

ACCESSORIES & EQUIPMENT

Cellular, Entertainment, and Navigation - Coupe And Wagon

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
AM/FM Stereo and Clock and Audio Disc Player Radio Control Screws	2.5 N.m	22 lb in
Communication Interface Module Nut	9 N.m	80 lb in
Digital Radio and Mobile Telephone and Vehicle Location Base Assembly Nut	10 N.m	89 lb in
Front Overhead Console Reinforcement Bracket Screw	2 N.m	18 lb in
Radio and Video and Audio Disc Player and Navigational Information Display Screw	2.5 N.m	22 lb in
Radio Antenna Bolt	9 N.m	80 lb in
Radio Front Side Door Speaker Bolt/Screw	2.5 N.m	22 lb in
Radio Front Speaker Bolt/Screw	2.5 N.m	22 lb in
Radio Rear Side Door Speaker Bolt/Screw	2.5 N.m	22 lb in
Radio Rear Speaker Bolt/Screw	1.5 N.m	13 lb in
Radio Screws	9 N.m	80 lb in
Radio Speaker Amplifier Nut	6 N.m	54 lb in
Television Antenna Amplifier Bolt	10 N.m	89 lb in

SCHEMATIC WIRING DIAGRAMS

RADIO/NAVIGATION SYSTEM WIRING SCHEMATICS

Power, Ground, Data Communication, and Amp, Radio, Radio/HVAC (U2R, U2S, U2T)

Amplifier Inputs (UQA or UQS)

Front Speakers (Coupe with UQA)

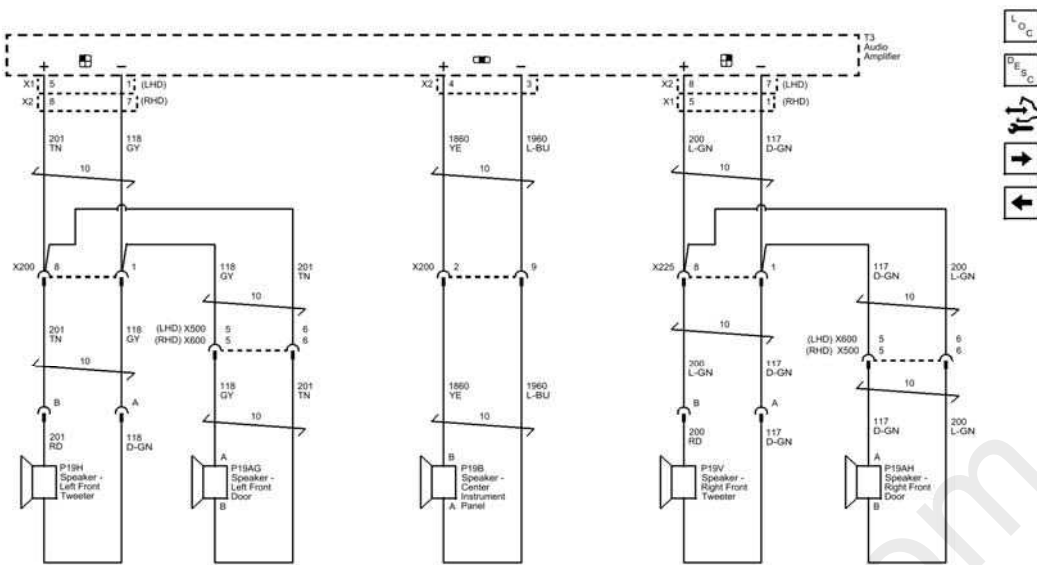


Fig. 3: Front Speakers (Coupe with UQA)
 Courtesy of GENERAL MOTORS COMPANY

Front Speakers (Wagon with UQA)

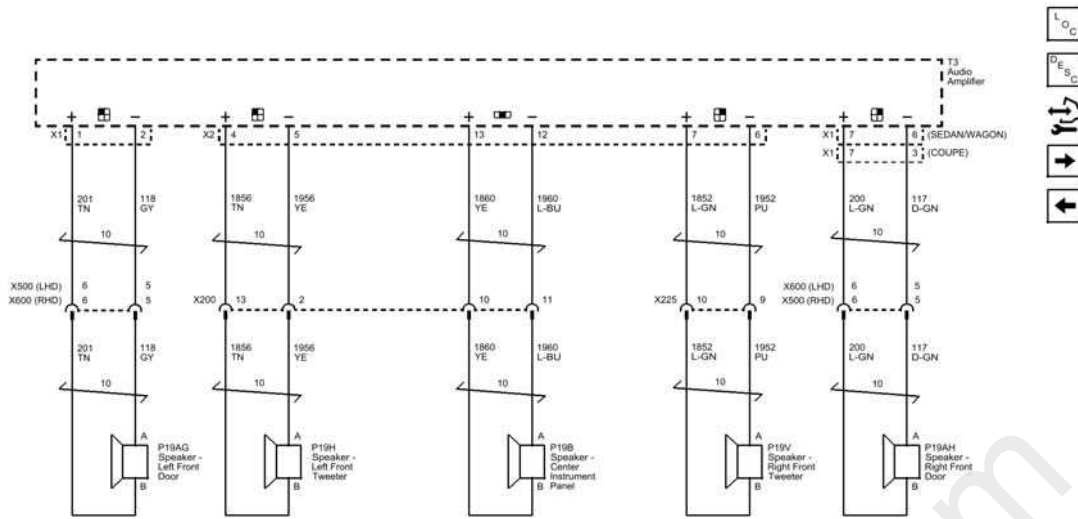


Fig. 5: Front Speakers (UQS)

Courtesy of GENERAL MOTORS COMPANY

Rear Speakers (Wagon with UQA)

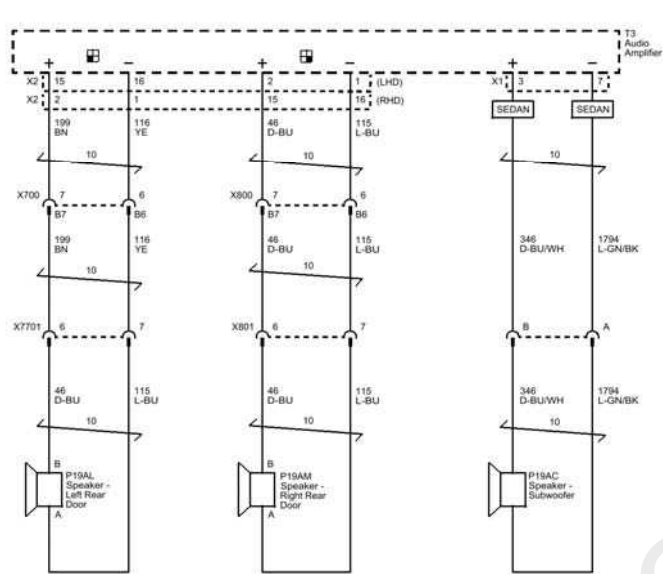


Fig. 6: Rear Speakers (Wagon with UQA)
 Courtesy of GENERAL MOTORS COMPANY

Rear Speakers (Wagon with UQS)

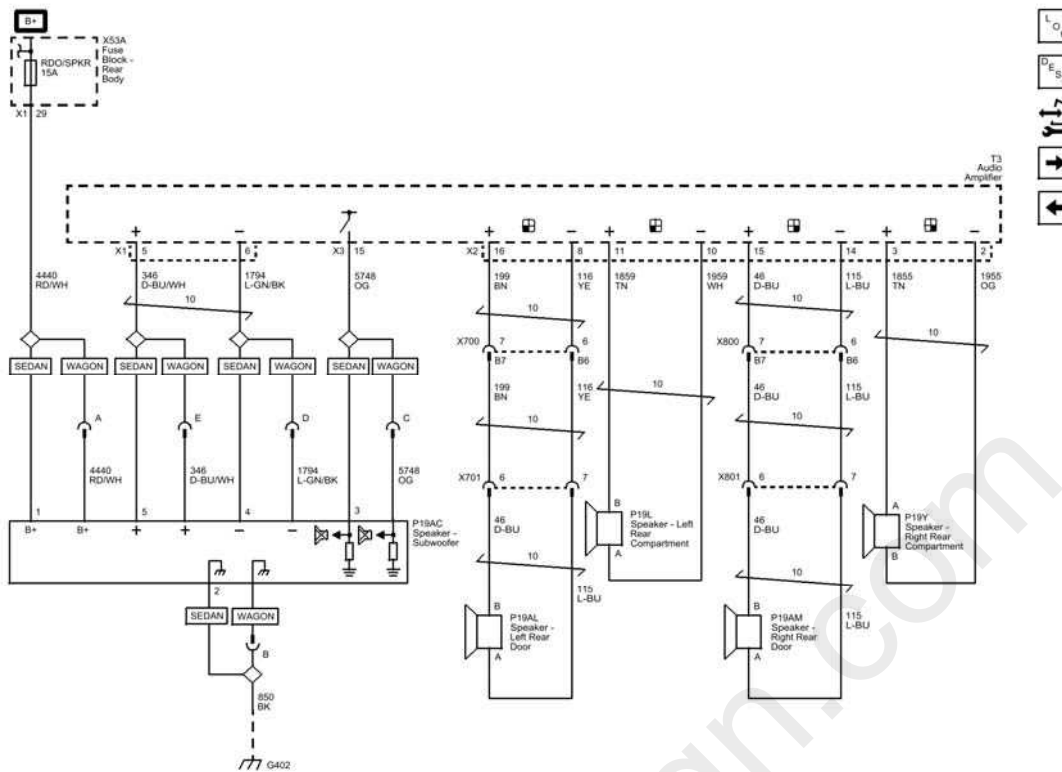


Fig. 7: Rear Speakers (Wagon with UQS)
Courtesy of GENERAL MOTORS COMPANY

Rear Speakers (Coupe with UQA)

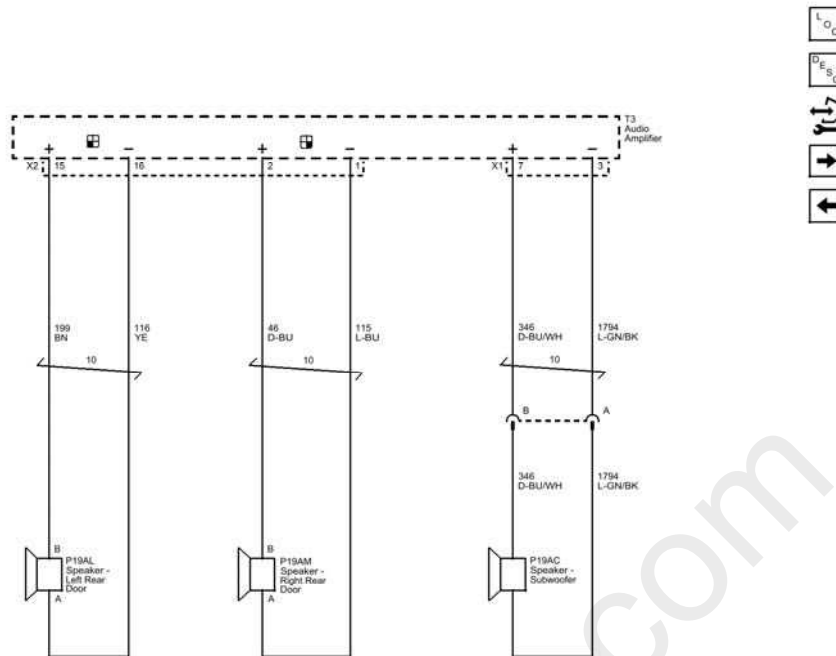


Fig. 8: Rear Speakers (Coupe with UQA)
 Courtesy of GENERAL MOTORS COMPANY

Rear Speakers (Coupe with UQS)

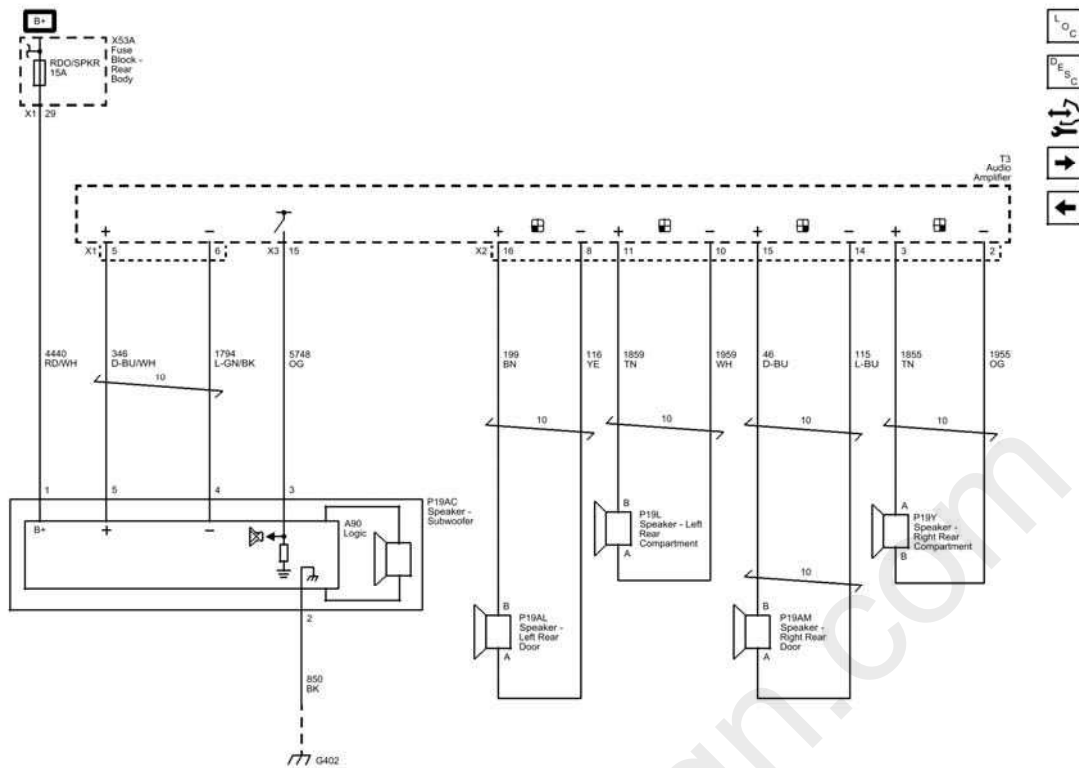


Fig. 9: Rear Speakers (Coupe with UQS)
Courtesy of GENERAL MOTORS COMPANY

Auxiliary Audio Jack, Microphones, Navigation Audio Signals

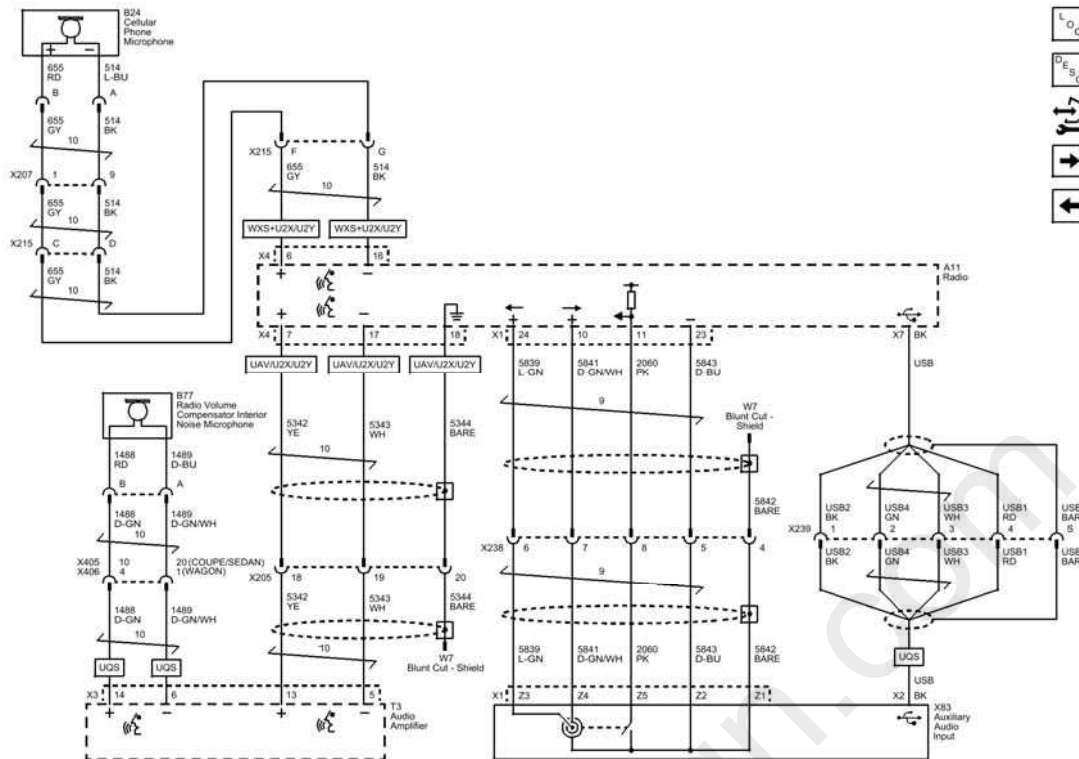


Fig. 10: Auxiliary Audio Jack, Microphones, Navigation Audio Signals
Courtesy of GENERAL MOTORS COMPANY

Antenna Signals

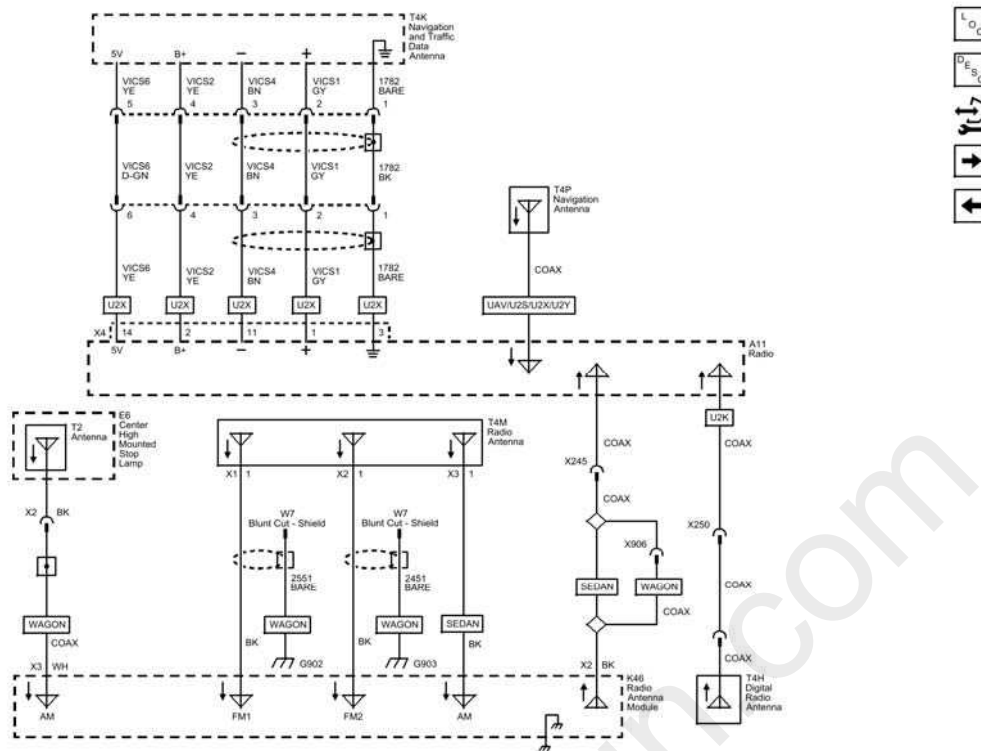
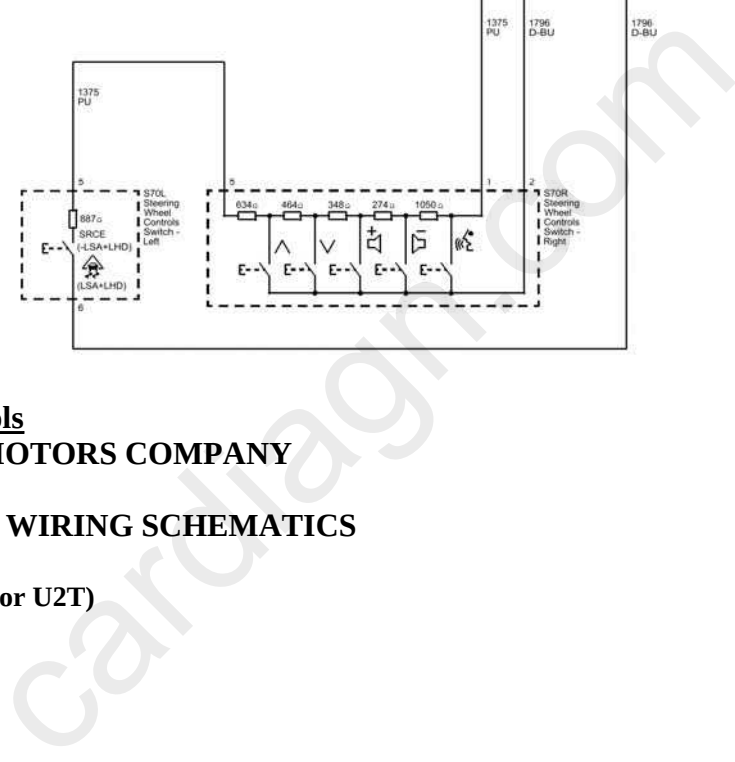


