2007 ACCESSORIES & EQUIPMENT

Remote Functions - HHR

SCHEMATIC AND ROUTING DIAGRAMS

REMOTE FUNCTION SCHEMATICS

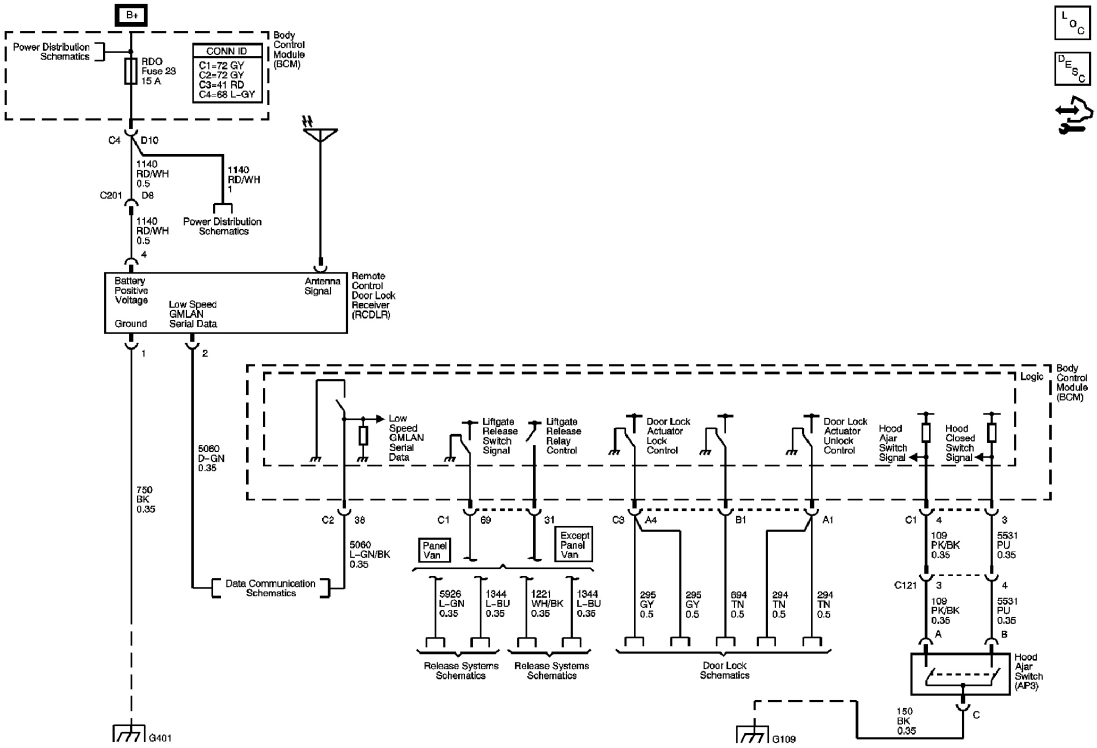

Fig. 1: Keyless Entry Schematics
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

REMOTE FUNCTION COMPONENT VIEWS

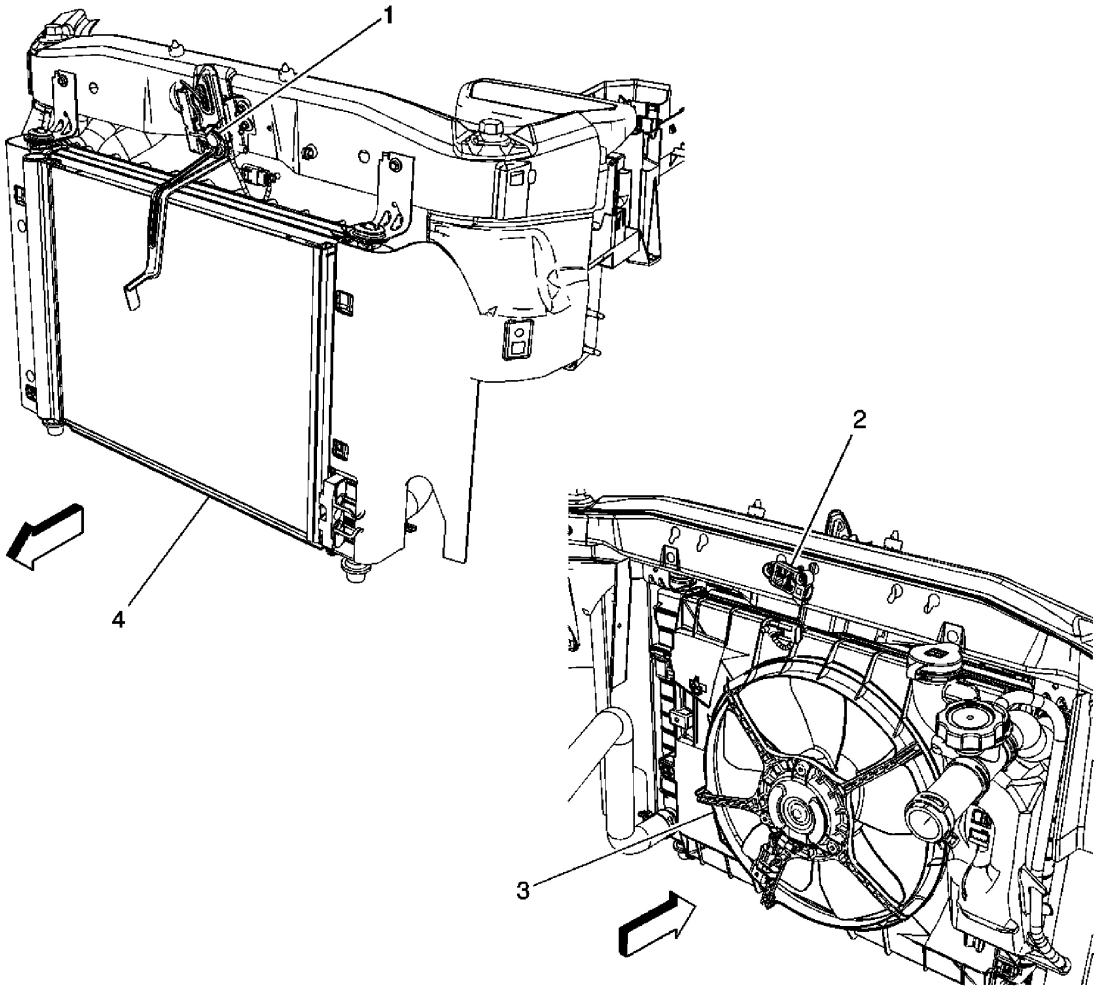

Fig. 2: Front of the Engine Compartment
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Hood Ajar Switch (AP3)
2	Inflatable Restraint Front End Sensor
3	Engine Cooling Fan
4	Radiator

