows engine starting while not in the vehicle. It also allows the vehicle HVAC system and other vehicle systems to enable, providing a comfortable vehicle upon entry. RVS functions have an operating range of up to 195 feet, depending on conditions. The RVS sequence begins by pressing and releasing the lock button and then pressing and holding the RVS buttons on the keyless entry transmitter. The turn signal lamps will illuminate to indicate the vehicle has received the remote start request. Each time an RVS is performed, the vehicle doors are locked, however they may then be unlocked/locked with the transmitter or vehicle key at any time. Once activated, the engine is allowed to run for 10 minutes. The RVS time may be extended by an additional 10 minutes by again pressing and releasing the lock button and then pressing and holding the RVS buttons on the transmitter. This feature is called a RVS continue and allows a maximum of 20 minutes of engine running. If the RVS continue is performed at 7 minutes into the initial 10 minute time-out, a total of 17 minutes of engine running would occur. The RVS event may be suspended at any time by pressing only the RVS button on the transmitter or by entering the vehicle and turning ON the hazard lamps.

In between ignition cycles, only 2 RVS events may occur or be attempted. Once 2 events or attempts have been made, future RVS events will be suspended until the vehicle is started using the ignition.

Enable/Disable RVS

Using the driver information center (DIC), RVS may be enabled or disabled as a part of vehicle personalization. Refer to the vehicle owners manual for more information.

Hood Ajar Switch

The hood switch provides status of the hood to the BCM for RVS purposes. The switch is integrated into the hood latch assembly. The hood ajar switch provides 2 separate inputs to the BCM. These separate inputs allow the BCM to actively monitor for a hood ajar switch fault.

RVS Circuit Description

The RCDLR receives a signal from the keyless entry transmitter indicating a RVS request. A message is then sent to the BCM which determines if a crank request message will be sent to the ECM to allow engine starting. To determine if conditions are correct for an RVS event, the BCM will ensure the following conditions are met:

- All vehicle doors are closed.
- A valid hood ajar switch closed signal is present.
- The doors are locked.
- The hazard switch is OFF.
- The vehicle power mode is correct.
- No content theft deterrent (CTD) alarm triggers are present.
- The vehicle is not in valet mode, if equipped.

When the BCM determines all conditions meet those required for an RVS event, a message is sent via serial data to the ECM. The ECM relies on the RVS message from BCM to enable RVS when the crank request signal is received. If the ECM does not receive a valid RVS message, it will not attempt to start the engine. While the ECM is in RVS mode it will suspend engine operation if any of the following additional conditions occur:

- Vehicle speed is greater than 0.
- Transmission is not in PARK.
- Excessive engine coolant temperature
- Low oil pressure
- The malfunction indicator lamp (MIL) is commanded ON.
- Engine crank time is greater than 30 seconds.
- Excessive engine speed
- Accelerator pedal position too high
- Remote start timer equals 0.
- Immobilizer system indicates tamper

Keyless Entry Personalization

Vehicle lock/unlock functions and remote vehicle start (RVS) settings may be personalized. For functional descriptions and personalization instructions, refer to the vehicle owners manual.

Rolling Code

The Keyless Entry System uses rolling code technology. Rolling code technology prevents anyone from recording the message sent from the transmitter and using the message in order to gain entry to the vehicle. The term "rolling code" refers to the way that the Keyless Entry System sends and receives the signals. The transmitter sends the signal in a different order each time. The transmitter and the remote control door lock receiver (RCDLR) are synchronized to the appropriate order. If a programmed transmitter sends a signal that is not in the order that the RCDLR expects, then the transmitter is out of synchronization. This occurs after 256 presses of any transmitter button when it is out of range of the vehicle.

Automatic Synchronization

The keyless entry transmitters do not require a manual synchronization procedure. If needed, the transmitters automatically re-synchronize when any button on the transmitter is pressed within range of the vehicle. The transmitter will operate normally after the automatic synchronization.

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