Fig. 11: Antenna Signals
Courtesy of GENERAL MOTORS COMPANY

Radio/HVAC Display (UAV, U2X, U2Y)

Secondary Controls



Courtesy of GENERAL MOTORS COMPANY

OnStar (UE1 with U2R, U2S, or U2T)

OnStar (UE1 with UAV or U2Y)

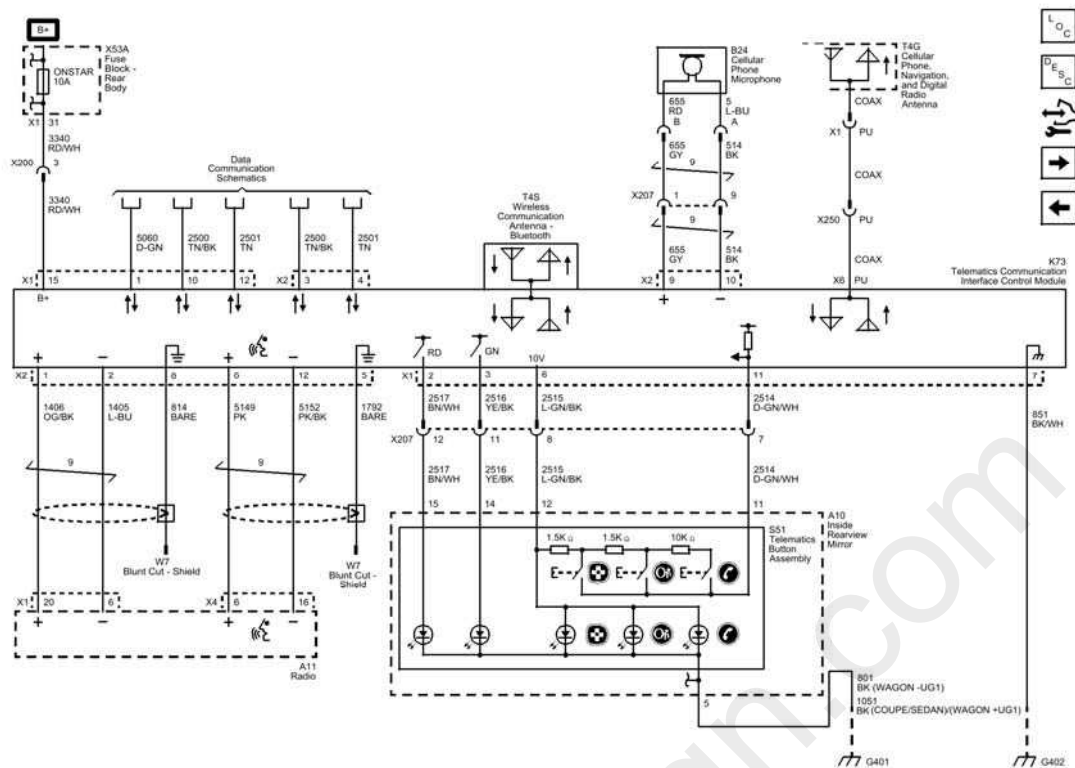


Fig. 16: OnStar (UE1 with UAV or U2Y)
Courtesy of GENERAL MOTORS COMPANY

Hands Free Phone Accommodation (WXS)

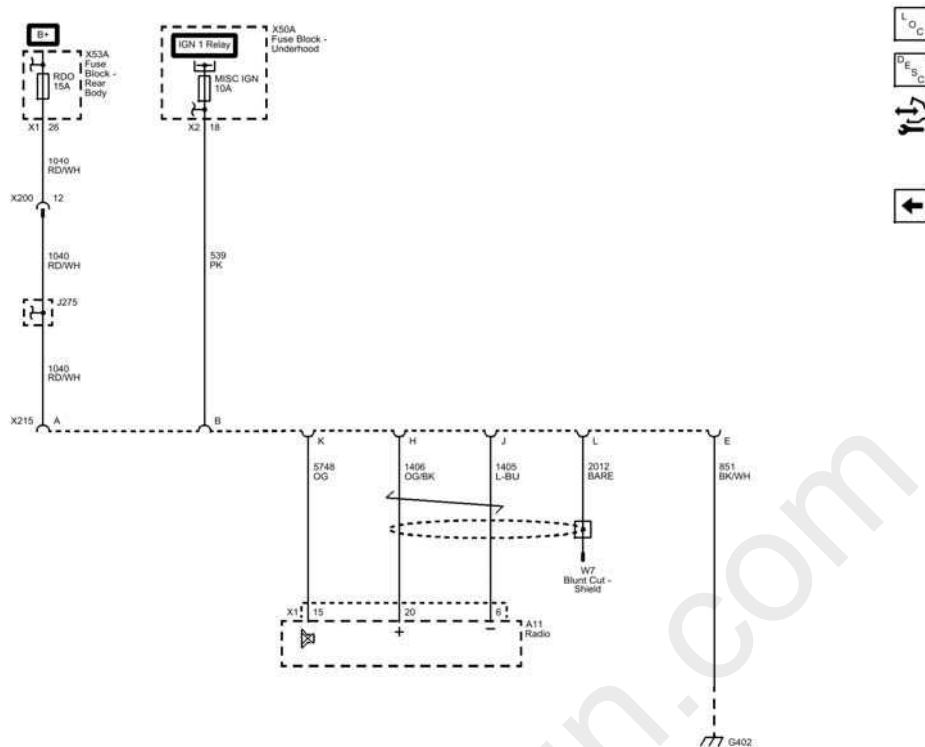


Fig. 17: Hands Free Phone Accommodation (WXS)
 Courtesy of GENERAL MOTORS COMPANY

VIDEO SYSTEM WIRING SCHEMATICS

Dual DVD Headrest System

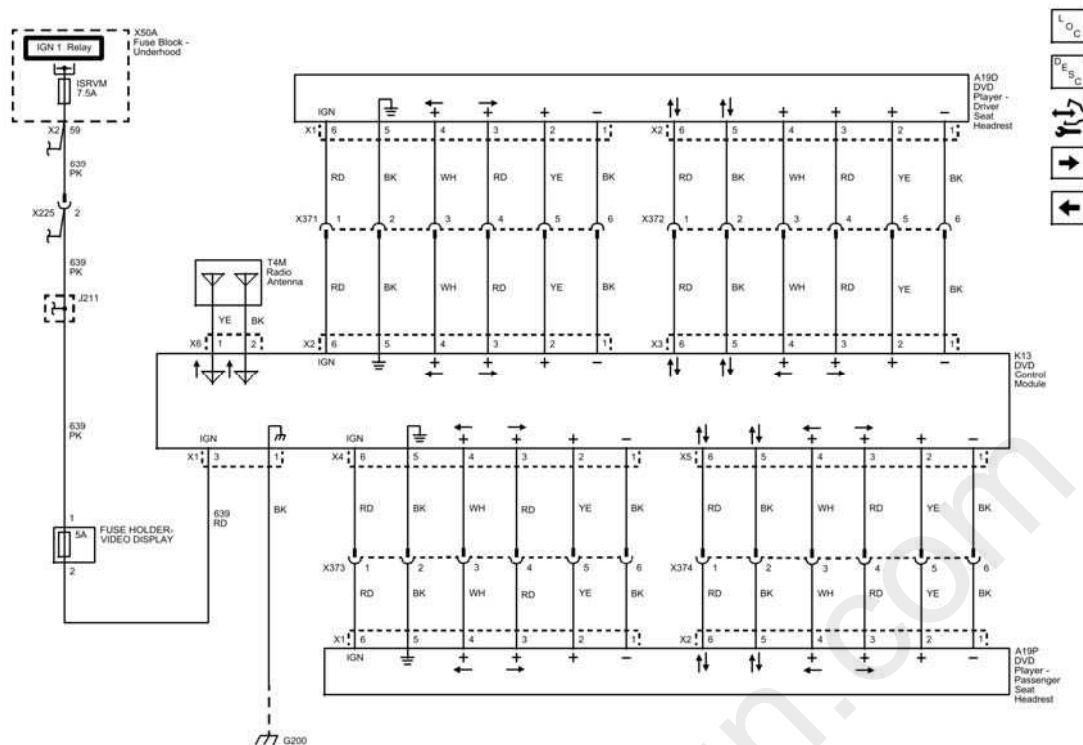


Fig. 18: Dual DVD Headrest System

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0997	DTC B0997 00 Auxiliary Electronic Control Unit (ECU) 2 Performance
DTC B1020	DTC B1020 00 Auxiliary Electronic Control Unit (ECU) 1 Performance
DTC B1024	DTC B1024 11 Circuit Board Temperature Sensor Above Maximum Threshold DTC B1024 53 Circuit Board Temperature Sensor Low DTC B1024 54 Circuit Board Temperature Sensor High
DTC B1025-B1125	DTC B1025 01 Audio Output 1 Left Front Circuit Short to Battery (LF Door) DTC B1025 02 Audio Output 1 Left Front Circuit Short to Ground (LF Door) DTC B1025 04 Audio Output 1 Left Front Circuit Open (LF Door) DTC B1035 01 Audio Output 2 Right Front Circuit Short to Battery (RF Door) DTC B1035 02 Audio Output 2 Right Front Circuit Short to Ground (RF Door)

	Door) DTC B1035 04 Audio Output 2 Right Front Circuit Open (RF Door) DTC B1045 01 Audio Output 3 Left Rear Circuit Short to Battery (LR Door) DTC B1045 02 Audio Output 3 Left Rear Circuit Short to Ground (LR Door) DTC B1045 04 Audio Output 3 Left Rear Circuit Open (LR Door) DTC B1055 01 Audio Output 4 Right Rear Circuit Short to Battery (RR Door) DTC B1055 02 Audio Output 4 Right Rear Circuit Short to Ground (RR Door) DTC B1055 04 Audio Output 4 Right Rear Circuit Open (RR Door) DTC B1065 01 Audio Output 5 Circuit Short to Battery (Center IP) DTC B1065 02 Audio Output 5 Circuit Short to Ground (Center IP) DTC B1065 04 Audio Output 5 Circuit Open (Center IP) DTC B1075 01 Audio Output 6 Circuit Short to Battery (Subwoofer) DTC B1075 02 Audio Output 6 Circuit Short to Ground (Subwoofer) DTC B1085 01 Audio Output 7 Circuit Short to Battery (LR Shelf) DTC B1085 02 Audio Output 7 Circuit Short to Ground (LR Shelf) DTC B1085 04 Audio Output 7 Circuit Open (LR Shelf) DTC B1095 01 Audio Output 8 Circuit Short to Battery (RR Shelf) DTC B1095 02 Audio Output 8 Circuit Short to Ground (RR Shelf) DTC B1095 04 Audio Output 8 Circuit Open (RR Shelf) DTC B1105 01 Audio Output 9 Circuit Short to Battery (LF I/P Tweeter) DTC B1105 02 Audio Output 9 Circuit Short to Ground (LF I/P Tweeter) DTC B1105 04 Audio Output 9 Circuit Open (LF I/P Tweeter) DTC B1115 01 Audio Output 10 Circuit Short to Battery (RF I/P Tweeter) DTC B1115 02 Audio Output 10 Circuit Short to Ground (RF I/P Tweeter) DTC B1115 04 Audio Output 10 Circuit Open (RF I/P Tweeter)
<u>DTC B125C</u>	DTC B125C 01 Satellite Antenna 1 Circuit Short to Battery DTC B125C 02 Satellite Antenna 1 Circuit Short to Ground DTC B125C 04 Satellite Antenna 1 Circuit Open Circuit
<u>DTC B1265</u>	DTC B1265 02 Switched 14 Volt Performance Short to Ground
<u>DTC B1271</u>	DTC B1271 00 Theft Locked
<u>DTC B1278 or B1279</u>	DTC B1278 01 Auxiliary Input 1 Signal Circuit Short to Battery DTC B1278 02 Auxiliary Input 1 Signal Circuit Short to Ground DTC B1279 01 Auxiliary Input 2 Signal Circuit Short to Battery DTC B1279 02 Auxiliary Input 2 Signal Circuit Short to Ground
<u>DTC B128A</u>	DTC B128A 01 Mono Audio Signal Circuit Short to Battery DTC B128A 02 Mono Audio Signal Circuit Short to Ground
<u>DTC B128D</u>	DTC B128D 01 Video Display Position Signal Short to Battery DTC B128D 02 Video Display Position Signal Short to Ground DTC B128D 04 Video Display Position Signal Open Circuit
<u>DTC B1283-B1286</u>	DTC B1283 00 Television Antenna 1 Performance DTC B1284 00 Television Antenna 2 Performance DTC B1285 00 Television Antenna 3 Performance DTC B1286 00 Television Antenna 4 Performance

<u>DTC B1287</u>	DTC B1287 01 Amplifier Control Signal Circuit Short to Battery DTC B1287 02 Amplifier Control Signal Circuit Short to Ground DTC B1287 04 Amplifier Control Signal Circuit Open
<u>DTC B2455</u>	DTC B2455 02 Cellular Phone Microphone Circuit Short to Ground DTC B2455 04 Cellular Phone Microphone Circuit Open
<u>DTC B2462 (Navigation Radio)</u>	DTC B2462 02 Global Positioning System (GPS) Short to Ground DTC B2462 04 Global Positioning System (GPS) Open Circuit
<u>DTC B2470</u>	DTC B2470 02 Cellular Phone Antenna Circuit Malfunction Short to Ground DTC B2470 04 Cellular Phone Antenna Circuit Malfunction Open Circuit
<u>DTC B2476 or B2482</u>	DTC B2476 04 Cellular Phone Select Service Switch Open DTC B2476 59 Cellular Phone Select Service Switch Protection Time-out DTC B2482 00 Cellular Phone Select Service Switch Range/Performance
<u>DTC B2485</u>	DTC B2485 02 Wireless Communication Antenna Circuit Short to Ground DTC B2485 04 Wireless Communication Antenna Circuit Open Circuit

DTC B0997: AUXILIARY ELECTRONIC CONTROL UNIT (ECU) 2 PERFORMANCE

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 B0997 00

Auxiliary Electronic Control Unit (ECU) 2 Performance

Circuit/System Description

The navigation radio communicates with the navigation display via serial data. If the navigation radio receives an improper status response message, DTC B0997 will set.

Conditions for Running the DTC

- The ignition is in the RUN or ACC position.
- The system voltage is greater than 9.5 volts and less than 15.5 volts.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

The navigation radio receives an improper status response message back from the navigation display assembly.

Action Taken when the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC clears when the navigation radio receives the proper response message from the radio control assembly.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System 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

Verify that DTC B0997 is not set.

- If the DTC is set, replace the navigation display assembly.

Repair Instructions

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

Radio, Video, and Audio Player and Navigation Information Display Replacement

DTC B1020: AUXILIARY ELECTRONIC CONTROL UNIT (ECU) 1 PERFORMANCE

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 B1020 00

Auxiliary Electronic Control Unit (ECU) 1 Performance

Circuit/System Description

The navigation radio communicates with the radio control assembly via serial data. If the radio receives an improper status response message, DTC B1020 will set.

This DTC indicates an internal ECU fault or a stuck button on the faceplate. No external circuits are involved.

Conditions for Running the DTC

- Ignition is ON or in the ACC position.
- The system voltage is at least 9.5 volts and no more than 15.5 volts.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

The radio receives an improper status response indicating an internal ECU fault or a stuck button on the radio control assembly.

Action Taken when the DTC Sets

No action is taken.

Conditions for Clearing the DTC

- A current DTC clears when the radio receives a proper status response message back from the radio control assembly.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System 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

Verify that DTC B1020 is not set.

- If the DTC is set, replace the radio control assembly.

Repair Instructions

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

Radio Control Assembly Replacement (with Navigation Display), Radio Control Assembly Replacement (without Navigation Display)

DTC B1024: CIRCUIT BOARD TEMPERATURE SENSOR

Diagnostic Instructions

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

DTC Descriptor

DTC B1024 11

Circuit Board Temperature Sensor Above Maximum Threshold

DTC B1024 53

Circuit Board Temperature Sensor Low

DTC B1024 54

Circuit Board Temperature Sensor High

Circuit/System Description

The internal module circuitry temperature is monitored. If the an over-heat condition which exceeds the maximum threshold of the internal circuitry or a malfunctioning temperature sensor is detected, the module will shut down until the internal circuitry cools.

Conditions for Running the DTC

- The radio is in the ON or ACCY position
- The system voltage is at least 9 volts and no more than 16 volts.

Conditions for Setting the DTC

The module detects an over-heat condition or a malfunctioning sensor.

Action Taken When the DTC Sets

Module functionality is suspended.

Conditions for Clearing the DTC

- A current DTC clears when the module temperature returns to an acceptable level.
- A history DTC clears after 100 malfunction-free ignition cycles.

Diagnostic Aids

Extended use of extremely high volume, especially in warm weather conditions, may cause this DTC to set in the audio amplifier. Under these conditions, it may be normal for this DTC to set to prevent permanent damage to the amplifier circuitry and no repair should be attempted.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

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Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Circuit/System Verification

Verify that DTC B1024 is not set.

- If the DTC is set, replace the appropriate control module that set the DTC.