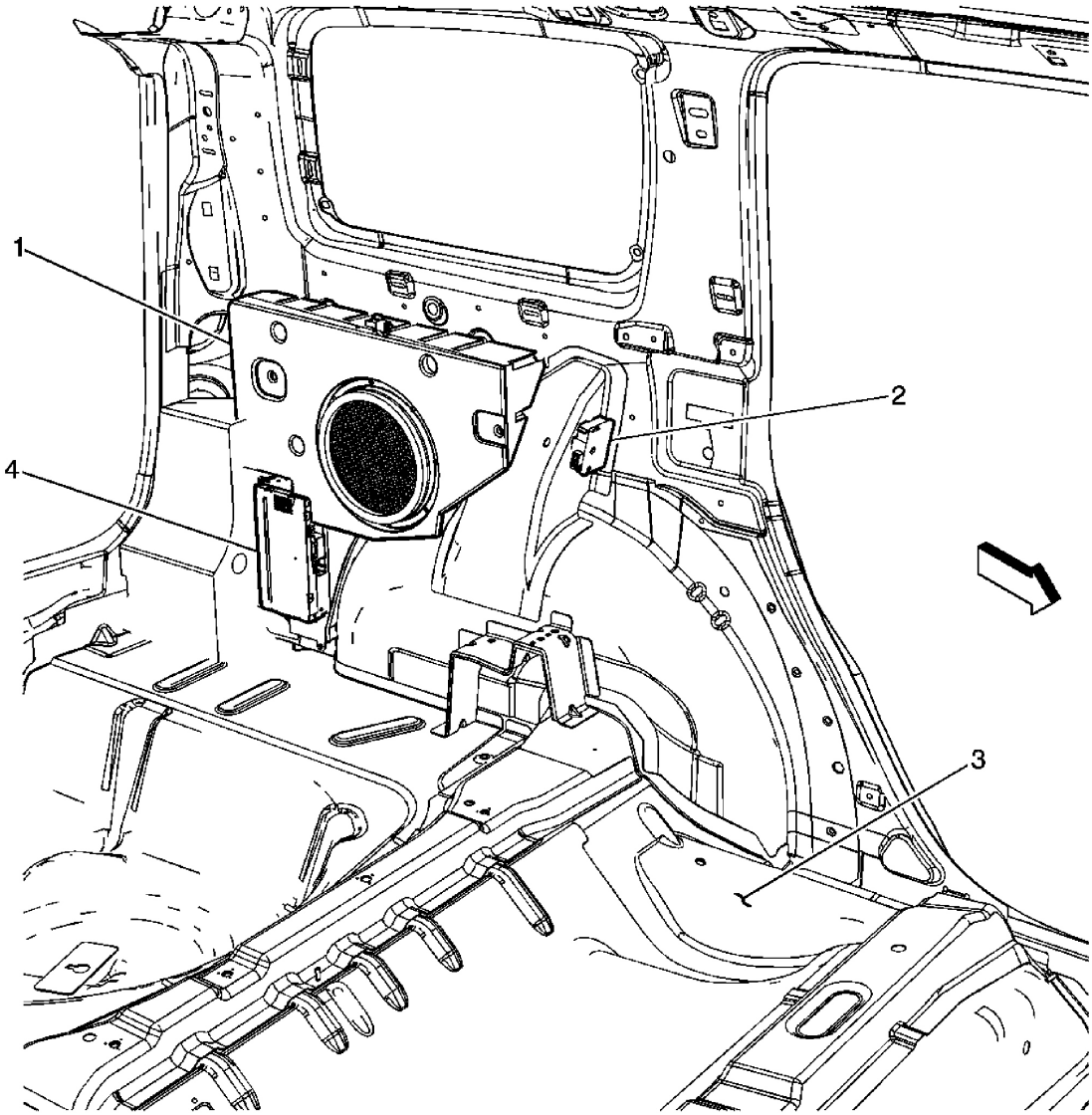

Fig. 3: LR of the Passenger Compartment
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Speaker - Subwoofer (UQ3)
2	Remote Control Door Lock Receiver (RCDLR)
3	Floor Pan
4	Audio Amplifier (UQ3)

REMOTE FUNCTION CONNECTOR END VIEWS

Hood Ajar Switch (AP3)

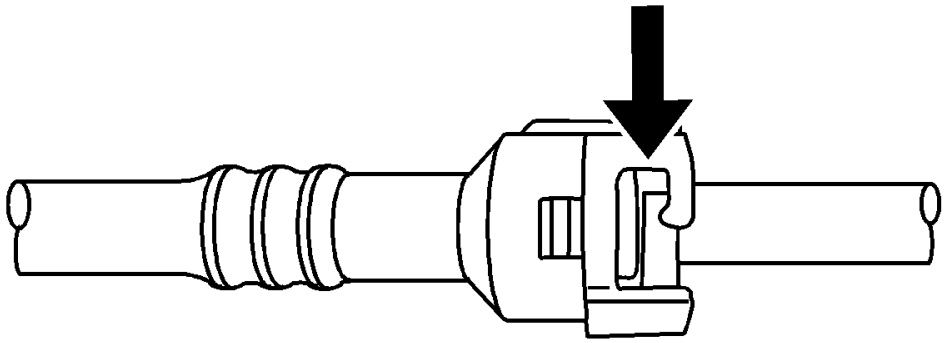

Fig. 4: Hood Ajar Switch Connector End View (AP3)
Courtesy of GENERAL MOTORS CORP.