Repair Instructions

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

Control Module References for audio amplifier or antenna module replacement, setup, and programming

DTC B1025-B1125: AUDIO OUTPUT

Diagnostic Instructions

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

DTC Descriptors

DTC B1025 01

Audio Output 1 Left Front Circuit Short to Battery (LF Door)

DTC B1025 02

Audio Output 1 Left Front Circuit Short to Ground (LF Door)

DTC B1025 04

Audio Output 1 Left Front Circuit Open (LF Door)

DTC B1035 01

Audio Output 2 Right Front Circuit Short to Battery (RF Door)

DTC B1035 02

Audio Output 2 Right Front Circuit Short to Ground (RF Door)

DTC B1035 04

Audio Output 2 Right Front Circuit Open (RF Door)

DTC B1045 01

Audio Output 3 Left Rear Circuit Short to Battery (LR Door)

DTC B1045 02

Audio Output 3 Left Rear Circuit Short to Ground (LR Door)

DTC B1045 04

Audio Output 3 Left Rear Circuit Open (LR Door)

DTC B1055 01

Audio Output 4 Right Rear Circuit Short to Battery (RR Door)

DTC B1055 02

Audio Output 4 Right Rear Circuit Short to Ground (RR Door)

DTC B1055 04

Audio Output 4 Right Rear Circuit Open (RR Door)

DTC B1065 01

Audio Output 5 Circuit Short to Battery (Center IP)

DTC B1065 02

Audio Output 5 Circuit Short to Ground (Center IP)

DTC B1065 04

Audio Output 5 Circuit Open (Center IP)

DTC B1075 01

Audio Output 6 Circuit Short to Battery (Subwoofer)

DTC B1075 02

Audio Output 6 Circuit Short to Ground (Subwoofer)

DTC B1085 01

Audio Output 7 Circuit Short to Battery (LR Shelf)

DTC B1085 02

Audio Output 7 Circuit Short to Ground (LR Shelf)

DTC B1085 04

Audio Output 7 Circuit Open (LR Shelf)

DTC B1095 01

Audio Output 8 Circuit Short to Battery (RR Shelf)

DTC B1095 02

Audio Output 8 Circuit Short to Ground (RR Shelf)

DTC B1095 04

Audio Output 8 Circuit Open (RR Shelf)

DTC B1105 01

Audio Output 9 Circuit Short to Battery (LF I/P Tweeter)

DTC B1105 02

Audio Output 9 Circuit Short to Ground (LF I/P Tweeter)

DTC B1105 04

Audio Output 9 Circuit Open (LF I/P Tweeter)

DTC B1115 01

Audio Output 10 Circuit Short to Battery (RF I/P Tweeter)

DTC B1115 02

Audio Output 10 Circuit Short to Ground (RF I/P Tweeter)

DTC B1115 04

Audio Output 10 Circuit Open (RF I/P Tweeter)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Amplifier B+	-	2	-	-
Speaker Output Circuit (+)	B1XXX 02*,**	B1XXX 04*,**	B1XXX 01*,**	-
Speaker Output Circuit (-)	B1XXX 02*,**	B1XXX 04*,**	B1XXX 01*,**	-
Subwoofer Signal (+)	B1075 02,**	1	B1075 01,**	-
Subwoofer Signal (-)	B1075 02,**	1	B1075 01,**	-
Amplifier Control	B1287 02	B1287 04	B1287 01	-
Amplifier Ground	-	2	-	-
1. No or reduced sound from subwoofer 2. Amplifier inoperative/no sound from speaker * Sets associated speaker DTC with appropriate symptom type - see DTC descriptors ** Noticeable audio distortion possible				

Circuit/System Description

Each of the audio output channel circuits (+) and (-) have a varying AC mV signal that is produced by the radio and sent to the amplifier. The amplifier then processes these signals and passes the audio along with a DC bias voltage to the appropriate speakers. The audio being played on the system is produced by the varying AC voltage. The AC voltage is what causes the speaker cone to move and produce sound. This voltage will vary depending on what type of audio is being listened to, talk or music, and type of music, as well as the volume setting of the system. When using a DMM, each of the audio amplifier output channel circuits will measure approximately 6.5V DC.

Conditions for Running the DTC

- The ignition is in the RUN or ACC position.
- The system voltage is at least 9.5 volts and no more than 15.5 volts.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

B1025 01, B1035 01, B1045 01, B1055 01, B1065 01, B1075 01, B1085 01, B1095 01, B1105 01, B1115 01

The amplifier detects a short to voltage on the audio (+) or audio (-) circuit.

B1025 02, B1035 02, B1045 02, B1055 02, B1065 02, B1075 02, B1085 02, B1095 02, B1105 02, B1115 02

The amplifier detects a short to ground on the audio (+) or audio (-) circuit.

B1025 04, B1035 04, B1045 04, B1055 04, B1065 04, B1085 04, B1095 04, B1105 04, B1115 04

The amplifier detects an open on the audio (+) or audio (-) circuit.

Action Taken When the DTC Sets

The amplifier disables the audio output to the speaker with the current fault.

Conditions for Clearing the DTC

- A current DTC clears when the conditions for setting the DTC are no longer present and the ignition has been cycled from OFF to ON.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Radio ON, adjust the fade and balance controls on the radio to test all channels individually. Each channel should produce clear and even sound.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 and X2 connectors at the amplifier.

2. Radio ON, test for less than 1 volt between the appropriate signal circuit terminal listed below and ground:

- Left front tweeter speaker output (+) - terminal 4 X2
- Left front tweeter speaker output (-) - terminal 5 X2
- Right front tweeter speaker output (+) - terminal 7 X2
- Right front tweeter speaker output (-) - terminal 6 X2
- Left rear speaker output (+) - terminal 16 X2
- Left rear speaker output (-) - terminal 8 X2
- Right rear speaker output (+) - terminal 15 X2
- Right rear speaker output (-) - terminal 14 X2
- Front center speaker output (+) - terminal 13 X2
- Front center speaker output (-) - terminal 12 X2
- Left rear subwoofer speaker output (+) - terminal 5 X1
- Left rear subwoofer speaker output (-) - terminal 6 X1
- Right front speaker output (+) - terminal 7 X1
- Right front speaker output (-) - terminal 3 X1
- Left front speaker output (+) - terminal 1 X1
- Left front speaker output (-) - terminal 2 X1
- Right front speaker output (+) - terminal 7 X1
- Right front speaker output (-) - terminal 3 X1
- Left rear midrange speaker output (+) - terminal 11 X2
- Left rear midrange speaker output (-) - terminal 10 X2
- If greater than the specified range, test both circuits of the affected speaker for a short to voltage.

3. Radio ON, test for greater than 1 ohm between the appropriate signal circuit terminal listed below and ground:

- Left front tweeter speaker output (+) - terminal 4 X2
- Left front tweeter speaker output (-) - terminal 5 X2
- Right front tweeter speaker output (+) - terminal 7 X2
- Right front tweeter speaker output (-) - terminal 6 X2
- Left rear speaker output (+) - terminal 16 X2
- Left rear speaker output (-) - terminal 8 X2
- Right rear speaker output (+) - terminal 15 X2
- Right rear speaker output (-) - terminal 14 X2
- Front center speaker output (+) - terminal 13 X2
- Front center speaker output (-) - terminal 12 X2
- Left rear subwoofer speaker output (+) - terminal 5 X1
- Left rear subwoofer speaker output (-) - terminal 6 X1
- Right front speaker output (+) - terminal 7 X1

- Right front speaker output (-) - terminal 3 X1
 - Left front speaker output (+) - terminal 1 X1
 - Left front speaker output (-) - terminal 2 X1
 - Right front speaker output (+) - terminal 7 X1
 - Right front speaker output (-) - terminal 3 X1
 - Left rear midrange speaker output (+) - terminal 11 X2
 - Left rear midrange speaker output (-) - terminal 10 X2
 - If less than the specified range, test both circuits of the affected speaker for a short to ground.
4. If all circuits test normal, reconnect all harness connectors at the amplifier.
 5. Ignition ON, radio ON, disconnect the appropriate speaker.
 6. Test for 5.0-7.5 volts between the signal circuit terminals and ground.
 - If less than the specified range test the circuit for an open/high resistance. If the circuit tests normal, replace the amplifier.
 7. If the circuit tests normal, test or replace the appropriate speaker.

Repair Instructions

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

- **Speaker Replacement Reference**
- **Control Module References** for amplifier replacement, setup, and programming

DTC B125C: SATELLITE 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 B125C 01

Satellite Antenna 1 Circuit Short to Battery

DTC B125C 02

Satellite Antenna 1 Circuit Short to Ground

DTC B125C 04

Satellite Antenna 1 Circuit Open Circuit

Circuit/System Description

The digital radio receiver, located inside the radio, receives digital radio information from the digital radio antenna located on the outside of the vehicle. The digital radio receiver is connected to the digital radio antenna via a shielded coax cable.

Conditions for Running the DTC

This DTC is run every 300 milliseconds.

Conditions for Setting the DTC

The radio detects a circuit fault in the digital radio antenna.

Action Taken When the DTC Sets

The radio displays No XM Signal or Check Antenna.

Conditions for Clearing the DTC

- A current DTC clears when the condition for setting the DTC is no longer present.
- A history DTC clears after 100 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

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Description and Operation

Radio/Audio System Description and Operation

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

Special Tools

EL-48028 Digital Radio Test Antenna

Circuit System Verification

With the vehicle outside in an area with an unobstructed view of the southern sky, tune to XM. Verify XM reception is clear and the No XM Signal message is not displayed on the radio.

Circuit/System Testing

1. Ignition OFF, disconnect the disconnect the digital radio antenna coax from the radio. Connect the **EL-48028** digital radio test antenna to the radio and place on the roof of the vehicle.
2. Ignition ON, radio tuned to XM channel 1. Verify DTC B125C is not set as current and XM reception is improved.
 - If DTC B125C is set as current or the reception is not improved, replace the radio.
3. Ignition OFF, reconnect the antenna coax cable at the radio. Disconnect the antenna coax cable from the digital radio antenna.
4. Ignition ON, radio ON, test for 4.5-5.5 V between the antenna coax cable center terminal and an outer shield.
 - If less than the specified range, test the antenna coax cable for an open/high resistance.
 - If greater than the specified range, test the antenna coax cable for a short to voltage.
5. If all circuits test normal, replace the digital radio antenna.

Repair Instructions

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

- **Digital Radio, Mobile Telephone, and Vehicle Location Base Replacement**
- **Control Module References** for radio replacement, setup, and programming

DTC B1265: SWITCHED 14 VOLT PERFORMANCE 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 Descriptor

DTC B1265 02

Switched 14 Volt Performance Short to Ground

Circuit/System Description

When the navigation radio is on, a discrete 12-volt signal is supplied on the Entertainment Remote Enable Signal circuit to the Display Module, Display Actuator, Antenna module, and Amplifier (UQA). This signal is

used to control the power state of the modules.

Conditions for Running the DTC

The following are conditions that must be present in order for the navigation radio to enable diagnostics:

- The ignition must be in the RUN or ACC position.
- The system voltage is at least 9.5 volts and no more than 15.5 volts.

Conditions for Setting the DTC

- The navigation radio detects a short to ground on the Entertainment Remote Enable Signal circuit.
- All the above conditions are present for greater than 250 mS.

Action Taken When the DTC Sets

The Display Module, Display Module Actuator, Antenna module, and Audio Amplifier (UQA) may become inoperative.

Conditions for Clearing the DTC

- The condition for setting the DTC no longer exists.
- A history DTC clears after 50 malfunction-free ignition cycles.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the navigation radio.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the navigation radio.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Navigation System Description and Operation

Electrical Information Reference

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

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: The ignition circuit controls multiple modules/components. Each of the modules will need to be disconnected if the ignition circuit test fails for a short to voltage or short to ground. Disconnect one module/component at a time while testing the ignition circuit for a short to voltage or short to ground. If the fault is no longer present when disconnecting a module/component replace that module/component. If the fault is still present with all the module/component disconnected repair the circuit.

1. Ignition OFF, disconnect one of the connectors listed below at an inoperative module/component:
 - Antenna Module
 - Radio/HVAC Display X1
 - Radio/HVAC Display X2
 - Audio Amplifier X3 (UQA only)
2. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal listed below and ground.
 - Antenna Module - terminal 1
 - Radio/HVAC Display X1 - terminal 4
 - Radio/HVAC Display X2 - terminal 3
 - Audio Amplifier (UQA only) - terminal 8
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance. If the circuit tests normal replace the Radio.
3. If all circuits test normal, replace the module/component that was disconnected in step 1.

Repair Instructions

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

- **Control Module References** for radio and amplifier replacement, programming, and Setup
- **Radio Antenna Module Replacement (Wagon)**, **Radio Antenna Module Replacement (Coupe)** for radio antenna module replacement
- **Radio, Video, and Audio Player and Navigation Information Display Replacement** for navigation display replacement

DTC B1271: THEFT LOCKED

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 B1271 00

Theft Locked

Circuit/System Description

This DTC is generated by the module when the Theft Lock is activated. This occurs when the VIN as received over the data communication circuit and the VIN as stored in the module memory do not match. This also occurs when no VIN is received over the data communication circuit. The only circuit required is the communication line.

Conditions for Running the DTC

This DTC test runs when the radio changes from OFF to ON.

Conditions for Setting the DTC

This DTC is generated by the module when the VIN as received over the data communication circuit and the VIN as stored in the module memory do not match. This also occurs if no VIN is received over the data communication circuit.

Action Taken When the DTC Sets

The radio does not function. The radio will display indicate that Theftlock is active.

Conditions for Clearing the DTC

Re-calibration with the correct calibrations for the vehicle and cycling the radio to OFF then to ON will clear the DTC if there is no damage to the radio.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System 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

Perform the appropriate radio programming or setup as directed in **Control Module References** .

- If the DTC resets, replace the radio..

Repair Instructions

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

Control Module References for radio replacement, setup, and programming.

DTC B1278 OR B1279: AUXILIARY INPUT SIGNAL

Diagnostic Instructions

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

DTC Descriptors

DTC B1278 01

Auxiliary Input 1 Signal Circuit Short to Battery

DTC B1278 02

Auxiliary Input 1 Signal Circuit Short to Ground

DTC B1279 01

Auxiliary Input 2 Signal Circuit Short to Battery

DTC B1279 02

Auxiliary Input 2 Signal Circuit Short to Ground

Circuit/System Description

A remote 3.5 mm auxiliary stereo jack allows playback of audio signals from remote devices (e.g., laptop computer, IPOD, MP3 player, etc.). When a remote devices audio mini-plug is inserted in the remote auxiliary jack, an internal mechanical switch closes completing the aux jack detect circuit to the radio. The radio automatically detects the input through the circuit and the device begins playing. The radio receives the devices audio signals on the auxiliary input 1 (left) signal circuit and auxiliary input 2 (right) signal circuit.

Conditions for Running the DTC

The following are conditions that must be present in order for the radio to enable diagnostics:

- The ignition must be in the RUN or ACC position.
- The system voltage is at least 9.5 volts and no more than 15.5 volts.

Conditions for Setting the DTC

- The radio detects a short to battery on the auxiliary input 1 signal circuit or auxiliary input 2 signal circuit.
- The radio detects a short to ground on the auxiliary input 1 signal circuit or auxiliary input 2 signal circuit.
- All the above conditions are present for greater than 250 mS.

Action Taken When the DTC Sets

No audio is heard from the remote audio device.

Conditions for Clearing the DTC

- The conditions for setting the DTC are no longer present on the auxiliary input signal circuits.
- A history DTC clears after 50 malfunction-free ignition cycles.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module.
- If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the auxiliary audio jack harness connector.
2. Ignition ON, test for less than 1 volt between the left auxiliary audio signal terminal 6, to ground.
 - If greater than the specified value, test the circuit for a short to voltage. If the circuit tests normal, replace the radio.
3. Test for less than 1 volt between the right auxiliary audio signal terminal 7, to ground.
 - If greater than the specified value, test the circuit for a short to voltage. If the circuit tests normal, replace the radio.
4. Test for less than 1 volt between the auxiliary audio common signal terminal 5, to ground.
 - If greater than the specified value, test the circuit for a short to voltage. If the circuit tests normal, replace the radio.
5. Ignition OFF, test for infinite resistance from the left auxiliary audio signal terminal 6, to ground.
 - If less than the specified value, test the circuit for a short to ground. If the circuit tests normal, replace the radio.
6. Test for infinite resistance from the right auxiliary audio signal terminal 7, to ground.
 - If less than the specified value, test the circuit for a short to ground. If the circuit tests normal, replace the radio.
7. If all of the circuits test normal, replace the auxiliary audio jack.

DTC B128A: MONO AUDIO SIGNAL CIRCUIT

Diagnostic Instructions

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

DTC Descriptors

DTC B128A 01

Mono Audio Signal Circuit Short to Battery

DTC B128A 02

Mono Audio Signal Circuit Short to Ground

Circuit/System Description

When a OnStar® key press is made, a serial data message is sent to the audio system to mute all radio functions and transmit OnStar® originated audio. After the audio is muted, the OnStar® signals are transmitted to the audio system on the mono audio signal out circuit, and returned to the module on the mono audio signal in circuit.

Conditions for Running the DTC

The following are conditions that must be present in order for the navigation radio to enable diagnostics:

- The ignition must be in the RUN or ACC position.
- The system voltage is at least 9.5 volts and no more than 15.5 volts.

Conditions for Setting the DTC

- The navigation radio detects a short to battery on the mono audio signal circuit.
- The navigation radio detects a short to ground on the mono audio signal circuit.
- All the above conditions are present for greater than 250 mS.

Action Taken When the DTC Sets

No audio is heard from the OnStar module.

Conditions for Clearing the DTC

- The conditions for setting the DTC are no longer present on either mono audio signal circuit.
- A history DTC clears after 50 malfunction-free ignition cycles.

Diagnostic Aids

- This DTC may be stored as a history DTC without affecting the operation of the module.

- If stored only as a history DTC and not retrieved as a current DTC, do not replace the module.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

If this DTC is retrieved as a current DTC, replace the module that set the DTC.

DTC B128D: VIDEO DISPLAY POSITION SIGNAL

Diagnostic Instructions

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

DTC Descriptors

DTC B128D 01

Video Display Position Signal Short to Battery

DTC B128D 02

Video Display Position Signal Short to Ground

DTC B128D 04

Video Display Position Signal Open Circuit

Circuit/System Description

Pressing the NAV button, located on the Infotainment Faceplate Control Module or faceplate, sends a 5-volt signal on the video display position control circuit to the Display Module Actuator. The 5-volt signal sets the position of the Display Module Actuator commanding the display to the Up position. Pressing the NAV button again removes the signal on the circuit commanding the display to the Down position.

When the display is commanded to the Up position, the motor controller, located in the actuator, sends a 5-volt signal on the video display position signal circuit to the navigation radio. This signal is read by the radio in order to know which graphics to render on the touch-screen display.

Conditions for Running the DTC

The following are conditions that must be present in order for the navigation radio to enable diagnostics:

- The ignition must be in the RUN or ACC position.
- The system voltage is at least 9.5 volts and no more than 15.5 volts.

Conditions for Setting the DTC

All the below conditions are present for greater than 250 mS:

- The navigation radio detects a short to battery on the popup position sense circuit.
- The navigation radio detects a short to ground on the popup position sense circuit.
- The navigation radio detects an open on the popup position sense circuit

Action Taken When the DTC Sets

The Display Module Actuator is inoperative.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition ON, place the navigation display in the down position.
2. Ignition OFF, disconnect the X4 harness connector at the radio.
3. Ignition ON, test for less than 1 volt between signal terminal 13 and ground.
 - If greater than specified range, test the signal circuit for a short to voltage. If circuit tests normal, replace the navigation display.
4. Ignition OFF, test for infinite resistance between the signal terminal 13 and ground.
 - If less than specified range, test the signal circuit for a short to ground. If circuit tests normal, replace the navigation display.
5. Ignition OFF, disconnect the X2 harness connector at the radio/HVAC display.
6. Test for less than 5 ohms between the signal circuit terminal 13 X4 at the radio and terminal 5 X2 at the navigation display
 - If greater than specified value, test the circuit for an open/high resistance.
7. If the circuit tests normal, replace the radio.

Repair Instructions

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

- **Radio, Video, and Audio Player and Navigation Information Display Replacement**
- **Control Module References** for radio replacement, setup, and programming

DTC B1283-B1286: TELEVISION ANTENNA 1-4

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 B1283 00

Television Antenna 1 Performance

DTC B1284 00

Television Antenna 2 Performance

DTC B1285 00

Television Antenna 3 Performance

DTC B1286 00

Television Antenna 4 Performance

Circuit/System Description

The TV antenna signal circuits consists of 4 individual coaxial cables that carry the TV signal information received by the TV antenna through the TV antenna amplifier to the TV antenna module.

Conditions for Running the DTC

- Ignition ON.
- Battery voltage must be between 9-16 volts.

Conditions for Setting the DTC

The TV antenna module detects a open or short to ground on one or more of the 4 TV antenna coax cables for 20 seconds.

Action Taken When the DTC Sets

The TV antenna module disables all 4 coax cables when a short to ground is detected. When the TV antenna detects an open/high resistance in one or more TV antenna coax inputs, the unaffected TV antenna coax inputs will continue to operate.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- The DTC clears after the TV function has been cycled OFF then ON.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the appropriate antenna harness connector at the TV antenna module and the harness connector at the TV antenna amplifier.
2. Test for less than 5 ohms of resistance between the two ends of the coax cable center conductor.
 - If greater than the specified range, replace the antenna coax cable.
3. Test for less than 5 ohms of resistance between the two ends of the coax cable outer shield.
 - If greater than the specified range, replace the antenna coax cable.
4. Test for infinite resistance between the antenna coax center conductor and the outer shield.
 - If less than the specified range, replace the antenna coax cable.
5. Connect the harness connector at the TV antenna module.
6. Ignition ON, TV ON, wait 20 seconds, test for more than 1 volt at the coax cable center conductor terminal 2.
 - If less than the specified value, replace the TV antenna module.
7. Ignition OFF, disconnect the harness connector at the appropriate TV antenna.
8. Test for less than 5 ohms of resistance between the two ends of the TV antenna coax cable center conductor.
 - If greater than the specified range, replace the TV antenna coax cable.
9. Test for less than 5 ohms of resistance between the two ends of the TV antenna coax cable outer shield.
 - If greater than the specified range, replace the TV antenna coax cable.
10. Test for infinite resistance between the TV antenna coax center conductor and the outer shield.

- If less than the specified range, replace the TV antenna coax cable.
- 11. Ignition OFF, TV OFF, connect the harness connector at the TV antenna amplifier.
- 12. Ignition ON, TV ON, wait 20 seconds, test for more than 1 volt at the TV antenna coax cable center conductors.
 - If less than the specified value, replace the TV antenna amplifier.
- 13. If all circuits test normal, replace the inoperative TV antenna.

Repair Instructions

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

- **Television Antenna Amplifier Replacement**
- **Television Antenna Cable Replacement**

DTC B1287: AMPLIFIER CONTROL SIGNAL

Diagnostic Instructions

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

DTC Descriptors

DTC B1287 01

Amplifier Control Signal Circuit Short to Battery

DTC B1287 02

Amplifier Control Signal Circuit Short to Ground

DTC B1287 04

Amplifier Control Signal Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Amp Control	DTC B1287 02,**	DTC B1287 04,**	DTC B1287 01,*	-
* No audio output.				
** 4 Channel unmute, possible noise in speakers when radio muted or turned off				

Circuit/System Description

The radio amp control circuit provides varying pulse width modulated (PWM) signals to control overall muting of the amplifier. The PWM signals are varying duty cycle percentages ranging from 0-100 percent. A low duty cycle unmutes all amplifier channels and a high duty cycle mutes all amplifier channels. The radio monitors the amp control circuit for faults. When a fault is detected the radio sets the appropriate DTC.

Conditions for Running the DTC

The following are conditions that must be present in order for the radio to enable the diagnostics.

- The radio is in ACCESSORY, RUN, or RAP power mode.
- The system voltage is at least 9 volts and no more than 16 volts.

Conditions for Setting the DTC

The radio detects a fault on the Amp Control circuit 400 ms after radio activates the Remote Enable circuit.

Action Taken When the DTC Sets

Radio sets the DTC and continues to output correct state.

Conditions for Clearing the DTC

- The condition must be corrected.
- A history DTC clears after 100 malfunction-free ignition cycles.
- The radio receives the clear code command from the scan tool.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Electrical Information Reference

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

Circuit/System Verification

Verify the audio system performance by adjusting the fade and balance of the speaker outputs.

Circuit/System Testing

RPO Code UQA

1. Ignition OFF, disconnect the radio X1 harness connector and the X3 amplifier harness connector.
2. Ignition ON, test for less than 1 volt on the radio audio mute signal terminal 37 X1 at the radio.
 - o If greater then the specified value, test the circuit for a short to voltage.
3. Test for less than 5 ohms between the radio X1 terminal 37 to the amplifier X3 terminal 11.
 - o If greater then specified range, test the circuit for an open/high resistance.

Repair Instructions

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

Control Module References for radio replacement, setup, and programming

DTC B2455: CELLULAR PHONE MICROPHONE

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** provide an overview of each diagnostic category.

DTC Descriptors

DTC B2455 02

Cellular Phone Microphone Circuit Short to Ground

DTC B2455 04

Cellular Phone Microphone Circuit Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cellular Microphone High Signal	B2455 02	B2455 04	-	-
Cellular Microphone Low Signal	-	B2455 04	1	-
1. OnStar Microphone Inoperative - Caller Cannot Be Heard				

Circuit/System Description

The vehicle communication interface control module provides the cellular phone microphone with a supplied voltage on the cellular phone microphone high signal circuit. When the microphone is in use, voice data from the user is sent back to the vehicle communication interface control module on the microphone high signal circuit. The vehicle communication interface control module provides a ground for the cellular phone microphone via the low signal wire.

Conditions for Running the DTC

- The ignition must be in the RUN or ACC position.
- The system voltage is at least 9.5 V and no more than 15.5 V.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

B2455 02

The vehicle communication interface control module detects an short to ground in the cellular phone microphone high signal circuit for 10 seconds or greater.

B2455 04

The following conditions will set this DTC:

- The vehicle communication interface control module detects an open/high resistance in the cellular phone microphone signal circuit for 10 seconds or greater.
- The vehicle communication interface control module detects an open/high resistance in the microphone low signal circuit for 10 seconds or greater.

Action Taken When the DTC Sets

- The OnStar® status LED turns red.
- The vehicle communication interface control module will not receive a signal from the cellular phone microphone.
- Calls can be placed but the caller cannot be heard.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the cellular phone microphone.
2. Ignition ON, test for 8.0-10.5 V between the microphone high signal circuit terminal 3 and ground.
 - If less than the specified range, test the circuit for a short to ground, shorted together, or an open/high resistance. If the circuit tests normal, replace the vehicle communication interface control module.
 - If greater than the specified range, test the circuit for a short to voltage. If the circuit tests normal, replace the vehicle communication interface control module.
3. Test for 8.0-10.5 V between the microphone high signal circuit terminal 3 and the microphone low signal circuit terminal 2.
 - If less than the specified range, test the microphone low signal circuit for a short to ground, shorted together, or an open/high resistance. If the circuit tests normal, replace the vehicle communication interface control module.
 - If greater than the specified range, test the microphone low signal circuit for a short to voltage. If the circuit tests normal, replace the vehicle communication interface control module.
4. If all circuit test normal, replace the cellular phone microphone.

Repair Instructions

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

- **Mobile Telephone Microphone Replacement**
- **Control Module References** for vehicle communication interface control module replacement, setup, and programming

DTC B2462 (NAVIGATION RADIO): GLOBAL POSITIONING SYSTEM

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 B2462 02

Global Positioning System (GPS) Short to Ground

DTC B2462 04

Global Positioning System (GPS) Open Circuit

Circuit Description

The global positioning system (GPS) antenna is connected to the navigation radio by a coaxial cable. The antenna cable also provides a path for DC current for powering the antenna.

Conditions for Running the DTC

- Radio ON
- Battery voltage between 9-16 volts
- The navigation radio tests the GPS antenna every 10 seconds

Conditions for Setting the DTC

B2462 02

The navigation radio detects a short to ground in the GPS antenna signal circuit.

B2462 04

The navigation radio detects an open/high resistance in the GPS antenna signal circuit.

Actions Taken When the DTC Sets

- The radio uses the last reported position and the vehicle speed signal to calculate the vehicle position.
- Route guidance may be inaccurate.
- Turn by turn navigation may be inaccurate or inoperative.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Electrical Information Reference

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

Scan Tool Reference

Control Module References

Circuit/System Testing

IMPORTANT: The global positioning system (GPS) requires a clear line of sight to the sky to operate properly. In most cases the GPS will not have reception near tall buildings or inside structures.

1. Ignition OFF, disconnect the GPS antenna coax cable from the navigation radio.
2. Ignition ON, test for 4.5-5.5 volts between the radio coax cable connection center conductor and ground.
 - If not within the specified range, replace the radio.
3. If all circuits test normal, replace the GPS antenna.

Repair Instructions

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

- **Navigation Antenna Replacement (With UAV or U2Y)**
- **Control Module References** for radio replacement, setup, and programming

DTC B2470: CELLULAR PHONE 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 B2470 02

Cellular Phone Antenna Circuit Malfunction Short to Ground

DTC B2470 04

Cellular Phone Antenna Circuit Malfunction Open Circuit

Circuit/System Description

The cellular and digital radio antenna is connected to the vehicle communication interface module (VCIM) with a RG-58 coax cable. The VCIM polls the data from the cellular and digital radio antenna once every second.

Conditions for Running the DTC

- Ignition in the RUN or ACC position.
- System voltage is between 9.5 volts and 15.5 volts.
- The above conditions are present for greater than 1 second.

Conditions for Setting the DTC

- The VCIM does not detect the presence of a cellular and digital radio antenna.
- The above conditions are present for greater than 1 second.

Action Taken When the DTC Sets

- The vehicle is unable to connect to the OnStar® Call Center.
- The OnStar® status LED turns red.

Conditions for Clearing the DTC

- The VCIM detects the presence of a cellular and digital radio antenna.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

EL-49903 GM OnStar Antenna Diagnostic Tool Kit

Circuit/System Verification

Verify that the cellular and digital radio antenna and cellular and digital radio antenna coupling assembly are not damaged.

- If the antenna assembly is damaged, replace the cellular and digital radio antenna.

Circuit/System Testing

NOTE: **The vehicle may be equipped with sectioned coax. Test each section and replace only the faulty section, not the entire length of coax.**

1. Ignition OFF, disconnect the GPS and cellular coax cable connector at the VCIM.
2. Using the EL-49903-3 kit (EL-49903-5 adapter and EL-49903-4 coax cable), connect the **EL-49903** GM OnStar antenna diagnostic tool kit to the VCIM.
3. Clear the DTCs and operate the vehicle within the conditions for running the DTC. Verify DTC B2470 does not set.
 - If the DTC sets, replace the VCIM.
4. Ignition OFF, disconnect the **EL-49903** GM OnStar antenna diagnostic tool kit from the VCIM and perform the coax cable test on the coax cable between the VCIM and the cellular and digital radio antenna.
 - If the coax cable does not pass the test, replace the coax cable.

5. If all circuits test normal, replace the cellular and digital radio antenna.

Component Testing

CAUTION: Refer to Test Probe Caution

NOTE: Before testing the coax cable, check the cable exterior for being pinched, cut, damaged, or having loose connections at the components, which can cause reception issues.

To prevent false reading when testing the center coax terminals, use care not to ground the test probe on the outer housing/shield.

Coax Cable Test

1. Ignition OFF, disconnect the GPS and cellular phone coax cable at both components.
2. Test both for less than 5 ohms between both ends of the coax cables center terminals.
 - If greater than the specified range, replace the failed coax cable.
3. Test for greater than 10k ohms between the coax cable center wire and the outer coax shield.
 - If less than the specified range, replace the coax cable.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Digital Radio, Mobile Telephone, and Vehicle Location Base Replacement
- Control Module References for VCIM replacement, setup, and programming

DTC B2476 OR B2482: CELLULAR PHONE SELECT SERVICE SWITCH

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 B2476 04

Cellular Phone Select Service Switch Open

DTC B2476 59

Cellular Phone Select Service Switch Protection Time-out

DTC B2482 00

Cellular Phone Select Service Switch Range/Performance

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
10 V Reference	B2476 04	B2476 04	B2476 04	-
Signal Terminal 11	1	B2476 04	B2476 59	B2476 59, B2482 00
Ground	-	B2476 04	-	-
1. OnStar® Buttons Inoperative				

Circuit/System Description

The OnStar® button assembly consists of 3 buttons: Call/Answer, OnStar® Call Center, and OnStar® Emergency. The telematics communication interface control module supplies the OnStar® button assembly with 10 V via the 10 V reference circuit . Each of the buttons, when pressed, completes the circuit across a resistor allowing a specific voltage to be returned to the telematics communication interface control module over the keypad signal circuit. Depending upon the voltage range returned, the telematics communication interface control module is able to identify which button has been pressed.

Conditions for Running the DTC

- Ignition ON.
- Battery voltage must be between 9-16 V.

Conditions for Setting the DTC

B2476 04

The telematics communication interface control module detects a short to voltage or an open/high resistance on the keypad 10 V reference circuit.

B2482 and B2476 59

The telematics communication interface control module detects a valid signal on the keypad signal circuit for longer than 15 seconds. If one of the OnStar® buttons is held or stuck for 15 seconds or greater, the telematics communication interface control module will set this DTC.

Action Taken When the DTC Sets

- The OnStar® status LED turns red.
- No calls can be placed.

- The telematics communication interface control module will ignore all inputs from the OnStar® button assembly.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

NOTE: **Contact the OnStar® Call Center first before pressing the emergency button in order to notify them of the test.**

1. Ignition ON.
2. Verify that each button of the S51 Telematics Button Assembly operates normally by pressing each button individually.
 - **If none of the buttons operate normally**

Refer to Circuit/System testing

- **If some, but not all, of the buttons operate normally**

Test or replace the A10 Inside Rearview Mirror

- **If all of the buttons operate normally**

3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A10 Inside Rearview Mirror. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the ground circuit terminal 8 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. Test for 8.0-10.5 V between the 10 V reference circuit terminal 12 and ground.
 - **If less than 8.0 V**
 1. Ignition OFF, disconnect the harness connector at the K73 Telematics Communication Interface Control Module.
 2. Test for infinite resistance between the 10 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the 10 V reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K73 Telematics Communication Interface Control Module.
 - **If greater than 10.5 V**
 1. Ignition OFF, disconnect the harness connector at the K73 Telematics Communication Interface Control Module, ignition ON.
 2. Test for less than 1 V between the 10 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K73 Telematics Communication Interface Control Module.
 - **If between 8.0-10.5 V**
5. Ignition OFF.
6. Test for 500-900 ohms between the signal circuit terminal 11 and ground.
 - **If less than 500 ohms**
 1. Disconnect the X1 harness connector at the K73 Telematics Communication Interface Control

Module.

2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K73 Telematics Communication Interface Control Module.
 - **If greater than 900 ohms**
1. Disconnect the X1 harness connector at the K73 Telematics Communication Interface Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Ignition OFF.
4. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K73 Telematics Communication Interface Control Module.
 - **If between 500-900 ohms**
7. Test or replace the A10 Inside Rearview Mirror.

Repair Instructions

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

- **Inside Rearview Mirror Replacement**
- **Control Module References** for telematics communication interface control module replacement, programming, and setup.

DTC B2485: WIRELESS COMMUNICATION ANTENNA CIRCUIT

Diagnostic Instructions

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

DTC Descriptors

DTC B2485 02

Wireless Communication Antenna Circuit Short to Ground

DTC B2485 04

Wireless Communication Antenna Circuit Open Circuit

Circuit/System Description

The Bluetooth ® antenna is a small fixed antenna connected directly to the communication interface module (CIM) and is used to send and receive signals from a Bluetooth ® enabled cellular phone. The antenna utilizes no cabling and is not external to the vehicle.

Conditions for Running the DTC

- Ignition ON.
- Battery voltage must be between 9-16 V.
- The CIM tests the antenna once every second.

Conditions for Setting the DTC

B2485 02

The CIM detects a short to ground in the Bluetooth ® antenna.

B2485 04

The CIM detects an open/high resistance in the Bluetooth ® antenna.

Actions Taken When the DTC Sets

- The OnStar ® status LED turns red.
- Bluetooth ® functionality is disabled.

Conditions for Clearing the DTC

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

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar Description and Operation

Electrical Information Reference

- **Circuit Testing**

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Verify the Bluetooth ® antenna is properly connected to the CIM and is not damaged.
 - If the antenna is disconnected or damaged, repair or replace as necessary.
2. Ignition ON, verify the DTC B2485 is not set .
 - If the DTC is set, replace the Bluetooth ® antenna. Clear the DTC and cycle the ignition OFF then back ON. If the DTC resets as current, replace the CIM.

Repair Instructions

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

- **Wireless Communication Interface Antenna Replacement**
- **Control Module References** for CIM replacement, setup, and programming

SYMPTOMS - CELLULAR COMMUNICATION

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

1. Perform the **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 **OnStar Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Radio/Audio System. Refer to **Checking Aftermarket Accessories** .
- Inspect for 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:

- **Bluetooth Malfunction**
- **OnStar Global Positioning System (GPS) Data Not Current or Inaccurate**
- **OnStar Microphone Malfunction**
- **OnStar Audio Malfunction**
- **OnStar Button LED Malfunction (without DRC or DRG), OnStar Button LED Malfunction (with DRC or DRG)**
- **OnStar Call Center Remote Function Requests Malfunction**
- **OnStar Button Malfunction**
- **Unable to Contact OnStar Call Center**
- **OnStar Voice Recognition Malfunction**
- **OnStar Steering Wheel Control Functions Malfunction**

SYMPTOMS - ENTERTAINMENT

IMPORTANT: The following steps must be completed before using the symptom table.

1. Perform the **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 **Radio/Audio System Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Radio/Audio System. Refer to **Checking Aftermarket Accessories**.
- Inspect for 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:

- **Radio Poor Reception**

- **Radio Displays LOC, LOCKED, or CODE**
- **Noise Compensated Volume Malfunction**
- **Digital Radio Poor or No Reception**
- **Speaker Malfunction**
- **No Global Positioning System (GPS) Reception**

AUXILIARY AUDIO INPUT 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** provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Auxiliary Audio Common Signal	-	6	-	-
Auxiliary Detection Signal	5	6	-	-
Left Auxiliary Audio Signal	2	2	2, 4	-
Right Auxiliary Audio Signal	3	3	3, 4	-
USB Cable	1	1	1	-
1. USB port Inoperative 2. No left side audio from device connected to AUX jack 3. No right side audio from device connected to AUX jack 4. Noticeable distortion may be present in affected audio channel 5. Radio does not detect auxiliary device connection, AUX not available as input selection 6. AUX always available as an input selection, with or without auxiliary device connected				

Circuit/System Description

Auxiliary Audio Input Jack

The 3.5 mm (1/8 in.) auxiliary audio input jack is located in the console. All circuits from the auxiliary jack are connected directly to the radio. When a device is connected to the auxiliary jack an internal switch opens. The radio detects the device and switches to AUX as the audio source. Audio signals from the device are sent to the radio from the auxiliary input jack via the left, right, and common audio signal circuits.

USB Port

The vehicle may be equipped with a USB port in the console. This port allows USB connectivity to the infotainment system from portable media players or a USB storage device (memory stick/flash drive). When a device is connected to the USB port, the system detects the device and switches to USB as the audio source.

Once connected, the device can be controlled from the radio controls.

The USB port is connected to the radio via a standard USB cable. Mini type USB connectors are used to connect the cable at the USB port and at the radio or multimedia player interface module. Standard USB male to female connections are typically used for connecting USB cables together where an in-line connection is required. An in-line cable connection is typically found between the console and I/P harness.

Not all portable media player devices are compatible. Refer to the owner's manual for information on USB devices, control, and operation.

Diagnostic Aids

Auxiliary Audio Input Jack

- When a device is first connected to the 3.5 mm (1/8 in.) input jack the infotainment system automatically switches to that device. If an auxiliary device has already been connected, press the AUX or CD/AUX button to select the device.
- If the system detects the device, but the audio is not heard or is not clear, attempt to connect the device using a different cable; cables can deteriorate over time or become damaged.
- Playback of an audio device that is connected to the 3.5 mm jack can only be controlled using the controls on the device.
- The volume control on the device may need to be adjusted to ensure sufficient playback volume through the infotainment system.