Hood Ajar Switch Connector Part Information (AP3)

Connector Part Information

- OEM: 15326808
- Service: 15306388
- Description: 3-Way F GT 150 Series Sealed (BK)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Hood Ajar Switch Connector Terminal Identification (AP3)

Pin	Wire Color	Circuit No.	Function
A	PK/BK	109	Hood Ajar Switch Signal (AP3)
B	PU	5531	Hood Ajar Switch Signal (AP3)
C	BK	150	Ground (AP3)

Remote Control Door Lock Receiver (RCDLR)

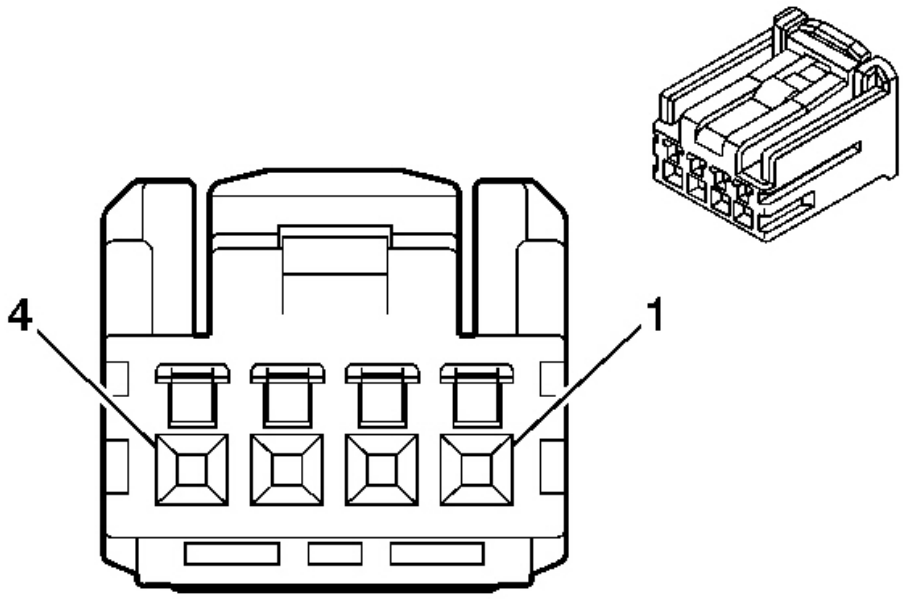

Fig. 5: Remote Control Door Lock Receiver (RCDLR) Connector End View
Courtesy of GENERAL MOTORS CORP.

Remote Control Door Lock Receiver (RCDLR) Connector Part Information

Connector Part Information

- OEM: HCMPB-04-K
- Service: 88988403
- Description: 4-Way F HCM Series (BK)

Terminal Part Information

- Pins: 1, 2, 4
- Terminal/Tray: SHCM-A03T-P025/20
- Core/Insulation Crimp: J/J
- Release Tool/Test Probe: 12094429/J-35616-64B (L-BU)

Remote Control Door Lock Receiver (RCDLR) Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
1	BK	750	Ground
2	D-GN	5060	Low Speed GMLAN Serial Data
3	-	-	Not Used
4	RD/WH	1140	Battery Positive Voltage

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3105	Key Fobs Not Programmed
DTC B3109	Keyless Entry Transmitter 1 or Generic Low Battery
DTC B3110	Keyless Entry Transmitter 2 or Generic Low Battery
DTC B3111	Keyless Entry Transmitter 3 or Generic Low Battery
DTC B3112	Keyless Entry Transmitter 4 or Generic Low Battery

DIAGNOSTIC STARTING POINT - REMOTE FUNCTIONS

Begin the system diagnosis with **Diagnostic System Check - Vehicle** . The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection (s)	Description
Key Fob Button Test	Output Controls	The RCDLR monitors the incoming RF communications to ensure all keyless entry transmitter functions are operating properly.

SCAN TOOL DATA LIST

Body Control Module (BCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON, Engine OFF.			
Backup Power Moding	Remote Start Disable History Data	Active/Inactive	Inactive
Battery Voltage	Keyless/Remote Start Data	Normal/Out of Range	Normal
BTSI Fault	Remote Start Disable History Data	Present/Not Present	Not Present
Door Ajar Switch	Keyless/Remote Start Data	Door Closed/Door Ajar	Door Closed
Door Lock Switch	Keyless/Remote Start Data	Volts	Varies
Door Lock Switch	Keyless/Remote Start Data	Lock/Unlock/Idle	Unlock
Driver Door Ajar Sw.	Keyless/Remote Start Data	Door Closed/Door Ajar	Door Closed
Driver Door Lock Acutator Command	Keyless/Remote Start Data	Lock/Unlock/Idle/Invalid	Unlock