USB

- When a device is first connected to the USB port, the infotainment system automatically switches to that device. If an auxiliary device has already been connected, press the AUX or CD/AUX button to select the device.
- A low battery condition in a portable media player may not allow the device to connect to the system, or can create communication issues with the device. Verify the device battery state of charge and re-charge or replace as needed.
- Connect the device directly to the USB port if possible. Only use a cable if it is required to connect the device. The use of extension cables can cause communication issues.
- If a cable is required for connection, attempt to connect the device using a different cable; cables can deteriorate over time or become damaged.
- Attempt audio playback from multiple USB devices when diagnosing USB concerns. Device compatibility can vary based on vehicle equipment. If the infotainment system is capable of operating any USB type device, the cause of the concern is not with the vehicle system. The inoperative device(s) may be incompatible or contain no recognized media types.
- If a 'Device Not Supported' or similar type error message is displayed, this indicates the system has connected to the device but cannot communicate with it properly. This does not indicate an issue with the vehicle system. The device may be incompatible, may require a 'reset', or may require an update to its software/firmware.
- If a 'No Supported Data Found' or similar type error message is displayed, this indicates the system has

connected to the device and is communicating, but cannot find any compatible files/data. This does not indicate an issue with the vehicle system. Verify the device contains compatible media/file types.

- Poor connections or damaged USB cables can cause intermittent or no operation of USB devices. Inspect connectors, terminals, and cables for damage and replace components as necessary. Ensure all USB inline connections and connections at components are fully seated and connector position retainers/locks are secure.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System 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

- **EL-50334-20** Multi-Media Interface Tester (MIT)
- **EL-50334-50** USB Cable and Adapter Kit

For equivalent regional tools, refer to **Special Tools, Special Tools (MIT tool instructions)**

Circuit/System Verification

Auxiliary Audio Input Jack

1. Verify no DTCs are present.
 - **If any DTCs are present**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If no DTCs are present**

2. Ignition ON, radio ON.
3. Verify the infotainment system switches to AUX as the audio source with the **EL-50334-20** Multi-Media Interface Tester (MIT) connected to the auxiliary audio input jack.
 - **If the infotainment system does not switch to AUX as the audio source**

Refer to Circuit/System Testing - Auxiliary Input Jack.

- **If the infotainment system switches to AUX as the audio source**

4. Verify the audio from the **EL-50334-20** Multi-Media Interface Tester (MIT) is heard through the vehicle infotainment system while operating the test tool to begin audio playback.
 - **If audio is not heard from the test tool.**

Refer to Circuit/System Testing - Auxiliary Input Jack.

- **If audio is heard from the test tool.**

5. All OK

USB Port

1. Verify no DTCs are present.
 - **If any DTCs are present**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- **If no DTCs are present**

2. Ignition ON, radio ON.
3. Verify the infotainment system switches to USB as the audio source with the **EL-50334-20** Multi-Media Interface Tester (MIT) connected to the USB port.
 - **If the infotainment system does not switch to USB as the audio source**

Refer to Circuit/System Testing - USB Port.

- **If the infotainment system switches to USB as the audio source**

4. Verify the audio from the **EL-50334-20** Multi-Media Interface Tester (MIT) is heard through the vehicle infotainment system while operating the system to play audio from the test tool.
 - **If audio is not heard from the test tool.**

Refer to Circuit/System Testing - USB Port.

- **If audio is heard from the device**

5. All OK.

Circuit/System Testing

Auxiliary Audio Input Jack

1. Ignition OFF, disconnect the X1 harness connector at the X83 Auxiliary Audio Input. Ignition ON, radio ON.
2. Test for 2.5-3.5 V between the signal circuit terminal 5 and ground.
 - **If less than 2.5 V**
 1. Ignition OFF, disconnect the X1 harness connector at the A11 Radio.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the signal circuit end to end
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the A11 Radio.
 - **If greater than 3.5 V**
 1. Ignition OFF, disconnect the X1 harness connector at the A11 Radio, ignition ON.
 2. Test for less than 1 V between the detection circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the A11 Radio.
 - **If between 2.5-3.5 V**
3. Test for less than 1 V between the signal circuits listed below and ground:
 - Left auxiliary audio signal circuit terminal 1
 - Right auxiliary audio signal circuit terminal 2
 - Auxiliary audio common signal circuit terminal 3
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X1 harness connector at the A11 Radio. Ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the A11 Radio.
 - **If less than 1 V**
4. Ignition OFF, disconnect the X1 harness connector at the A11 Radio.
5. Test for infinite resistance between the signal circuits listed below and ground:
 - Auxiliary audio common signal circuit terminal 23
 - Left auxiliary audio signal circuit terminal 24
 - Right auxiliary audio signal circuit terminal 10
 - **If less than infinite resistance**

Repair the short to ground on the circuit.

- **If infinite resistance**

6. Test for less than 5 ohms between the signal circuit terminals listed below:

- A11 Radio terminal 24 X1 and the X83 Auxiliary Audio Input terminal 1 X1
- A11 Radio terminal 10 X1 and the X83 Auxiliary Audio Input terminal 2 X1
- A11 Radio terminal 23 X1 and the X83 Auxiliary Audio Input terminal 3 X1

- **If 5 ohms greater**

Repair the open/high resistance in the circuit.

- **If less than 5 ohms**

7. Replace the X83 Auxiliary Audio Input. Connect all harness connectors.

8. Connect and operate the **EL-50334-20** Multi-Media Interface Tester (MIT).

9. Verify the audio from the test tool is heard through the vehicle infotainment system.

- **If audio is not heard from the test tool**

Replace the A11 Radio.

- **If audio is heard from the test tool**

10. All OK.

USB Port

1. Ignition OFF, disconnect the USB cable connection at the A11 Radio.

NOTE: USB cables and adapters for the following tests are found in the EL-50334-50 USB Cable and Adapter Kit.

2. Connect the EL-50334-1 Type A male to Mini A male USB Cable to the A11 Radio. Connect the EL-50334-3 Type A female to Type A female adapter to the EL-50334-1 Cable.

3. Ignition ON, radio ON, connect the **EL-50334-20** Multi-Media Interface Tester (MIT) to the EL-50334-3 adapter.

4. Verify the infotainment system switches to USB as the audio source.

- **If the infotainment system does not switch to USB as the audio source**

Replace the A11 Radio.

- **If the infotainment system switches to USB as the audio source**

5. Ignition OFF, connect the vehicle USB cable to the A11 Radio. Disconnect the I/P to floor console inline USB cable connector.

NOTE: The EL-50334-3 or EL-50334-4 adapter may be required for the following test.

6. Ignition ON, radio ON, connect the **EL-50334-20** Multi-Media Interface Tester (MIT) to the I/P side of the inline USB cable connector.
7. Verify the infotainment system switches to USB as the audio source.

- **If the infotainment system does not switch to USB as the audio source**

Replace the I/P USB cable assembly.

- **If the infotainment system switches to USB as the audio source**

8. Ignition OFF, connect the I/P to floor console inline USB cable connector.
 9. Disconnect the USB cable at the X83 Auxiliary Audio Input. Connect the EL-50334-4 Type A female to Mini B female adapter to the USB cable.
 10. Ignition ON, radio ON, connect the **EL-50334-20** Multi-Media Interface Tester (MIT) to the EL-50334-4 adapter.
 11. Verify the infotainment system switches to USB as the audio source.
- **If the infotainment system does not switch to USB as the audio source**

Replace the console USB cable assembly.

- **If the infotainment system switches to USB as the audio source**

12. Test or replace the X83 Auxiliary Audio Input.

Repair Instructions

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

- **Control Module References** for radio replacement, programming, and setup.

BLUETOOTH 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** provide an overview of each diagnostic category.

Circuit/System Description

The Bluetooth ® antenna is a small fixed antenna connected directly to the communication interface module (CIM) and is used to send and receive signals from a Bluetooth ® enabled cellular phone. The antenna utilizes no cabling and is not external to the vehicle.

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth ® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone's information is deleted. For safety reasons, the pairing

process is disabled while the vehicle is moving.

Diagnostic Aids

- The purpose of this diagnostic is to verify the ability of the CIM to pair to a Bluetooth ® device.
- Before performing this test, verify compatibility of the cellular phone(s) the customer is attempting to use with the vehicle. Based on the cellular phone's service provider and the manufacturer's implementation of Bluetooth ®, not all phones support all available Bluetooth ® functionality. A vehicle and feature compatibility list will be provided via the GM Bluetooth ® website:
<http://www.onstar.com/web/Bluetooth/>
- If the vehicle passes the following tests and a compatible device is being used, the concern may be due to a device malfunction or an incomplete/improper pairing attempt.
- A Bluetooth ® test tool or equivalent can also be used to verify the ability of the customers cellular phone (s) to pair with another device.

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify DTC B2485 is not set.
 - If DTC B2485 is set , refer to **DTC B2485**.
2. Set up a Bluetooth ® test tool or equivalent.
3. Ignition ON, perform the discovery/search operation with the test tool. Verify the vehicle appears in the list of available devices.

- If the vehicle is not in the list of available devices, repeat the discovery/search operation. If the vehicle is still not in the list of available devices, replace the CIM.
- 4. Follow the instructions provided in the Vehicle Owners Manual for pairing a device. Verify successful pairing with the test tool.
 - If pairing is not successful, repeat the pairing process. If pairing is still not successful, replace the CIM.
- 5. Refer to Diagnostic Aids.

Repair Instructions

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

Control Module References for CIM replacement, programming and setup

DIGITAL RADIO POOR OR NO RECEPTION

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 digital radio receiver, located inside the radio, receives digital radio information from the digital radio antenna located on the outside of the vehicle. The digital radio receiver is connected to the digital radio antenna via a shielded coax cable.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System 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

EL-48028 Digital Radio Test Antenna

Circuit/System Verification

1. Tune to a strong AM or FM station and verify each speaker is producing clear and even sound, with no distortion.
 - If any speaker is not producing sound or the sound produced is distorted, refer to **Speaker Malfunction**.
2. With the vehicle outside in an area with an unobstructed view of the southern sky, tune to XM. Verify XM reception is clear and the No XM Signal message is not displayed on the radio.

Circuit/System Testing

1. Ignition OFF, disconnect the digital radio antenna coax from the radio. Connect the **EL-48028** digital radio test antenna to the radio and place on the roof of the vehicle. Move the vehicle outside in an area with an unobstructed view of the southern sky.
2. Ignition ON, radio tuned to XM channel 1, verify XM reception is clear and uninterrupted.
 - If reception is not clear, replace the radio.
3. Ignition OFF, reconnect the antenna coax cable at the radio. Disconnect the antenna coax cable from the digital radio antenna.
4. Ignition ON, radio ON, test for 4.5-5.5 V between the antenna coax cable center terminal and outer shield.
 - If less than the specified range, test the antenna coax cable for an open/high resistance.
 - If greater than the specified range, test the antenna coax cable for a short to voltage.
5. If all circuits test normal, replace the digital radio antenna.

Repair Instructions

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

- **Digital Radio, Mobile Telephone, and Vehicle Location Base Replacement**
- **Control Module References** for radio replacement, setup, and programming

DUAL DVD REAR SEAT ENTERTAINMENT HEADREST DISPLAY MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
DVD Control Module B+	-	1	-	-
Left Display B+	2	2	2	-
Right Display B+	3	3	3	-
Left Audio Signal (+)	4	5	4	-
Right Audio Signal (+)	6	7	6	-
Left DVD Video Signal (+)	8	8	8	-
Right DVD Video Signal (+)	9	9	9	-
Left Display Video Ground	8	8	8	-
Right Display Video Ground	9	9	9	-
Left Display Ground	-	2	2	-
Right Display Ground	-	3	3	-
DVD Control Module Ground	-	1	-	-
1. DVD Control Module inoperative, both displays inoperative. 2. Left display inoperative. 3. Right display inoperative. 4. Left audio distorted. 5. No sound from left audio. 6. Right audio distorted. 7. No sound from right audio. 8. Left display blank. 9. Right display blank.				

Circuit Description

The DVD displays are grounded and powered by the DVD control module. When a movie is playing, the video signals are sent from the player, to the DVD control module, and back to the display. This allows the other monitor to source the same video as the player with the disc.

Reference Information

Schematic Reference

Video System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Video Entertainment System Description and Operation (Dual Headrest DVD Systems)

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

One Display Inoperative

1. Ignition OFF, disconnect the X1 harness connector at the appropriate display.
2. Test for less than 5 ohms between the ground circuit terminal 5 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the DVD control module.
3. Ignition ON, test for B+ between the ignition voltage circuit terminal 6 and ground.
 - If less than the specified value, B+ circuit for an open/high resistance. If the circuit tests normal, replace the DVD control module.
4. Ignition OFF, reconnect the X1 harness connector, and disconnect the X2 harness connector at the display.
5. Ignition ON, test for 4.5-5.5 V between the terminals listed below and ground:
 - I2C Clock Signal - terminal 5
 - I2C Data - terminal 6
 - If less than specified range, test the signal circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the DVD control module.
 - If greater than specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the DVD control module.
6. If all circuits test normal, replace the appropriate display.

Both Displays Inoperative

1. Ignition OFF, disconnect the X1 harness connector at the DVD control module.
2. Test for less 5 ohms between the ground circuit terminal 1 and ground.
 - If the greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, test for B+ between the accessory voltage circuit terminal and ground.

- If less than the specified value, test the B+ circuit for a short to ground or an open/high resistance.
- 4. Ignition OFF, Reconnect the X1 harness connector at the DVD control module
- 5. Disconnect the X1 harness connector at the driver seat headrest.
- 6. Test for less than 5 ohms between the ground circuit terminal 5 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance. If the circuit tests normal, replace the DVD control module.
- 7. Ignition ON, test for B+ between the ignition voltage circuit terminal 6 and ground.
 - If less than the specified value, B+ circuit for an open/high resistance. If the circuit tests normal, replace the DVD control module.
- 8. Ignition OFF, reconnect the X1 harness connector, and disconnect the X2 harness connector at the display.
- 9. Ignition ON, test for 4.5-5.5 V between the terminals listed below and ground:
 - I2C Clock Signal - terminal 5
 - I2C Data - terminal 6
 - If less than specified range, test the signal circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the DVD control module.
 - If greater than specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the DVD control module.
- 10. If all circuits test normal, replace the appropriate display.

DUAL DVD REAR SEAT ENTERTAINMENT HEADREST DISPLAY INOPERATIVE - ONE OR MORE

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.

Reference Information

Schematic Reference

Video System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Electrical Information Reference

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

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

Circuit/System Testing

One Display Inoperative (Dual Display)

1. Turn ON the ignition, press the power button on the suspect display. Verify the suspect DVD display does not power up.
 - If the DVD display powers up but the screen is blank and will not play any DVDs, replace the DVD display.
2. At the DVD control module, touch a test lamp at the back of the suspect black or red connector between terminal 6 and ground. Verify that a test lamp illuminates between terminal 6 and ground.
 - If the test lamp does not illuminate, replace the DVD control module.
3. At the DVD control module, touch a test lamp at the back of the suspect black or red connector between terminal 5 and B+. Verify that a test lamp illuminates between terminal 5 and B+.
 - If the test lamp does not illuminate, replace the DVD control module.
4. Disconnect the suspect black or red connector from the suspect DVD display. At the black or red DVD display connector, Test for B+ at terminal 6.
 - If B+ is not present replace the DVD display harness.
5. At the black or red DVD display connector, test for less than 1.0 ohm between the ground circuit terminal 5 and ground.
 - If greater than the specified range, replace the DVD display harness.
 - If all circuits test normal replace the suspect DVD display.

Display Inoperative (Single Display) or Both Displays Inoperative (Dual Display)

1. Turn ON the ignition, press the power button on both suspect displays. Verify the suspect DVD displays do not power up.
 - If the DVD display powers up but the screen is blank and will not play any DVDs, replace the suspect DVD display.
2. Disconnect the 2 wire connector from the DVD control module. At the 2 wire harness connector, test for less than 1.0 ohm between the ground circuit terminal and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. At the DVD control module 2 wire harness connector, verify that a test lamp illuminates between the B+ circuit terminal and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Reconnect the 2 wire harness connector at the DVD control module
5. At the DVD control module, touch a test lamp at the back of the black or red connector between terminal 1 and ground. Verify that a test lamp illuminates between terminal 1 and ground.
 - If the test lamp does not illuminate, replace the DVD control module.

6. At the DVD control module, touch a test lamp at the back of the suspect black or red connector between terminal 2 and B+. Verify that a test lamp illuminates between terminal 2 and B+.
 - If the test lamp does not illuminate, replace the DVD control module.

Repair Instructions

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

Refer to Dual DVD Rear Seat Entertainment Headrest Package Installation

DUAL DVD REAR SEAT ENTERTAINMENT HEADREST AUDIO 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 Description

The infrared transmitter is internal to the DVD display and is grounded and powered by the DVD control module. When listening to the headphones, the infrared transmitter sends an infrared signal to the headphones. There are two channels on the headphones, the first channel is dedicated to the driver side video screen, and the other channel is dedicated to the passenger side. The audio that is sent over the DVD audio signal circuits is a varying AC voltage.

Reference Information

Schematic Reference

Video System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Video Entertainment System Description and Operation (Dual Headrest DVD Systems)

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

Dual DVD Rear Seat Entertainment Audio Malfunction - With FM Antenna

1. Turn ON the ignition, tune the radio to station 88.3, 88.7, 89.1, 89.5, 89.9, or 90.3MHz. Chose the station that has the least amount of regular audible radio reception.
2. Headrest DVD displays ON, insert a DVD and operate the DVD player in play mode.
3. DVD playing, DVD Surround Sound ON, set the DVD Player to the same station as the radio. Verify audio can be heard through the radio.
 - If the DVD audio can be heard review the system operation with the customer.
4. Verify the DVD player is in play mode.
5. At the DVD control module, test for AC voltage between terminal 6 and terminal 3 or 4 with a DMM at the back of the black or red connector.
 - If AC voltage is present replace the DVD control module.
6. Turn the DVD player off and disconnect both connectors from the DVD display that was playing the DVD.
7. Swap the two connectors on the display and swap the two corresponding connectors at the DVD control module. Verify the DVD audio now operates normally.
 - If the DVD audio now operates normally, replace the DVD display harness.
 - If the DVD audio is still inoperative replace the suspect DVD display.

Dual DVD Rear Seat Entertainment Audio Malfunction - Without FM Antenna

1. Turn ON the ignition, tune the radio to station 88.3, 88.7, 89.1, 89.5, 89.9, or 90.3MHz. Chose the station that has the least amount of regular audible radio reception.
2. Press the power button on the headrest DVD displays. Insert a DVD and operate the DVD player in play mode. Verify the DVD audio is distorted on one of the above stations.
 - If the DVD audio can be heard review the system operation with the customer.
3. Turn the DVD player off and disconnect both connectors from the DVD display that was playing the DVD.
4. Swap the two connectors on the display and swap the two corresponding connectors at the DVD control module. Verify the DVD audio now operates normally.
 - If the DVD audio now operates normally, replace the DVD display harness.
 - If the DVD audio distortion persists, replace the DVD control module.

DUAL DVD REAR SEAT ENTERTAINMENT HEADREST VIDEO DOES NOT SYNCHRONIZE

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.

Reference Information

Schematic Reference

Video System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Electrical Information Reference

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

Circuit/System Testing

IMPORTANT: Before performing this diagnostic verify that both DVD displays turn on and operate normally. If one or more displays are inoperative, go to Dual DVD Rear Seat Entertainment Headrest Display Inoperative - One or More.

1. Turn ON the ignition, press the power button on one of the displays and insert a DVD. Operate the DVD player in play mode.
2. Press the power button on the other display. Press the source button to view the DVD video playing on the adjacent display. Verify that the video displays do not synchronize.
 - Test or repair the suspect video in/out signal circuit for a short to B+, short to ground or open circuit. If all circuits test normal replace the DVD control module.