Extended Crank	Remote Start Disable History Data	Present/Not Present	Not Present
Hazard Lamp Switch	Keyless/Remote Start Data	Active/Inactive	Inactive
Hazard Lamps	Remote Start Disable History Data	On/Off	Off
Hood Ajar Switch	Keyless/Remote Start Data	Volts	Varies
Hood Ajar Switch	Keyless/Remote Start Data Remote Start Disable History Data	Closed/Ajar	Closed
Hood Switch Fault	Remote Start Disable History Data	Present/Not Present	Not Present
Ignition Switch Fault	Remote Start Disable History Data	Yes/No	No
Key In Ignition	Remote Start Disable History Data	Yes/No	Yes
Last RFA Command Received	Keyless/Remote Start Data	Engine Start/Engine Stop/Alarm Press/Alarm Hold/Fob 4 Unlock/Fob 3 Unlock/Fob 2 Unlock/Fob 1 Unlock/Low Battery/Lock/Rear Release/Programmed Fob/Programmed	Varies
Liftgate Ajar Switch	Keyless/Remote Start Data	Closed/Ajar	Closed
Liftgate Motor	Keyless/Remote Start Data	On/Off	Off
Liftgate Release Solenoid Cmd.	Keyless/Remote Start Data	On/Off	Off
Liftgate Release Switch	Keyless/Remote Start Data	Active/Inactive	Inactive
Park Lamp Request	Keyless/Remote Start Data	On/Off	Off
Passenger Doors Lock Actuator Command	Keyless/Remote Start Data	Lock/Unlock/Idle/Invalid	Unlock
Powertrain Abort	Remote Start Disable History Data	Yes/No	No
Remote Start Equipped	Keyless/Remote Start Data	Enabled/Disabled	Enabled
Remote Start Timer	Keyless/Remote Start Data	Counts	Varies
Remote Start Request	Keyless/Remote Start Data	Yes/No	No
Run/Crank Relay	Keyless/Remote Start Data	On/Off	Off
Run/Crank Relay Command	Keyless/Remote Start Data	On/Off	Off
Theft Mode	Remote Start Disable History Data	On/Off	Off
Turn Signal Lamp Request	Keyless/Remote Start Data	Yes/No	No

Remote Control Door Lock Receiver (RCDLR)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON, Engine OFF.			
Last Fob Used	Key FOB Information	None/Fob 1/Fob 2/Fob 3/Fob 4/Fob 5	Varies
Fob 1 Programmed	Key FOB Information	Yes/No	Varies
Fob 1 Function	Key FOB Information	None/Lock/Dr Door Unlock/All Door Unlock/R Closure Rel./Lt Sliding Ctrl/Rt Sliding Ctrl/Panic/Fuel Door/Power Window/Power Top/Engine Start/Engine Stop/Fob Program/Locate/R Closure Close/R Closure Open/Double Lock/R Closure Stop/R Closure	Varies

		Start/Lt Sliding Stop	
Fob 1 Battery	Key FOB Information	OK/Low	OK
Fob 2 Programmed	Key FOB Information	Yes/No	Varies
Fob 2 Function	Key FOB Information	None/Lock/Dr Door Unlock/All Door Unlock/R Closure Rel./Lt Sliding Ctrl/Rt Sliding Ctrl/Panic/Fuel Door/Power Window/Power Top/Engine Start/Engine Stop/Fob Program/Locate/R Closure Close/R Closure Open/Double Lock/R Closure Stop/R Closure Start/Lt Sliding Stop	Varies
Fob 2 Battery	Key FOB Information	OK/Low	OK
Fob 3 Programmed	Key FOB Information	Yes/No	Varies
Fob 3 Function	Key FOB Information	None/Lock/Dr Door Unlock/All Door Unlock/R Closure Rel./Lt Sliding Ctrl/Rt Sliding Ctrl/Panic/Fuel Door/Power Window/Power Top/Engine Start/Engine Stop/Fob Program/Locate/R Closure Close/R Closure Open/Double Lock/R Closure Stop/R Closure Start/Lt Sliding Stop	Varies
Fob 3 Battery	Key FOB Information	OK/Low	OK
Fob 4 Programmed	Key FOB Information	Yes/No	Varies
Fob 4 Function	Key FOB Information	None/Lock/Dr Door Unlock/All Door Unlock/R Closure Rel./Lt Sliding Ctrl/Rt Sliding Ctrl/Panic/Fuel Door/Power Window/Power Top/Engine Start/Engine Stop/Fob Program/Locate/R Closure Close/R Closure Open/Double Lock/R Closure Stop/R Closure Start/Lt Sliding Stop	Varies
Fob 4 Battery	Key FOB Information	OK/Low	OK

SCAN TOOL DATA DEFINITIONS

Back up Power Moding

The scan tool displays Active or Inactive. The scan tool displays if back up power mode is active or not active as commanded by the BCM.

Battery Voltage

The scan tool displays Normal or Out of Range. The battery voltage input represents the system voltage status as measured at the body control module (BCM) ignition feed input.

Door Ajar Switch

The scan tool displays Door Closed or Door Ajar. The state of the door ajar switch as commanded by the BCM.

Door Ajar Switch

The scan tool displays voltage. This is the value of the voltage drop across the door ajar switch.

Door Lock Switch

The scan tool displays Lock, Unlock, or Idle. The state of the door lock switch as commanded by the BCM.

Driver Door Ajar Sw

The scan tool displays Door Closed or Door Ajar. The state of the driver door ajar switch as commanded by the BCM.

Driver Door Lock Actuator Command

The scan tool displays Lock, Unlock, Idle, or Invalid. The state of the driver door lock actuator switch as commanded by the BCM.

Extended Crank

The scan tool displays Present or Not Present. The BCM indicates a failure attempt of the remote start as part of the remote start disable history.

Fob 1 Programmed

The scan tool displays whether a keyless entry transmitter is currently programmed into the #1 slot.

Fob 1 Function

The scan tool indicates the last keyless entry function commanded by the keyless entry transmitter programmed to the #1 slot.

Fob 1 Battery

The scan tool displays the current battery state of the keyless entry transmitter battery as either Low or OK.

Fob 2 Programmed

The scan tool displays whether a keyless entry transmitter is currently programmed into the #2 slot.

Fob 2 Function

The scan tool indicates the last keyless entry function commanded by the keyless entry transmitter programmed to the #2 slot.

Fob 2 Battery

The scan tool displays the current battery state of the keyless entry transmitter battery as either Low or OK.

Fob 3 Programmed

The scan tool displays whether a keyless entry transmitter is currently programmed into the #3 slot.

Fob 3 Function

The scan tool indicates the last keyless entry function commanded by the keyless entry transmitter programmed to the #3 slot.

Fob 3 Battery

The scan tool displays the current battery state of the keyless entry transmitter battery as either Low or OK.

Fob 4 Programmed

The scan tool displays whether a keyless entry transmitter is currently programmed into the #4 slot.

Fob 4 Function

The scan tool indicates the last keyless entry function commanded by the keyless entry transmitter programmed to the #4 slot.

Fob 4 Battery

The scan tool displays the current battery state of the keyless entry transmitter battery as either Low or OK.

Last Fob Used

The scan tool indicates the last keyless entry transmitter that used the keyless entry system.

Last RFA Command Received

The scan tool displays Engine Start, Engine Stop, Alarm Press, Alarm Hold, Fob 4 Unlock, Fob 3 Unlock, Fob 2 Unlock, Fob 1 Unlock, Low Battery, Lock, Rear Release, Programmed Fob, or Programmed. The scan tool indicates the last command received from the keyless entry system.

Hazard Lamp Switch

The scan tool displays Active or Inactive. When the hazard switch is placed in the ON position, the scan tool will display ON.

Hazard Lamps

The scan tool displays On or Off. The state of the hazard lamps as commanded by the BCM.

Hood Ajar Switch

The scan tool displays Closed or Ajar. The state of the hood ajar switch as commanded by the BCM.

Hood Ajar Switch

The scan tool displays voltage. This is the value of the voltage drop across the hood ajar switch.

Hood Closed Switch

The scan tool displays Active or Inactive. Active is displayed when the hood is closed. Inactive is displayed when the hood is open. The hood closed switch must be Active in order for the remote start to function.

Hood Open Switch

The scan tool displays Active or Inactive. Active is displayed when the hood is open. Inactive is displayed when the hood is closed. The hood open switch must be Inactive in order for the remote start to function.

Hood Switch Fault

The scan tool displays Present or Not Present. The BCM monitors for problems in the hood switch that could prevent remote start.

Ignition Switch Fault

The scan tool displays Yes or No. The BCM monitors for problems in the ignition switch that could prevent remote start.

Key in Ignition

The scan tool displays Yes or No. The state of the key in ignition switch as commanded by the BCM.

Liftgate Ajar Switch

The scan tool displays Closed or Ajar. The state of the liftgate ajar switch as commanded by the BCM.

Liftgate Motor

The scan tool displays On or Off. The state of the liftgate motor as commanded by the BCM.

Liftgate Release Switch

The scan tool displays Active or Inactive. The state of the liftgate release switch as commanded by the BCM.

Liftgate Release Solenoid Cmd

The scan tool displays On or Off. The state of the liftgate solenoid as commanded by the BCM.

Passenger Door Lock Actuator Command

The scan tool displays Lock, Unlock, Idle, or Invalid. The state of the passenger door lock actuator switch as commanded by the BCM.

Park Lamp Request

The scan tool displays On or Off. The state of the park lamps request as monitored by the BCM.

Powertrain Abort

The scan tool displays Yes or No. The BCM indicates a failure of the remote start as part of the remote start disable history.

Remote Start Equipped

The scan tool displays Enabled or Disabled. The scan tool indicates if the vehicle is equipped with remote start.

Remote Start Request

The scan tool displays Yes or No. The scan tool indicates if the BCM received a request for remote engine start from a keyless entry transmitter.

Remote Start Timer

The scan tool displays counts. The scan tool indicates if the BCM received a request for the remote engine start timer from a keyless entry transmitter.

Run/Crank Relay

The scan tool displays Yes or No. The scan tool displays the run/crank relay status as commanded by the BCM.

Run/Crank Relay Command

The scan tool displays On or Off. The scan tool displays if the run/crank relay is commanded on or off by the BCM.

Theft Mode

The scan tool displays Yes or No. The state of the theft deterrent system as commanded by the BCM.

Turn Signal Lamp Request

The scan tool displays On or Off. The state of the turn signal lamps request as monitored by the BCM.

DTC B3105

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

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 remote function actuation (RFA) system must be enabled and a test is ran every time the key is cycled.

Conditions for Setting the DTC

This code is set if there are no learned key fobs in the RCDLR.

Action Taken When the DTC Sets

The RFA system is inoperative.

Conditions for Clearing the DTC

The code is cleared as current when at least one fob is programmed to the RCDLR.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Remote Function Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Special Tools Required

J 43241 Keyless Entry Tester

Circuit/System Verification

Attempt to program the keyless entry transmitter, refer to **Transmitter Programming**. 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** 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** . If the condition continues after battery replacement, replace the transmitter.
3. Attempt to program the transmitter, refer to **Transmitter Programming**. 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 Procedures

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

Control Module References for RCDLR replacement, setup, and programming

DTC B3109

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 B3109

Keyless Entry Transmitter 1 or Generic Low Battery

Circuit/System Description

This fault sets if the key fob programmed to slot 1 has a low battery.

Conditions for Running the DTC

The remote function actuation (RFA) system must be enabled.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The RFA system is inoperative.

Conditions for Clearing the DTC

The code is cleared as current when a normal transmitter voltage signal is received from any programmed transmitter.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Remote Function Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Replace the batteries in the transmitter and with the scan tool clear the DTC.
2. Operate the transmitter three consecutive times. The DTC should not set.
    - If the DTC sets again, test the battery.
3. If all circuits test normal, test or replace the transmitter.

Repair Procedures

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

DTC B3110

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 B3110

Keyless Entry Transmitter 2 or Generic Low Battery

Circuit/System Description

This fault sets if the key fob programmed to slot 2 has a low battery.

Conditions for Running the DTC

The remote function actuation (RFA) system must be enabled.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The RFA system is inoperative.

Conditions for Clearing the DTC

The code is cleared as current when a normal transmitter voltage signal is received from any programmed transmitter.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Remote Function Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Replace the batteries in the transmitter and with the scan tool clear the DTC.
2. Operate the transmitter three consecutive times. The DTC should not set.
    - If the DTC sets again, test the battery.
3. If all circuits test normal, test or replace the transmitter.