Repair Instructions

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

Refer to Dual DVD Rear Seat Entertainment Headrest Package Installation

DUAL DVD REAR SEAT ENTERTAINMENT HEADREST WIRELESS HEADPHONES 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 Description

The infrared transmitter is internal to the DVD display and is grounded and powered by the DVD control module. When listening to the headphones, the infrared transmitter sends an infrared signal to the headphones. There are two channels on the headphones, the first channel is dedicated to the driver side video screen, and the other channel is dedicated to the passenger side. The audio that is sent over the DVD audio signal circuits is a varying AC voltage.

Reference Information

Schematic Reference

Video System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

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: **Test or replace the headphone batteries before performing Circuit/System Verification.**

1. Verify there are no obstructions that may block the infra-red port located above the video display screen.
2. Radio ON, DVD playing, verify all of the headphones are working properly and the power indicator illuminates.
 - If all of the headphones are inoperative, or the sound is distorted, refer to Circuit/System Testing.
 - If only one of the headphones is not producing sound on either channel, or the sound is distorted, replace the appropriate set of headphones.
3. Using a known good pair of wired headphones, plug them into both of the headphone jacks on the front of each DVD Monitor.

- If there is audio emitted from the wired headphones, and not the wireless headphones, replace the appropriate display.

Circuit/System Testing

NOTE: Select both channels by switching the channel selector located on the side of the headphones and verify the volume is turned up. Also verify that the headphones are not in mute mode. Press the Sound Around ON/OFF button on the remote to change audio muting status.

1. Ignition OFF, disconnect the appropriate seat headrest X2 connector at the monitor.
2. Ignition ON, DVD playing, test for 15-40 mV A/C between the terminals on the monitor listed below and ground.
 - Right Audio Signal - terminal 3
 - Left Audio Signal - terminal 4
 - If the not within the specified range, replace the appropriate DVD display.
3. Ignition OFF, reconnect the harness connector at the monitor.
4. Disconnect the appropriate seat headrest X2 connector at the DVD control module.
5. Ignition ON, DVD playing, test for 15-40 mV A/C between the terminals on the monitor listed below and ground.
 - Right Audio Signal - terminal 3
 - Left Audio Signal - terminal 4
 - If the not within the specified range, replace the wiring harness.
6. If all circuits test normal, replace the DVD control module.

DUAL DVD REAR SEAT ENTERTAINMENT HEADREST REMOTE 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 Description

The infrared transmitter is internal to the DVD display and is grounded and powered by the DVD control module. When listening to the remote control, the remote sends an infrared signal to the infrared receiver. No external circuits are involved.

Reference Information

Schematic Reference

Video System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

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: Test or replace the remote batteries before performing Circuit/System Verification.

1. Verify there are no obstructions that may block the infra-red port located above the video display screen.
2. DVD playing, press multiple buttons on the remote control and verify the remote operates properly at both monitors.
 - If remote fails to operate either DVD monitor, replace the remote.
 - If remote operates only one DVD monitor, replace the inoperative monitor.

ONSTAR GLOBAL POSITIONING SYSTEM (GPS) DATA NOT CURRENT OR INACCURATE

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 vehicle communication interface module (VCIM) receives information from a specific cellular and digital radio antenna located on the outside of the vehicle. The cellular and digital radio antenna is connected to the vehicle communication interface module via a shielded coaxial cable. The antenna cable also provides a path for DC current for powering the antenna.

Diagnostic Aids

- The GPS signal title on the scan tool will display a Yes or No dependant upon whether or not the module sees an increment of the seconds transmitted by GPS signals to the vehicle communication interface

module. Upon entering this screen, the GPS signal title will automatically display Yes, regardless of the presence of time increment, for at least 2 seconds, while the algorithm in the scan tool determines the status of the clock. If increment is found, Yes is continually displayed. If the clock remains static, No is displayed. The scan tool looks for increment every second, regardless of current display.

- Inaccurate or aged GPS position concerns which are no longer present may have been due to the temporary loss of GPS signal reception by the vehicle. Conditions such as driving through tunnels or parking structures while making an OnStar® keypress will restrict the cellular and digital radio antenna from a clear view of the satellites in the sky and may have caused this temporary data loss.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

IMPORTANT: It is important to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from the satellites. It is also necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.

1. Ignition ON, observe the GPS signal status indicator for at least 10 seconds with a scan tool. The indicator should display Yes.
 - If the indicator does not display Yes, refer to Circuit/System Testing.

2. Call and verify the OnStar advisor has received the GPS data.
 - If the advisor did not receive the GPS data and the call was a "fail to voice", contact the GM Technical Assistance Center.
 - If the advisor did not receive the GPS data and the call was not a "fail to voice", refer to Circuit/System Testing.
3. Verify with the OnStar Call Center advisor that your actual position is within a reasonable distance from the actual location of the vehicle.
 - If your actual position is not within a reasonable distance from the actual location of the vehicle, replace the vehicle communication interface module.

Circuit/System Testing

1. Ignition OFF, disconnect the GPS and cell coax cable connector at the vehicle communication interface module.
2. Using the EL-49903-3 kit (EL-49903-5 adapter and EL-49903-4 coax cable), connect the **EL-49903** GM OnStar antenna diagnostic tool kit to the vehicle communication interface module, place the test antenna on the roof of the vehicle.
3. Ignition ON, wait 5 minutes, then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call, ask the consultant to verify the vehicle location to confirm the GPS system is functioning.
 - If the OnStar GPS does not function, replace the vehicle communication interface module.
4. Reconnect the coax cable to the vehicle communication interface module. Disconnect the coax cable from the cellular and digital radio antenna.
5. Test for 4.5-5.5 V between the coax cable center conductor and the outer shield.
 - If not within the specified range, replace the coax cable.
6. If all circuits test normal, replace the cellular and digital radio antenna.

Repair Instructions

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

- **Digital Radio, Mobile Telephone, and Vehicle Location Base Replacement**
- **Control Module References** for vehicle communication interface module replacement, setup, and programming

ONSTAR MICROPHONE MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Cellular Microphone High Signal	B2455 02	B2455 04	-	-
Cellular Microphone Low Signal	-	B2455 04	1	-
Voice Recognition Audio Signal	2	2	2	-
Low Reference	-	2	-	-
1. OnStar® Microphone Inoperative - Caller Cannot Be Heard 2. OnStar® Call Center Consultant Cannot Hear Caller				

Circuit/System Description

The telematics communication interface control module provides the cellular phone microphone with a supplied voltage on the cellular phone microphone high signal circuit. When the cellular phone microphone is in use, voice data from the user is sent back to the telematics communication interface control module on the microphone high signal circuit. The telematics communication interface control module provides a ground for the microphone via the microphone low signal wire.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

NOTE: The following verification requires the vehicle to be outside with an

unobstructed view of the southern sky. Allow 5 minutes after turning key on for the GPS satellites to acquire vehicle signal.

1. Ignition ON, verify DTC B2455 is not set.
 - If any DTC B2455 is set, refer to **DTC B2455**.
2. Ignition ON, verify the OnStar® voice recognition is operating normally.
 - If the OnStar® voice recognition is inoperative, refer to Circuit/System Testing - Microphone Malfunction.
3. Radio ON, contact the OnStar® call center consultant by pressing the blue OnStar® button. Verify the OnStar® call center consultant can hear you clearly.
 - If the OnStar® call center consultant can not hear you clearly, refer to Circuit/System Testing - Cellular Telephone Voice Malfunction.

Circuit/System Testing

Microphone Malfunction

1. Ignition OFF, disconnect the harness connector at the cellular phone microphone.
2. Ignition ON, test for 9.5-10.5 V between the microphone high signal circuit terminal B and ground.
 - If less than the specified range, test the circuit for a short to ground, shorted together, or an open/high resistance. If the circuit tests normal, replace the vehicle communication interface control module.
 - If greater than the specified range, test the circuit for a short to voltage. If the circuit tests normal, replace the vehicle communication interface control module.
3. Test for 9.5-10.5 V between the microphone high signal circuit terminal B and the microphone low signal circuit terminal A.
 - If less than the specified range, test the low signal circuit for a short to ground, shorted together, or an open/high resistance. If the circuit tests normal, replace the vehicle communication interface control module.
 - If greater than the specified range, test the low signal circuit for a short to voltage. If the circuit tests normal, replace the vehicle communication interface control module.
4. If all circuit test normal, replace the cellular phone microphone.

Cellular Telephone Voice Malfunction

1. Ignition OFF, disconnect the appropriate harness connector at the radio.
 - X4 harness connector, (with UYS)
 - X1 harness connector, (without UYS)
2. Disconnect the X3 harness connector at the vehicle communication interface control module.
3. Ignition ON, test for less than 1 V between the vehicle communication interface control module voice recognition audio signal circuit terminal 2 X3 and ground.
 - If not the specified value, test the voice recognition audio signal circuit for a short to voltage.
4. Test for less than 1 V between the vehicle communication interface control module voice recognition

audio low reference circuit terminal 4 X3 and ground.

- If not the specified value, test the voice recognition audio low reference circuit for a short to voltage.
- 5. Ignition OFF, test for infinite resistance between the vehicle communication interface control module voice recognition audio signal circuit terminal 2 X3 and ground.
 - If not the specified value, test the voice recognition audio signal circuit for a short to ground.
- 6. Test for infinite resistance between the vehicle communication interface control module voice recognition audio low reference circuit terminal 4 X3 and ground.
 - If not the specified value, test the voice recognition audio low reference circuit for a short to ground.
- 7. Test for less than 2 ohms between the vehicle communication interface control module voice recognition audio signal circuit terminal 2 X3 and the appropriate radio terminal.
 - Voice Recognition Audio Signal Terminal 6 X4, (with UYS)
 - Voice Recognition Audio Signal Terminal 4 X1, (without UYS)
 - If not the specified value, test the voice recognition audio signal circuit for a open/high resistance.
- 8. Test for less than 2 ohms between the vehicle communication interface control module voice recognition audio low reference circuit terminal 4 X3 and the appropriate radio terminal.
 - Voice Recognition Audio Low Signal Terminal 16 X4, (with UYS)
 - Voice Recognition Audio Low Signal Terminal 5 X1, (without UYS)
 - If not the specified value, test the voice recognition audio low reference circuit for a open/high resistance.
- 9. If all circuits test normal, replace the vehicle communication interface control module.
- 10. If all circuits test normal, replace the radio.

Repair Instructions

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

- **Mobile Telephone Microphone Replacement**
- **Control Module References** for radio or vehicle communication interface control module replacement, setup, and programming

NAVIGATION SYSTEM - VOICE GUIDANCE 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** provide an overview of each diagnostic category.

Circuit/System Description

The vehicle navigation radio provides verbal directions to the driver through the radio speakers. The navigation

radio sends an audio voice signal to the amplifier on two dedicated circuits.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Navigation System 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

Circuit/System Testing

1. Ignition OFF, disconnect the radio harness connector X4 and amplifier harness connector X3.
2. Test for less than 1 volt on the navigation audio signal (+) circuit radio harness connector terminal 7 and ground.
 - If greater than specified value, test for a short to voltage.
3. Test for greater than 1 ohm between the navigation audio signal (+) circuit radio harness connector terminal 7 and ground.
 - If less than specified value, test for a short to ground.
4. Test for less than 1 ohm between the navigation audio signal (+) circuit radio harness connector terminal 7 and the amplifier harness connector terminal 13.
 - If greater than specified value, test for an open/high resistance.
5. Test for less than 1 volt on the navigation audio signal (-) circuit radio harness connector terminal 17 and ground.
 - If greater than specified value, test for a short to voltage.
6. Test for greater than 1 ohm between the navigation audio signal (-) circuit radio harness connector terminal 17 and ground.

- If less than specified value, test for a short to ground.
- 7. Test for less than 1 ohm between the navigation audio signal (-) circuit radio harness connector terminal 17 and the amplifier harness connector terminal 5.
 - If greater than specified value, test for an open/high resistance.
- 8. If all circuits test normal, replace the radio.

Repair Instructions

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

Control Module References for radio replacement, setup, and programming

NAVIGATION SYSTEM - VOICE RECOGNITION 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** provide an overview of each diagnostic category.

Circuit/System Description

The vehicle navigation radio and Onstar® system both utilize the cellular microphone to receive voice commands. The navigation radio receives an audio voice signal from the communication interface module (CIM).

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System 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, verify the OnStar® voice recognition is operating normally.

- If the OnStar® voice recognition is inoperative, refer to **OnStar Microphone Malfunction**.

Circuit/System Testing

1. Ignition OFF, disconnect the X3 harness connector at the CIM.
2. Ignition ON, test for 8.5-9.5 volts between the navigation voice signal circuit terminal 2 and ground.
 - If less than specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
3. Ignition ON, test for less than 1 volt between the navigation voice low reference circuit terminal 4 and ground.
 - If greater than the specified range, test the circuit for a short to voltage. If the circuit tests normal, replace the radio.
4. Ignition OFF, test for less than 10 ohms between the navigation voice low reference circuit terminal 4 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 radio.
5. Ignition ON, test for 8.5-9.5 volts between the navigation voice signal circuit terminal 2 and the drain wire circuit terminal 5.
 - If less than specified range, test the drain wire circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the radio.
6. Ignition OFF, disconnect the X4 harness connector at the radio.
7. Test for infinite resistance between ground and the navigation voice low reference circuit terminal 16.
 - If less than the specified value, test the low reference circuit for a short to ground.
8. If all circuits test normal, replace the CIM.

Repair Instructions

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

Control Module References for Radio and CIM replacement, setup, and programming

ONSTAR AUDIO MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Audio Signal	1	1	1	-
Audio Common Signal	-	1	-	-
1. No (or Noisy) OnStar® Audio				

Circuit/System Description

When an OnStar® keypress is made, a serial data message is sent to the audio system to mute all radio functions and output OnStar® originated audio. After the audio system is muted, the vehicle communication interface control module transmits signals to the audio system on the audio signal and audio common circuits.

Reference Information

Schematic Reference

- **OnStar/Telematics Schematics**
- **Radio/Navigation System Schematics**

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Tune radio to a known good station and verify the audio is heard clearly through all speaker channels.
 - If audio is not heard clearly, refer to **Speaker Malfunction**.
2. Ignition ON, radio ON, set volume to comfortable level and press OnStar® Call Center button. Verify Connecting to OnStar® message is heard clearly through the audio system.
 - If OnStar® message is noisy or distorted, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the radio.
2. Disconnect the X2 harness connector at the vehicle communication interface control module.
3. Ignition ON, test for less than 1 V between the vehicle communication interface control module cellular telephone voice signal circuit terminal 1 X2 and ground.
 - If not the specified value, test the cellular telephone voice signal circuit for a short to voltage.
4. Test for less than 1 V between the vehicle communication interface control module cellular telephone voice low reference circuit terminal 2 X2 and ground.
 - If not the specified value, test the cellular telephone voice low reference circuit for a short to voltage.
5. Ignition OFF, test for infinite resistance between the vehicle communication interface control module cellular telephone voice signal circuit terminal 1 X2 and ground.
 - If not the specified value, test the cellular telephone voice signal circuit for a short to ground.
6. Test for infinite resistance between the vehicle communication interface control module cellular telephone voice low reference circuit terminal 2 X2 and ground.
 - If not the specified value, test the cellular telephone voice low reference circuit for a short to ground.
7. Test for less than 2 ohms between the vehicle communication interface control module cellular telephone voice signal circuit terminal 1 X2 and the radio terminal 20 X1.
 - If not the specified value, test the cellular telephone voice signal circuit for an open/high resistance.
8. Test for less than 2 ohms between the vehicle communication interface control module cellular telephone voice low reference circuit terminal 2 X2 and the radio terminal 6 X1.
 - If not the specified value, test the cellular telephone voice low reference circuit for an open/high resistance.
9. If all circuits test normal, replace the vehicle communication interface control module.
10. If all circuits test normal, replace the radio.

Repair Instructions

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

Control Module References for radio or vehicle communication interface control module replacement, setup, and programming.

NO GLOBAL POSITIONING SYSTEM (GPS) RECEPTION

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 Description

The global positioning system (GPS) antenna is connected to the navigation radio by a coaxial cable. The antenna cable also provides a path for DC current for powering the antenna.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Navigation System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

IMPORTANT: The global positioning system (GPS) requires a clear line of sight to the sky to operate properly. In most cases the GPS will not have reception near tall buildings or inside structures.

1. Ignition OFF, disconnect the GPS antenna coax cable from the navigation radio.
2. Ignition ON, test for 4.5-5.5 volts between the radio coax cable connection center conductor and ground.

- If not within the specified range, replace the radio.
- 3. If all circuits test normal, replace the GPS antenna.

Repair Instructions

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

- **Navigation Antenna Replacement (With UAV or U2Y)**
- **Control Module References** for Radio replacement, setup, and programming

NOISE COMPENSATED VOLUME 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 Description

The audio amplifier supplies 9 volts to the noise compensation microphone. The audio amplifier receives a signal from the noise compensation microphone to determine the amount of interior vehicle noise and adjusts the amplifier output to the speakers accordingly.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the noise compensation microphone.
2. Ignition ON, test for 8.5-9.5 volts between the noise compensation microphone supply voltage circuit terminal B and ground.
 - If less than the specified range, test the voltage supply circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the audio amplifier.
 - If greater than the specified range, test the voltage supply circuit for a short to voltage. If the circuit tests normal, replace the audio amplifier.
3. Ignition ON, test for 8.5-9.5 volts between the noise compensation microphone supply voltage circuit terminal B and the drain wire circuit terminal A.
 - If less than the specified range, test the drain wire circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the audio amplifier.
4. If all circuits test normal, replace the noise compensation microphone.

Repair Instructions

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

- **Radio Volume Compensator Interior Noise Microphone Replacement**
- **Control Module References** for Audio Amplifier replacement, setup, and programming

ONSTAR BUTTON LED MALFUNCTION (WITHOUT DRC OR DRG)

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
10 V Reference	-	B24156 04	-	-
Control Terminal 14	1	1	2	-
Control Terminal 15	1	1	2	-
Signal Terminal 11	3	3	-	B24156 59, B2482 00
Ground	-	B24156 04	-	-
1. OnStar® LED Inoperative 2. LED Illuminated At All Times				

3. OnStar® Buttons Inoperative

Circuit Description

The OnStar® status LEDs are located in the inside rearview mirror telematic button assembly. The green LED is illuminated when the system is ON and operating normally. When the green LED is green and flashing, it is an indication that a call is in progress. When the red LED is illuminated, a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call. The OnStar® LEDs are controlled by the telematics communication interface control module via the keypad green LED control circuit and the keypad red LED control circuit.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

NOTE: If the green LED is off with the ignition ON and the LED functions correctly when commanded with the scan tool, contact the OnStar Center to confirm the vehicle has a current subscription.

1. Ignition ON.
2. Verify that the green LED turns ON and OFF when commanding the K73 telematics communication interface control module green indicator ON and OFF with a scan tool.
 - If the green LED does not turn ON and OFF

Refer to Circuit/System Testing - Green LED Test

- **If the green LED turns ON and OFF**

3. Verify that the red LED turns ON and OFF when commanding the K73 telematics communication interface control module red indicator ON and OFF with a scan tool.

- **If the red LED does not turn ON and OFF**

Refer to Circuit/System Testing - Red LED Test

- **If the red LED turns ON and OFF**

4. All OK.

Circuit/System Testing

Green LED Test

1. Ignition OFF, and all vehicle systems OFF, disconnect the harness connector at the A10 inside rearview mirror. It may take up to 2 minutes for all vehicle systems to power down. Doors closed, courtesy lamps OFF.
2. Test for less than 10 ohms between the ground circuit terminal 8 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. Test for less than 1 V between the control circuit terminal 14 and ground while commanding the K73 telematics communication interface control module green indicator OFF with a scan tool.
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X1 harness connector at the K73 telematics communication interface control module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 14 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K73 telematics communication interface control module.
 - **If less than 1 V**
5. Test for greater than 8 V between the control circuit terminal 14 and ground while commanding the K73 telematics communication interface control module green indicator ON with a scan tool.
 - **If 8 V or less**
 1. Ignition OFF, disconnect the X1 harness connector at the K73 telematics communication interface control module.
 2. Test for infinite resistance between the control circuit terminal 14 and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K73 telematics communication interface control module.
- **If greater than 8 V**
- 6. Test or replace the A10 inside rearview mirror.