Repair Procedures

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

DTC B3111

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 B3111

Keyless Entry Transmitter 3 or Generic Low Battery

Circuit/System Description

This fault sets if the key fob programmed to slot 3 has a low battery.

Conditions for Running the DTC

The remote function actuation (RFA) system must be enabled.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The RFA system is inoperative.

Conditions for Clearing the DTC

The code is cleared as current when a normal transmitter voltage signal is received from any programmed transmitter.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Remote Function Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Replace the batteries in the transmitter and with the scan tool clear the DTC.
2. Operate the transmitter three consecutive times. The DTC should not set.
    - If the DTC sets again, test the battery.
3. If all circuits test normal, test or replace the transmitter.

Repair Procedures

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

DTC B3112

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 B3112

Keyless Entry Transmitter 4 or Generic Low Battery

Circuit/System Description

This fault sets if the key fob programmed to slot 4 has a low battery.

Conditions for Running the DTC

The remote function actuation (RFA) system must be enabled.

Conditions for Setting the DTC

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

Action Taken When the DTC Sets

The RFA system is inoperative.

Conditions for Clearing the DTC

The code is cleared as current when a normal transmitter voltage signal is received from any programmed transmitter.

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Remote Function Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

- **Circuit Testing**

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Replace the batteries in the transmitter and with the scan tool clear the DTC.
2. Operate the transmitter three consecutive times. The DTC should not set.
    - If the DTC sets again, test the battery.
3. If all circuits test normal, test or replace the transmitter.

Repair Procedures

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

SYMPTOMS - REMOTE FUNCTIONS

IMPORTANT: 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**.

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 or wiring 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:

- **Keyless Entry System Inoperative**
- **Remote Vehicle Start Inoperative**

KEYLESS ENTRY SYSTEM INOPERATIVE

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 keyless entry system is a vehicle entry device. The keyless entry will unlock/unlatch the vehicle doors or open the rear gate when a corresponding button on the keyless entry transmitter is pressed. This is accomplished by the keyless entry transmitter sending a radio frequency to the remote control door lock receiver (RCDLR). The signal is received by the RCDLR via an internal antenna located within the RCDLR. The RCDLR interprets the signal and activates the requested function via a message over the GMLAN serial data line. 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.

Diagnostic Aids

For the **J 43241** , 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

Remote Function Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Special Tools Required

J 43241 Keyless Entry Tester

Circuit/System Verification

Attempt to program the keyless entry transmitter, refer to **Transmitter Programming**. 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 is Yes.
    - If not Yes, program the transmitter.
3. Place the transmitter on the test pad of the **J 43241** 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** . If the condition continues after battery replacement, replace the transmitter.
4. Attempt to program the transmitter, refer to **Transmitter Programming**. The transmitter should program.
    - If the transmitter does not program, replace the RCDLR.

Repair Procedures

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

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

REMOTE VEHICLE START INOPERATIVE

Diagnostic Fault Information

Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

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 even will occur. If conditions are determined to be acceptable, the RVS message is sent to the powertrain control module (PCM). The PCM 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 PCM will initiate engine starting. During the engine run time in a RVS attempt, before the operator enters the vehicle, the PCM 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

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

- The vehicle is in valet mode.
- 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 DRC is set.

- A vehicle speed sensor signal is detected by the PCM.
- A current vehicle DTC that illuminates the malfunction indicator lamp (MIL)

Reference Information

Schematic Reference

Remote Function Schematics

Connector End View Reference

Remote Function Connector End Views

Description and Operation

Keyless Entry System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Verification

1. Verify that RVS is enabled in the vehicle driver information center (DIC).
    - If RVS is not enabled, use the DIC to turn on RVS functionality.
2. Verify that the keyless entry functions operate with all available keyless entry transmitters.
    - If the keyless entry system does not function properly with all available transmitters, refer to **Keyless Entry System Inoperative**.
3. With a scan tool, verify that no RVS Disable History is present.
    - If RVS disable history is present, refer to the applicable subsection in which the failure occurred.
4. With a scan tool, verify that there are no Current CTD Triggers present.
    - If a CTD trigger exists, refer to **Content Theft Deterrent (CTD) Alarm Mode Inoperative** .

REPAIR INSTRUCTIONS

TRANSMITTER BATTERY REPLACEMENT

Removal Procedure

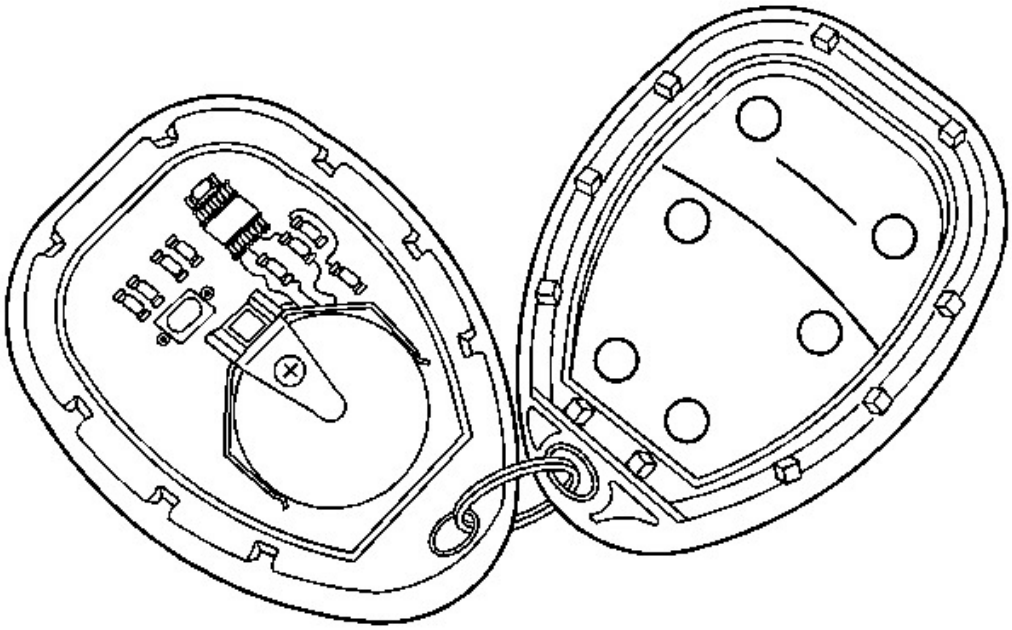

Fig. 6: Locating Transmitter Battery
Courtesy of GENERAL MOTORS CORP.