Red LED Test

1. Ignition OFF, and all vehicle systems OFF, disconnect the harness connector at the A10 inside rearview mirror. It may take up to 2 minutes for all vehicle systems to power down. Doors closed, courtesy lamps OFF.
2. Test for less than 10 ohms between the ground circuit terminal 8 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. Test for less than 1 V between the control circuit terminal 15 and ground while commanding the K73 telematics communication interface control module red indicator OFF with a scan tool.
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the X1 harness connector at the K73 telematics communication interface control module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 15 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K73 telematics communication interface control module.
 - **If less than 1 V**
5. Test for greater than 8 V between the control circuit terminal 15 and ground while commanding the K73 telematics communication interface control module red indicator ON with a scan tool.
 - **If 8 V or less**
 1. Ignition OFF, disconnect the X1 harness connector at the K73 telematics communication interface control module.
 2. Test for infinite resistance between the control circuit terminal 15 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.

- If less than 2 ohms, replace the K73 telematics communication interface control module.
 - **If greater than 8 V**
6. Test or replace the A10 inside rearview mirror.

Repair Instructions

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

- **Inside Rearview Mirror Replacement**
- **Control Module References** for telematics communication interface control module replacement, programming and setup.

ONSTAR BUTTON LED MALFUNCTION (WITH DRC OR DRG)

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 Description

The OnStar® status LEDs are internal to the inside rearview mirror. The green LED is illuminated when the system is ON and operating normally. When the green LED is green and flashing, it is an indication that a call is in progress. When the red LED is illuminated, a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call. The OnStar® LEDs are controlled internally by the inside rearview mirror via serial data from the telematics communication interface control module.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

NOTE: If the green LED is off with the ignition ON and the LED functions correctly when commanded with the scan tool, contact the OnStar Center to confirm the vehicle has a current subscription.

1. Ignition ON.
2. Verify no DTC are set.
 - **If any DTC are set**

Refer to **Diagnostic Trouble Code (DTC) List - Vehicle**

- **If no DTC are set**
3. Verify that the green LED turns ON and OFF when commanding the Green Indicator ON and OFF with a scan tool.
 - **If the green LED does not turn ON and OFF**

Replace the A10 Inside Review Mirror.

- **If the green LED turns ON and OFF**
4. Verify that the red LED turns ON and OFF when commanding the Red Indicator ON and OFF with a scan tool.
 - **If the red LED does not turn ON and OFF**

Replace the A10 Inside Review Mirror.

- **If the red LED turns ON and OFF**
5. All OK.

Repair Instructions

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

- **Inside Rearview Mirror Replacement**
- **Control Module References** for telematics communication interface control module replacement, programming and setup.

ONSTAR CALL CENTER REMOTE FUNCTION REQUESTS 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 telematics communication interface control module has the capability of commanding the horn, initiating door lock/unlock, or operating the exterior lamps using the serial data circuits. These functions are commanded by the OnStar® Call Center per a customer request.

Diagnostic Aids

The customer concern may have been due to a lack of cellular service in a given area, or a failure in the National Cellular Network infrastructure that has since been corrected.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

NOTE:

- It is necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.
- It is necessary to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.

1. Ignition ON.
2. Verify that the horn, lights, and the door locks on the vehicle operate properly.
 - If an applicable vehicle system does not operate properly

Refer to **Diagnostic System Check - Vehicle** .

- If all applicable vehicle systems operate properly
3. Verify that a call can be successfully placed to the OnStar Call Center by pressing the blue OnStar button.
 - If unable to contact the OnStar® call center

Refer to **Unable to Contact OnStar Call Center**

- If able to contact the OnStar Call Center
4. Verify with the OnStar advisor that all remote functions (door locks, lights, and horn) work.
 - If the remote functions do not operate when requested

Replace the K73 Telematics Communication Interface Control Module

- If the remote functions operate when requested
5. All OK.

Repair Instructions

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

Control Module References for telematics communication interface control module replacement, programming and setup.

ONSTAR BUTTON MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
10 V Reference	-	B2476 04	-	-
Control Terminal 14	1	1	2	-
Control Terminal 15	1	1	2	-
Signal Terminal 11	3	3	2	B2476 59, B2482 00
Ground	-	B2476 04	-	-
1. OnStar® LED Inoperative 2. LED Illuminated At All Times 3. OnStar® Buttons Inoperative				

Circuit/System Description

The OnStar® button assembly consists of 3 buttons: Call/Answer, OnStar® Call Center, and OnStar® Emergency. The telematics communication interface control module supplies the OnStar® button assembly with 10 V via the keypad supply voltage circuit . Each of the buttons, when pressed, completes the circuit across a resistor allowing a specific voltage to be returned to the telematics communication interface control module over the keypad signal circuit. Depending upon the voltage range returned, the telematics communication interface control module is able to identify which button has been activated.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

NOTE: Contact the OnStar® Call Center first before pressing the emergency button in order to notify them of the test.

1. Ignition ON.
2. Verify the buttons operate normally by pressing each button individually.
 - **If none of the buttons operate normally**

Refer to Circuit/System Testing.

- **If some, but not all, of the buttons operate normally**

Test or replace the A10 inside rearview mirror.

- **If all of the buttons operate normally**

3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A10 inside rearview mirror. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 15 ohms between the ground circuit terminal 8 and ground.
 - **If 15 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 15 ohms**
3. Ignition ON.
4. Test for 9.5-10.5 V between the 10 V reference circuit terminal 12 and ground.
 - **If less than 9.5 V**
 1. Ignition OFF, disconnect the harness connector at the K73 telematics communication interface control module.
 2. Test for infinite resistance between the 10 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the 10 V reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K73 telematics communication interface control module.
 - **If greater than 10.5 V**
 1. Ignition OFF, disconnect the harness connector at the K73 telematics communication interface

control module, ignition ON.

2. Test for less than 1 V between the 10 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K73 telematics communication interface control module.
 - **If between 9.5-10.5 V**
5. Ignition OFF.
6. Test for 500-900 ohms between the signal circuit terminal 11 and ground.
 - **If less than 500 ohms**
 1. Disconnect the X1 harness connector at the K73 telematics communication interface control module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K73 telematics communication interface control module.
 - **If greater than 900 ohms**
 1. Disconnect the X1 harness connector at the K73 telematics communication interface control module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Ignition OFF.
 4. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K73 telematics communication interface control module.
 - **If between 500-900 ohms**
7. Test or replace the A10 inside rearview mirror.

Repair Instructions

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

- **Inside Rearview Mirror Replacement**
- **Control Module References** for telematics communication interface control module replacement, programming and setup.

ONSTAR STEERING WHEEL CONTROL FUNCTIONS MALFUNCTION

Some vehicles equipped with the OnStar® system have the capability of accessing voice mailboxes and other automated phone systems by means of the steering wheel controls, while the OnStar® Personal Calling feature is in use. If the "Talk" or "Mute" button (depending upon the vehicle) on the steering wheel controls is depressed during an OnStar® Personal Calling call, the telematics communication interface control module receives the message on the serial data bus from either the radio or body control module. This message is interpreted as a request to turn any spoken numbers into dual tone multi-frequency tones to be delivered over

the airwaves to the phone system the user is communicating with. Complete instructions for operation of these features can be found in the information provided to the customer with the OnStar® system.

The steering wheel controls are a resistor network that consist of multiple momentary contact switches and a series of resistors. The switches and resistor network are arranged so that each switch has a different resistance value. When a switch is pressed, a voltage drop occurs in the resistor network, which produces a specific voltage value unique to the switch selected, to be interpreted by either the radio or BCM. In the event the OnStar® steering wheel control functions are inoperative, technicians should refer to **Steering Wheel Controls Malfunction** , to begin diagnosis of the steering wheel control concern.

RADIO CONTROLS MALFUNCTION (WITH NAVIGATION)

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 radio/HVAC controls are supplied battery voltage and ground . The radio controls the power state of the controls via a wake up circuit. Communications between the radio controls and the radio are through the CGI serial data circuits.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify no DTCs are set as current
 - If any DTCs are set as current, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Ignition ON, radio ON, verify the radio/HVAC controls backlighting illuminates and that all controls perform the correct function.
 - If some, but not all, controls operate normally, replace the radio/HVAC controls.
 - If all controls are inoperative, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the radio/HVAC controls.
2. Test for less than 10 ohms between the ground circuit terminal 16 and ground.
 - If greater than the specified range, test the ground for an open/high resistance.
3. Test for less than 20 ohms between the data shield circuit terminal 3 and ground.
 - If greater than the specified range, test the data shield circuit for an open/high resistance. If the circuit tests normal, replace the radio.
4. Verify that a test lamp illuminates between the B+ circuit terminal 8 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
5. Test for 2-3 V between the data circuit terminal 1 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
6. Test for 2-3 V between the data circuit terminal 2 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
7. Test for less than 1 V between the wake signal terminal 4 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
8. Test for less than 1 V between the reset signal terminal 11 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
9. Ignition OFF, reconnect the harness connector at the radio/HVAC controls.
10. Disconnect the X4 harness connector at the radio.
11. Ignition ON, test for 4.5-5.5 V between the reset signal circuit terminal 27 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high

resistance. If the circuit tests normal, replace the radio/HVAC controls.

- If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio/HVAC controls.
12. If all circuits test normal, replace the radio/HVAC controls. Reconnect all harness connectors.
 13. Ignition ON, radio ON, verify the radio/HVAC controls backlighting illuminates and that all controls perform the correct function.
 - If the radio/HVAC controls are still inoperative, replace the radio.

Repair Instructions

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

- **Radio Control Assembly Replacement (with Navigation Display), Radio Control Assembly Replacement (without Navigation Display)**
- **Control Module References** for radio replacement, setup, and programming

RADIO CONTROLS MALFUNCTION (WITHOUT NAVIGATION)

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 radio/HVAC controls are supplied battery voltage and ground . The radio/HVAC controls operate radio functions through serial data messages. .

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

- **Circuit Testing**

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify no DTCs are set as current
 - If any DTCs are set as current, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Ignition ON, radio ON, verify the radio/HVAC controls backlighting illuminates and that all controls perform the correct function.
 - If some, but not all, controls operate normally, replace the radio/HVAC controls.
 - If all controls are inoperative, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the X1 harness connector at the radio/HVAC controls.
2. Test for less than 10 ohms between the ground circuit terminal 16 and ground.
 - If greater than the specified range, test the ground for an open/high resistance.
3. Test for less than 20 ohms between the data shield circuit terminal 3 and ground.
 - If greater than the specified range, test the data shield circuit for an open/high resistance. If the circuit tests normal, replace the radio.
4. Verify that a test lamp illuminates between the B+ circuit terminal 8 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
5. Test for 2-3 V between the data circuit terminal 1 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
6. Test for 2-3 V between the data circuit terminal 2 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
7. Test for less than 1 V between the wake signal terminal 4 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
8. Test for less than 1 V between the reset signal terminal 11 and ground.

- If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
- 9. Ignition OFF, reconnect the harness connector at the radio/HVAC controls.
- 10. Disconnect the X4 harness connector at the radio.
- 11. Ignition ON, test for 4.5-5.5 V between the reset signal circuit terminal 27 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio/HVAC controls.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio/HVAC controls.
- 12. If all circuits test normal, replace the radio/HVAC controls. Reconnect all harness connectors.
- 13. Ignition ON, radio ON, verify the radio/HVAC controls backlighting illuminates and that all controls perform the correct function.
 - If the radio/HVAC controls are still inoperative, replace the radio.

Repair Instructions

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

- **Radio Control Assembly Replacement (without Navigation Display)**
- **Control Module References** for radio replacement, setup, and programming

RADIO INFORMATION DISPLAY MALFUNCTION (WITH NAVIGATION)

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 radio/hvac display is supplied battery voltage and ground . The radio controls the power state of the display through the remote enable circuit, which is also used to control the power state of other infotainment devices. Display backlighting dimming level, and screen touch signal are communicated over the touch data circuits. The radio sends graphical image data to the display via a dedicated video interface cable.

The radio controls the position of the display via the position control circuit. When the UP position is desired, the radio sends a voltage signal to the display actuator on the position control circuit, which commands the display actuator to raise the display. To lower the display, the radio removes the voltage signal on the position control circuit, which commands the display actuator to lower the display.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify DTC B1265 is not set as current.
 - If DTC B1265 is set as current, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Verify DTC B128D is not set as current.
 - If DTC B128D is set as current, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
3. Ignition ON, radio ON, verify the Radio/HVAC Display turns on and information is shown on the display.
 - If the display is inoperative, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, verify the video interface cable is properly connected at the display X3 and radio X5 connections and there is no damage to the cable or connections.
 - Perform the appropriate repair or replacement to correct any issues found with the video interface cable or it's connections.
2. Ignition OFF, disconnect the X1 harness connector at the Radio/HVAC Display.
3. Test for less than 10 ohms between the ground circuit terminal 2 and ground.
 - If greater than the specified range, test the ground for an open/high resistance.
4. Test for less than 20 ohms between the data shield circuit terminal 6 and ground.
 - If greater than the specified range, test the data shield circuit for an open/high resistance. If the circuit tests normal, replace the radio.
5. Verify that 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.
- 6. Ignition ON, radio ON, verify that a test lamp illuminates between the entertainment remote enable circuit terminal 4 and ground.
 - If the test lamp does not illuminate, test the remote enable circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
- 7. Test for 2-3 V between the data circuit terminal 7 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
- 8. Test for 2-3 V between the data circuit terminal 8 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
- 9. Ignition OFF, reconnect the harness connector at the Radio/HVAC Display.
- 10. Disconnect the X4 harness connector at the radio.
- 11. Ignition ON, test for 4.5-5.5 V between the display reset signal circuit terminal 10 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the Radio/HVAC Display.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the Radio/HVAC Display.
- 12. If all circuits test normal, replace the video interface cable. Reconnect all harness connectors.
- 13. Ignition ON, radio ON, verify the Radio/HVAC Display turns on and information is shown on the display.
 - If the information display still malfunctions, replace the Radio/HVAC Display. Ignition ON, radio ON, verify the Radio/HVAC Display turns on and information is shown on the display. If the Radio/HVAC Display still malfunctions, replace the radio.

Repair Instructions

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

- **Radio, Video, and Audio Player and Navigation Information Display Replacement**
- **Control Module References** for radio replacement, setup, and programming

RADIO INFORMATION DISPLAY MALFUNCTION (WITHOUT NAVIGATION)

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 radio/HVAC controls is a separate component from the radio, combined into an assembly. The assembly contains the radio control knobs and buttons for all audio and HVAC functions and the information display. The assembly is supplied battery voltage and ground. The radio uses the wake up circuit to control the power state of the display. The radio controls communicate inputs internally to the display. Display backlighting dimming level, graphical data, and radio control inputs are communicated over the CGI serial data circuits between the display and the radio.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio/Audio System 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, radio ON, verify the display turns on and information is shown on the display.

- If the display is inoperative, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the radio/HVAC controls.
2. Test for less than 10 ohms between the ground circuit terminal 16 and ground.

- If greater than the specified range, test the ground for an open/high resistance.
- 3. Test for less than 20 ohms between the data shield circuit terminal 3 and ground.
 - If greater than the specified range, test the data shield circuit for an open/high resistance. If the circuit tests normal, replace the A11 radio.
- 4. Verify that a test lamp illuminates between the B+ circuit terminal 8 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
- 5. Ignition ON, test for 2-3 V between the data circuit terminal 1 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
- 6. Ignition ON, test for 2-3 V between the data circuit terminal 2 and ground.
 - If less than the specified range, test the data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
 - If greater than the specified range, test the data circuit for a short to voltage. If the circuit tests normal, replace the radio.
- 7. Test for less than 1 V between the wake signal terminal 4 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
- 8. Test for less than 1 V between the reset signal terminal 11 and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio.
- 9. Ignition OFF, reconnect the harness connector at the radio/HVAC controls.
- 10. Disconnect the X1 harness connector at the A11 radio.
- 11. Test for 4.5-5.5 V between the signal circuit terminal 27 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio/HVAC controls.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio/HVAC controls.
- 12. Test for 4.5-5.5 V between the signal circuit terminal 13 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio/HVAC controls.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the radio/HVAC controls.
- 13. If all circuits test normal, replace the radio/HVAC controls. Reconnect all harness connectors.
- 14. Ignition ON, radio ON, verify the display turns on and information is shown on the display.
 - If the display still malfunctions, replace the radio.

Repair Instructions

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

- **Radio Control Assembly Replacement (without Navigation Display)**
- **Control Module References** for radio replacement, setup, and programming

RADIO DISPLAYS LOC, LOCKED, OR CODE

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 Aids

The vehicle identification number (VIN) in the radio is a single one-time VIN learn.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

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, using the scan tool, verify that the VIN, digits 2-17, of the radio matches the VIN, digits 2-17, of the vehicle.

- If not the specified value, replace the radio.

Repair Instructions

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

Control Module References for radio replacement, setup, and programming

RADIO POOR RECEPTION

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

AM and FM radio reception is dependent on the following components:

- Radio antenna - part of the rear glass (Coupe) or Center High Mount Stop Lamp (CHMSL - Wagon)
- Coax cable between the radio antenna and the radio antenna module
- Radio antenna module
- Coax cable between the radio antenna module and the radio
- Radio

Diagnostic Aids

Poor AM and FM radio reception is dependent on multiple influences, some of which may not be vehicle related. Areas which have high RF traffic or block the signal path may cause a degradation in radio reception. Radio reception may also be influenced by items within the vehicle, but not part of the radio system. Such examples are aftermarket electrical accessories or other items which may generate noise in the vehicle electrical system. Aftermarket window tinting, especially when there is a metallic in the film, may reduce radio reception.

AM reception is highly dependent on the antenna module receiving battery voltage from the radio. The antenna module has a built in antenna amplifier that boosts both AM and FM reception. When the antenna module no longer receives power, the radio will still receive FM stations and lose all AM stations.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Radio Rear Speaker Replacement (Coupe)

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

Coupe Bodystyle

1. Ignition OFF, disconnect the coax from the antenna located at the rear glass.
2. Verify the coax connector at the back glass is properly secured and free of any damage.
 - If damage is found, repair or replace as necessary.
3. Inspect the antenna on the rear glass. Verify all branches of the antenna are intact, with no scratches or other damage.
 - If damage is found, repair or replace as necessary.
4. Inspect the radio antenna module grounding surfaces and the mounting hardware for any corrosion that may cause a poor ground.
 - If corrosion is noted, clean the grounding surfaces or hardware.
5. Disconnect the harness connector at the antenna module.
6. Ignition ON, radio ON, verify a test lamp illuminates between the entertainment remote enable signal circuit terminal 1, and ground.
 - If test lamp does not illuminate, test the circuit for short to ground or an open/high resistance. If circuit tests normal, replace the radio.
7. Disconnect the antenna coax from the radio and the radio antenna module.
8. Test for infinite resistance between the antenna coax center terminal and ground.
 - If less than the specified value, replace the antenna coax.
9. Test for less than 5 ohms of resistance on the antenna coax center terminal from end to end.
 - If greater than the specified range, replace the antenna coax.
10. Test for less than 5 ohms of resistance on the antenna coax outer shield from end to end.
 - If greater than the specified range, replace the antenna coax.
11. Test for infinite resistance between the coax center terminal and the outer shield.
 - If less than the specified value, replace the antenna coax.
12. If all circuits test normal, replace the antenna module.
13. Ignition ON, radio ON, verify radio reception has improved.