NOTE: **When replacing the battery, use care not to touch any of the circuitry. Static from your body transferred to these surfaces may damage the transmitter.**

1. Insert a flat object, with a thin edge, into the notch located below the remote alarm button and separate the bottom half from the top half of the transmitter.
2. Remove the battery from the transmitter.

Installation Procedure

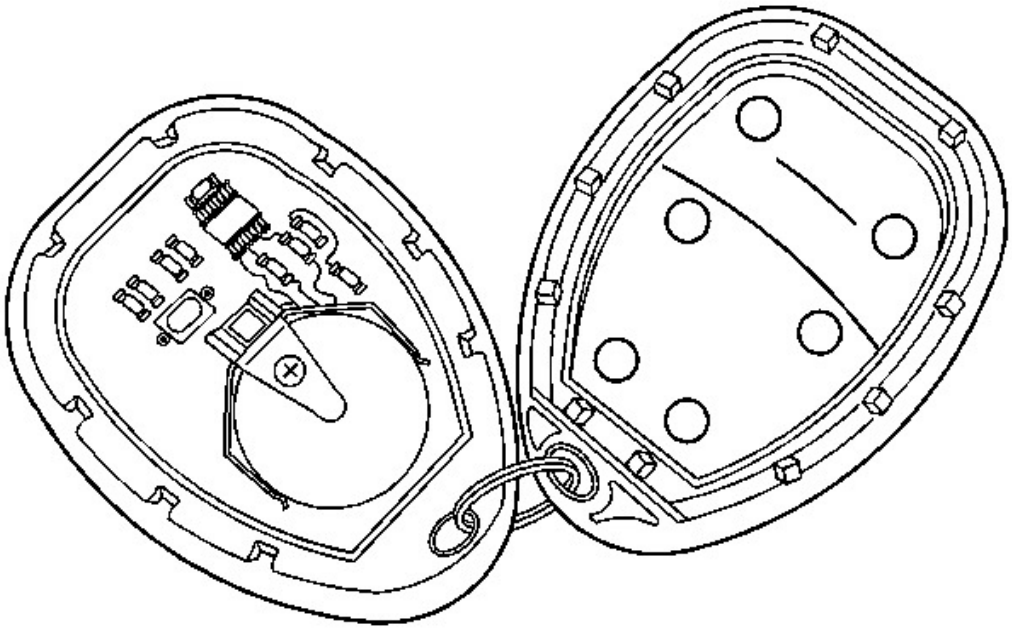

Fig. 7: Locating Transmitter Battery
Courtesy of GENERAL MOTORS CORP.

1. Install the battery into the transmitter with the positive side of the battery facing up.
2. Snap the front and back half of the transmitter together.
3. Ensure the transmitter halves are tight to prevent moisture from intruding into the transmitter.

REMOTE CONTROL DOOR LOCK RECEIVER REPLACEMENT

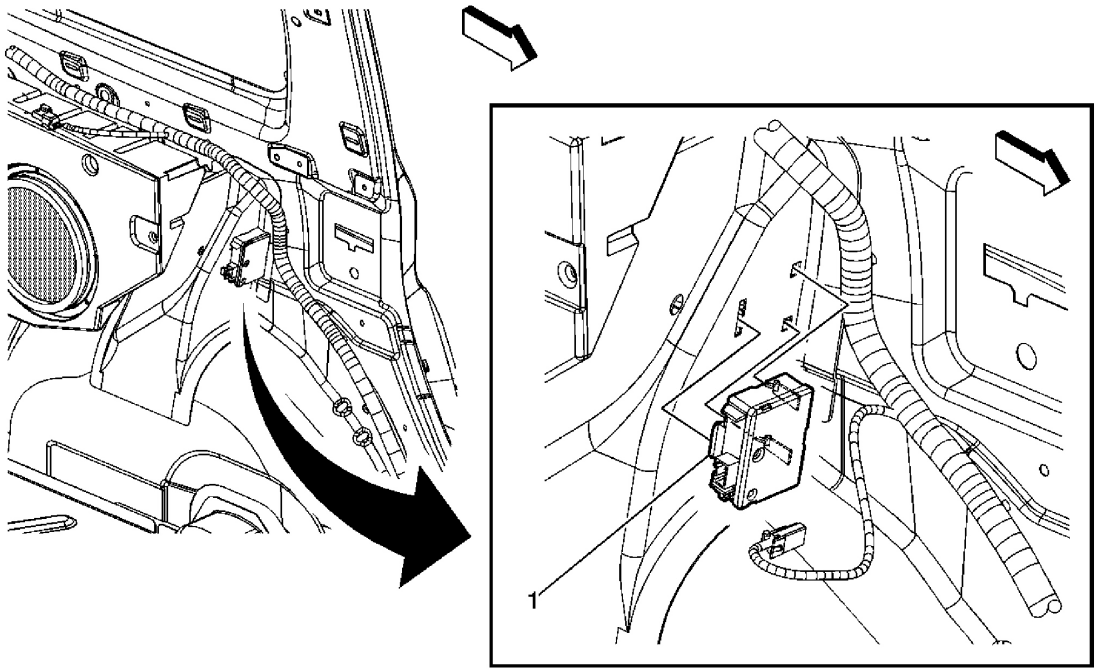

Fig. 8: Remote Control Door Lock Receiver Replacement
Courtesy of GENERAL MOTORS CORP.

Remote Control Door Lock Receiver Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the rear seat. Refer to **Rear Seat Replacement** . 2. Remove the left rear quarter lower trim panel. Refer to **Rear Quarter Lower Trim Panel Replacement** .	
1	Module, Remote Control Door Lock **Tip:** 1. The module is secured to the seat back cushion latch bracket with three integral tabs, pull away from the bracket to remove. 2. Disconnect the electrical connector. 3. Reprogram the remote control door lock module after installation. Refer to **Control Module References** .

TRANSMITTER PROGRAMMING

IMPORTANT: **Up to 4 transmitters can be programmed. 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. The order in which the transmitters are programmed is important. The first transmitter programmed will be transmitter #1, and the second transmitter programmed will be transmitter #2. Use care to program the transmitters correctly.**
The scan tool must stay connected until all of the transmitters are programmed.

Invalidate All

This procedure will erase all keyless entry transmitters from memory.

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 Invalidate All.
8. Follow the scan tool on screen instructions.

Next Available Slot

Incremental programming allows for a transmitter to be reprogrammed into the next available location without affecting the currently programmed transmitters. Previously programmed transmitters will not be erased during this procedure.

IMPORTANT: If all 4 slots are programmed, the Invalidate All procedure will need to be performed to allow transmitter programming.

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 Next Available Slot.
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.

DESCRIPTION AND OPERATION

KEYLESS ENTRY SYSTEM DESCRIPTION AND OPERATION

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 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 components:

- The door locks
- The illuminated entry lamps.
- The panic alarm.
- Remote vehicle start (RVS).

The keyless entry system has the following main components:

- The keyless entry transmitters
- The body control module (BCM)
- The remote control door lock receiver (RCDLR)-When you press a button on the transmitter, the transmitter sends a signal to the RCDLR. The RCDLR receives the signal and sends a X Link serial data message requesting the appropriate function from the BCM.

Unlock Driver Door Only

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

- Unlock the driver door only.
- Illuminate the interior lamps for approximately 20 seconds or until the ignition is turned ON.
- Flash the park lamps if the ignition is turned OFF and the doors are closed.
- Identify the driver to the radio-The radio will then revert to the station presets, the last station, the last volume settings, and the last playback mode used by that driver.

Unlock All Doors - Second Operation

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

- Unlock all of the doors.
- Illuminate the interior lamps for approximately 20 seconds or until the ignition is turned ON.

Lock All Doors

Press the LOCK button in order to perform the following functions:

- Lock all of the doors.
- Immediately turn OFF the interior lamps.
- Flash the park lamps if the ignition is OFF and the doors are closed, if turned ON via personalization.
- Chirp the horn if the ignition is OFF and the doors are closed, if turned ON via personalization.

Panic Alarm Function

A single press of the panic button performs the following functions:

- Illuminates the interior lamps.
- Chirp pulses the horn.
- Flashes the daytime running lamps for 30 seconds or until the following conditions occur:
    - The unlock button is pressed.
    - The ignition switch is turned to the RUN position with a valid key.

Remote Vehicle Start

The Remote Vehicle Start function allows the customer to start the vehicle while not in the car. The distance the customer can be away from the vehicle and operate this feature from a distance of up to 60 meters or 197 feet. The Remote Vehicle Start feature is started by pressing and releasing the lock button and then pressing and holding the remote vehicle start (RVS) buttons on the key fob. The turn signal lamps will flash if this feedback is enabled on to indicate the vehicle has received the Remote Start Request. Once the vehicle has been started, there is visible feedback. There are vehicle conditions which will prevent a remote start, for example if the hood is not closed or the key is in the ignition. The Remote Vehicle Start feature once activated is allowed to run for 10 minutes. At any time during this 10 minute time the 10 minute time-out can be reset once. This feature is called a Remote Vehicle Start Continue. This allows a maximum of 20 minutes of engine running via the Remote Vehicle Start feature without a reset. If the Remote Vehicle Start Continue is done at 7 minutes into the initial 10 minute time-out, a total of 17 minutes of engine running would occur. A remote vehicle start, once active, can be stopped by pressing a dedicated RVS button on the key fob or by pressing the Vehicle Hazard switch located inside the vehicle. The following will also abort a remote start, using an invalid passkey, force rotating the ignition, force shifting out of park. Remote start will also be stopped if any DTCs that turn ON the SES/MIL are stored in history or current status.

Customer Programming Method for Enabling/Disabling the RVS Feature

Using the driver information center (DIC), the RVS feature can be DISABLED and ENABLED just like other items programmable via the DIC.

Remote Vehicle Start Features That Allow A Remote Vehicle START/CONTINUE

- The remote vehicle start (RVS) feature must be enabled.
- A remote vehicle start request command is received by the body control module (BCM).
- The hood ajar switch status is closed.
- The number of remote start attempts is less than 3.
- The key is not in the ignition.
- The remote start voltages are within proper operating ranges 6-16 volts.
- There are no DTCs or serial data communication failures with RVS related systems.
- The transmission status is Park/Neutral and the vehicle speed is zero.

Conditions to Stop A Remote Vehicle Start

- Hood ajar switch status is - OPEN.
- Inserting the key in the ignition and turning the key to any non-off power modes, and returning the key to the OFF position
- The remote vehicle start (RVS) time has elapsed or timed out.
- The RVS master receives a run abort message from the engine control module (ECM).
- Hazard shutoff switch status is - ACTIVE.
- By content theft deterrent (CTD) system, if equipped, and alarm status becomes Violated
- RVS system voltage out of range, under 6 volts or over 16 volts
- DTCs set for any related systems, or serial data communication failure for any modules that support the RVS function

If the RVS master stops a remote vehicle start for any of these conditions, further remote vehicle starting is not allowed until a RVS RESET has occurred.

A RVS Reset occurs when, in an ignition switch vehicle, the key is inserted and rotated into the Run position, power mode of RUN is seen, and ECM Vehicle Theft Fuel Continue is received over serial data and passes VTD criteria.

This action results in resetting the RVS counters to MAX starts allowed and the RVS Attempts to 0.