- If there is still poor reception, replace the radio.

Wagon Bodystyle

1. Ignition OFF, disconnect the coax from the antenna located at the CHMSL.
2. Verify the coax connector at the CHMSL is properly secured and free of any damage.
 - If damage is found, repair or replace as necessary.
3. Inspect the antenna on the CHMSL. Verify all branches of the antenna are intact, with no scratches or other damage.
 - If damage is found, repair or replace as necessary.
4. Inspect the radio antenna module grounding surfaces and the mounting hardware for any corrosion that may cause a poor ground.
 - If corrosion is noted, clean the grounding surfaces or hardware.
5. Disconnect the harness connector at the antenna module.
6. Ignition ON, radio ON, verify a test lamp illuminates between the entertainment remote enable signal circuit terminal 1, and ground.
 - If test lamp does not illuminate, test the circuit for short to ground or an open/high resistance. If circuit tests normal, replace the radio.
7. Disconnect the antenna coax from the radio and the radio antenna module.
8. Test for infinite resistance between the antenna coax center terminal and ground.
 - If less than the specified value, replace the antenna coax.
9. Test for less than 5 ohms of resistance on the antenna coax center terminal from end to end.
 - If greater than the specified range, replace the antenna coax.
10. Test for less than 5 ohms of resistance on the antenna coax outer shield from end to end.
 - If greater than the specified range, replace the antenna coax.
11. Test for infinite resistance between the coax center terminal and the outer shield.
 - If less than the specified value, replace the antenna coax.
12. If all circuits test normal, replace the antenna module.
13. Ignition ON, radio ON, verify radio reception has improved.
 - If there is still poor reception, replace the radio.

Repair Instructions

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

- **Radio Antenna Module Replacement (Wagon), Radio Antenna Module Replacement (Coupe)**
- **Control Module References** for radio replacement, setup, and programming

SPEAKER REPLACEMENT REFERENCE

Speaker Replacement Reference

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Component	Repair Instruction
Front Speakers	Refer to <u>Radio Front Speaker Replacement</u>
Front Pillar Speakers	Refer to <u>Radio Front Side Door Lower Speaker Replacement</u>
Rear Pillar Speakers	Refer to <u>Radio Rear Speaker Replacement (Coupe)</u>
Rear Door Speakers	Refer to <u>Radio Rear Side Door Speaker Replacement (Wagon)</u> , <u>Radio Rear Side Door Speaker Replacement (Coupe)</u>

SPEAKER MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Amplifier B+	-	2	-	-
Speaker Output Circuit (+)	B1XXX 02*,**	B1XXX 04*,**	B1XXX 01*,**	-
Speaker Output Circuit (-)	B1XXX 02*,**	B1XXX 04*,**	B1XXX 01*,**	-
Subwoofer Signal (+)	B1075 02,**	1	B1075 01,**	-
Subwoofer Signal (-)	B1075 02,**	1	B1075 01,**	-
Amplifier Control	B1287 02	B1287 04	B1287 01	-
Amplifier Ground	-	2	-	-
1. No or reduced sound from subwoofer 2. Amplifier inoperative/no sound from speaker * Sets associated speaker DTC with appropriate symptom type - see DTC descriptors ** Noticeable audio distortion possible				

Circuit/System Description

Each of the audio output channel circuits (+) and (-) have a varying AC mV signal that is produced by the radio and sent to the amplifier. The amplifier then processes these signals and passes the audio along with a DC bias voltage to the appropriate speakers. The audio being played on the system is produced by the varying AC voltage. The AC voltage is what causes the speaker cone to move and produce sound. This voltage will vary depending on what type of audio is being listened to, talk or music, and type of music, as well as the volume setting of the system. When using a DMM, each of the audio amplifier output channel circuits will measure approximately 6.5 V DC.

Diagnostic Aids

- Improper speaker mounting or loose trim may cause an audible buzz or distortion. Inspect the appropriate speaker and the surrounding interior trim for proper and secure mounting.

The EL-50334-6 Audio System Diagnostic CD contains audio tracks that can be used to duplicate and isolate such concerns. Tracks 11 and 12 contain audio sweep tones for testing for speaker and grill rattles.

If the speaker or surrounding interior trim is found to be loose or improperly secured, correctly secure the item.

- When equipped with an amplifier, it is possible for some individual circuit faults to affect more than one speakers operation. Perform diagnostic tests in the sequence listed to avoid misdiagnosis.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

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Description and Operation

Radio/Audio System 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

Radio ON, verify clear audio is heard from each audio speaker.

- If audio is inoperative from all speakers, refer to Amplifier Circuit Malfunction.
- If audio is inoperative from one or more, but not all, speakers or the audio emitted from the speakers is not clear, refer to the appropriate Speaker Circuit Malfunction.

Circuit/System Testing

NOTE: **On Right Hand Drive (RHD) Models, only the Amplifier X3 connector is different from Left Hand Drive (LHD).**

Amplifier Circuit Malfunction

1. Ignition OFF, disconnect the X1 harness connector at the audio amplifier.
2. Ignition OFF, test for less than 1 V between the ground circuit terminal 8 and ground.
 - If greater than the specified range, test the ground circuit for an short to voltage.
3. Ignition OFF, test for less than 10 ohms between the ground circuit terminal 8 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for B+ between the B+ circuit terminal 4 and ground.
 - If less then specified value, test the circuit for a short to ground, or an open/high resistance.
5. Ignition OFF, disconnect the X3 harness connector at the audio amplifier.
6. For RPO UQA only: Radio ON, test for B+ between the Entertainment remote enable circuit terminal 8 and ground.
 - If less than the specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the radio.
7. If all circuits test normal, replace the audio amplifier.

Speaker Malfunction Radio Output Testing RPO UQA - LHD

1. Ignition OFF, disconnect the X3 connector at the amplifier.
2. Radio ON, test for a varying mV AC voltage reading between the appropriate signal circuit terminals listed below and ground.
 - Left front low level audio signal (+) - terminal 15 X3
 - Left front low level audio signal (-) - terminal 7 X3
 - Right front low level audio signal (+) - terminal 14 X3
 - Right front low level audio signal (-) - terminal 6 X3
 - Left rear low level audio signal (+) - terminal 13 X3
 - Left rear low level audio signal (-) - terminal 5 X3
 - Right rear low level audio signal (+) - terminal 12 X3
 - Right rear low level audio signal (-) - terminal 4 X3
 - If the varrying Mv A/C voltage reading is not present, test the signal circuit for a short to voltage, short to ground, or an open/high resistance. If the circuit tests normal, replace the radio.
3. If all circuits test normal, replace the amplifier.

Speaker Malfunction Radio Output Testing RPO UQA - RHD

1. Ignition OFF, disconnect the X3 connector at the amplifier.
2. Radio ON, test for a varying mV AC voltage reading between the appropriate signal circuit terminals listed below and ground.
 - Left front low level audio signal (+) - terminal 14 X3
 - Left front low level audio signal (-) - terminal 6 X3
 - Right front low level audio signal (+) - terminal 15 X3

- Right front low level audio signal (-) - terminal 7 X3
 - Left rear low level audio signal (+) - terminal 12 X3
 - Left rear low level audio signal (-) - terminal 4 X3
 - Right rear low level audio signal (+) - terminal 13 X3
 - Right rear low level audio signal (-) - terminal 5 X3
 - If the varying Mv A/C voltage reading is not present, test the signal circuit for a short to voltage, short to ground, or an open/high resistance. If the circuit tests normal, replace the radio.
3. If all circuits test normal, replace the amplifier.

Speaker Malfunction Radio Output Testing RPO UQS

1. Ignition OFF, disconnect the X3 and X4 harness connectors at the amplifier.
2. Ignition ON, radio ON, test for a varying mV AC voltage reading between the appropriate signal circuit terminals listed below and ground.
 - Left front low level audio signal (+) - terminal 11 X3
 - Left front low level audio signal (-) - terminal 12 X3
 - Right front low level audio signal (+) - terminal 3 X3
 - Right front low level audio signal (-) - terminal 4 X3
 - Left rear low level audio signal (+) - terminal 11 X4
 - Left rear low level audio signal (-) - terminal 12 X4
 - Right rear low level audio signal (+) - terminal 3 X4
 - Right rear low level audio signal (-) - terminal 4 X4
 - Center channel low level audio signal (+) - terminal 13 X4
 - Center channel low level audio signal (-) - terminal 14 X4
 - Subwoofer low level audio signal (+) - terminal 5 X4
 - Subwoofer low level audio signal (-) - terminal 6 X4
 - If the varying Mv A/C voltage reading is not present, test the signal circuit for a short to voltage, short to ground, or an open/high resistance. If the circuit tests normal, replace the radio.
3. If all circuits test normal, replace the amplifier.

Speaker Malfunction Amplifier Output Testing RPO UQA

1. Ignition OFF, disconnect the X1 and X2 connectors at the amplifier.
2. Radio ON, test for less than 1 V between the appropriate signal circuit terminal listed below and ground:
 - Left front speaker output (+) - terminal 5 X1
 - Left front speaker output (-) - terminal 1 X1
 - Right front speaker output (+) - terminal 8 X2
 - Right front speaker output (-) - terminal 7 X2
 - Left rear speaker output (+) - terminal 15 X2
 - Left rear speaker output (-) - terminal 16 X2

- Right rear speaker output (+) - terminal 2 X2
 - Right rear speaker output (-) - terminal 1 X2
 - Front center speaker output (+) - terminal 4 X2
 - Front center speaker output (-) - terminal 3 X2
 - Rear subwoofer speaker output (+) - terminal 7 X1
 - Rear subwoofer speaker output (-) - terminal 3 X1
 - If greater than the specified range, test both circuits of the affected speaker for a short to voltage.
3. Radio ON, test for infinite resistance between the appropriate signal circuit terminal listed below and ground:
- Left front speaker output (+) - terminal 5 X1
 - Left front speaker output (-) - terminal 1 X1
 - Right front speaker output (+) - terminal 8 X2
 - Right front speaker output (-) - terminal 7 X2
 - Left rear speaker output (+) - terminal 15 X2
 - Left rear speaker output (-) - terminal 16 X2
 - Right rear speaker output (+) - terminal 2 X2
 - Right rear speaker output (-) - terminal 1 X2
 - Front center speaker output (+) - terminal 4 X2
 - Front center speaker output (-) - terminal 3 X2
 - Rear subwoofer speaker output (+) - terminal 7 X1
 - Rear subwoofer speaker output (-) - terminal 3 X1
 - If less than the specified value, test both circuits of the affected speaker for a short to ground.
4. If all circuits test normal, reconnect all harness connectors at the amplifier.
5. Ignition ON, radio ON, disconnect the appropriate speaker.
6. Test for 5.0-7.5 V between the signal circuit terminals and ground.
- If less than the specified range, test the circuit for an open/high resistance. If the circuit tests normal, replace the amplifier.
 - If greater than the specified range, test the circuit for a short to voltage. If the circuit tests normal, replace the amplifier.
7. If the circuit tests normal, replace the appropriate speaker.

Speaker Malfunction Amplifier Output Testing RPO Code UQS

1. Ignition OFF, disconnect the X1 and X2 connectors at the amplifier.
2. Radio ON, test for less than 1 V between the appropriate signal circuit terminal listed below and ground:
 - Left front tweeter speaker output (+) - terminal 4 X2
 - Left front tweeter speaker output (-) - terminal 5 X2
 - Right front tweeter speaker output (+) - terminal 7 X2
 - Right front tweeter speaker output (-) - terminal 6 X2

- Left rear speaker output (+) - terminal 16 X2
- Left rear speaker output (-) - terminal 8 X2
- Right rear speaker output (+) - terminal 15 X2
- Right rear speaker output (-) - terminal 14 X2
- Front center speaker output (+) - terminal 13 X2
- Front center speaker output (-) - terminal 12 X2
- Left rear subwoofer speaker output (+) - terminal 5 X1
- Left rear subwoofer speaker output (-) - terminal 6 X1
- Right front speaker output (+) - terminal 7 X1
- Right front speaker output (-) - terminal 3 X1
- Left front speaker output (+) - terminal 1 X1
- Left front speaker output (-) - terminal 2 X1
- Right front speaker output (+) - terminal 7 X1
- Right front speaker output (-) - terminal 3 X1
- Left rear midrange speaker output (+) - terminal 11 X2
- Left rear midrange speaker output (-) - terminal 10 X2
- If greater than the specified range, test both circuits of the affected speaker for a short to voltage.

3. Radio ON, test for infinite resistance between the appropriate signal circuit terminal listed below and ground:

- Left front tweeter speaker output (+) - terminal 4 X2
- Left front tweeter speaker output (-) - terminal 5 X2
- Right front tweeter speaker output (+) - terminal 7 X2
- Right front tweeter speaker output (-) - terminal 6 X2
- Left rear speaker output (+) - terminal 16 X2
- Left rear speaker output (-) - terminal 8 X2
- Right rear speaker output (+) - terminal 15 X2
- Right rear speaker output (-) - terminal 14 X2
- Front center speaker output (+) - terminal 13 X2
- Front center speaker output (-) - terminal 12 X2
- Left rear subwoofer speaker output (+) - terminal 5 X1
- Left rear subwoofer speaker output (-) - terminal 6 X1
- Right front speaker output (+) - terminal 7 X1
- Right front speaker output (-) - terminal 3 X1
- Left front speaker output (+) - terminal 1 X1
- Left front speaker output (-) - terminal 2 X1
- Right front speaker output (+) - terminal 7 X1
- Right front speaker output (-) - terminal 3 X1
- Left rear midrange speaker output (+) - terminal 11 X2

- Left rear midrange speaker output (-) - terminal 10 X2
 - If less than the specified value, test both circuits of the affected speaker for a short to ground.
- 4. If all circuits test normal, reconnect all harness connectors at the amplifier.
- 5. Ignition OFF, disconnect the appropriate speaker.
- 6. Radio ON, test for 5.0-7.5 V between the signal circuit terminals and ground.
 - If less than the specified range test the circuit for an open/high resistance. If the circuit tests normal, replace the amplifier.
 - If greater than the specified range, test the circuit for a short to voltage. If the circuit tests normal, replace the amplifier.
- 7. If the circuit tests normal, replace the appropriate speaker.

Powered Subwoofer Malfunction RPO UQS

1. Disconnect the harness connector at the inoperative subwoofer.
2. Ignition ON, test for less than 1 V between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an short to voltage.
3. Ignition OFF, test for less than 10 ohms between the ground circuit terminal B and ground
 - If greater than specified range, test the ground circuit for an open/high resistance.
4. Ignition ON, test for B+ between circuit terminal A and ground.
 - If less than the specified value, test the B+ circuit for a short to ground or an open/high resistance.
5. Radio ON, test for B+ between the radio audio mute signal circuit terminal C and ground.
 - If less than the specified value, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the amplifier.
6. Radio ON, test for 5.0-7.5 V between the signal circuit terminal E and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the audio amplifier.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the audio amplifier.
7. Test for 5.0-7.5 V between the signal circuit terminal D and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the audio amplifier.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the audio amplifier.
8. If all circuits test normal, replace the subwoofer.

Repair Instructions

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

- **Speaker Replacement Reference**
- **Control Module References** for amplifier or radio replacement, programming and setup

UNABLE TO CONTACT ONSTAR CALL CENTER

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 vehicle communication interface module (VCIM) is a cellular device that allows the user to communicate data and voice signals over the national cellular network. When an OnStar keypress is made, the VCIM activates and connects the system to the cellular carriers communication system by interacting with the national cellular infrastructure. The module sends and receives all cellular communications over the cellular phone and navigation antenna and cellular antenna coax.

Diagnostic Aids

- The customer concern may have been due to a lack of cellular service in a given area. A failure in the National Cellular Network infrastructure at the time of the customers failed connection that has since been repaired may also have been the cause.
- If an OnStar® emergency call is able to successfully connect the vehicle to the OnStar® Call Center when an OnStar® Call Center button press is not, there may be a failure in the ability of the OnStar® system in the vehicle to be recognized by the local cellular carrier.
- If the prompt "OnStar® request ended" is heard, without pressing the white dot button at the end of the OnStar® keypress, the OnStar® system at one time has made a successful cellular connection, but was unable to complete the call.
- It is important to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar 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

EL-49903 GM OnStar Antenna Diagnostic Tool Kit

Circuit/System Verification

NOTE: **The following verification requires the vehicle to be outside with an unobstructed view of the southern sky. Allow 5 minutes after turning key on for the GPS satellites to acquire vehicle signal.**

Ignition ON, wait 5 minutes, then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call, verifying the vehicle OnStar system is functioning and the consultant can locate the vehicle.

- If the unit does not connect to the OnStar Call Center, use a scan tool to obtain and record the following information: Electronic Serial Number (ESN), Station Identifier (STID), GM 8-digit part number, Mobile Identification Number (MIN), Mobile Dialed Number (MDN), Transceiver ID (Trans ID) and call GM TAC to confirm a valid subscription.

Circuit/System Testing

NOTE: **The vehicle may be equipped with sectioned coax. Test each section and replace only the faulty section, not the entire length of coax.**

1. Ignition OFF, disconnect the GPS and cellular coax cable connector at the VCIM.
2. Using the EL-49903-3 kit (EL-49903-5 adapter and EL-49903-4 coax cable), connect the **EL-49903** GM OnStar antenna diagnostic tool kit to the VCIM.
3. Ignition ON, wait 5 minutes, and then contact the OnStar call center consultant by pressing the blue OnStar button. A call center consultant should answer the call.
 - If the unit does not connect to the OnStar Call Center, replace the VCIM.
4. Ignition OFF, disconnect the **EL-49903** GM OnStar antenna diagnostic tool kit from the VCIM and perform the coax cable test on the coax cable between the VCIM and the cellular and digital radio antenna.
 - If the coax cable does not pass the test, replace the coax cable.
5. If all circuits test normal, replace the cellular and digital radio antenna.

Component Testing

CAUTION: Refer to Test Probe Caution .

NOTE: Before testing the coax cable, check the cable exterior for being pinched, cut, damaged, or having loose connections at the components, which can cause reception issues.

To prevent false reading when testing the center coax terminals, use care not to ground the test probe on the outer housing/shield.

Coax Cable Test

1. Ignition OFF, disconnect the GPS and cellular phone coax cable at both components.
2. Test both for less than 5 ohms between both ends of the coax cables center terminals.
 - If greater than the specified range, replace the failed coax cable.
3. Test for greater than 10k ohms between the coax cable center wire and the outer coax shield.
 - If less than the specified range, replace the coax cable.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Digital Radio, Mobile Telephone, and Vehicle Location Base Replacement
- Control Module References for VCIM replacement, setup, and programming

ONSTAR VOICE RECOGNITION 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 telematics communication interface control module is capable of interpreting voice commands received over the cellular microphone circuit. Speech recognition allows the user to speak to one computer in the vehicle, and one reached over the cellular communication network. The module attempts to understand the users command, and responds by speaking back, or by taking the appropriate action, e.g. dialing the phone.

Reference Information

Schematic Reference

OnStar/Telematics Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

OnStar Description and Operation

Electrical Information Reference

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

Circuit/System Verification

NOTE:

- It is necessary to have the vehicle in an open outside area where a cellular call can be successfully placed and GPS data can be received from satellites.
- The vehicle should be located in a quiet area.

1. Ignition ON, press the blue OnStar Call button.
2. Verify that your voice is heard clearly by the OnStar Call center.
 - **If your voice can not be heard clearly**

Refer to **OnStar Microphone Malfunction**

- **If your voice can be heard clearly**
3. Verify that the system responds appropriately to all voice commands by pressing the voice command button and attempting to operate the system using multiple voice commands.

- **If the OnStar system does not respond to any voice commands**

Replace the K73 Telematics Communication Interface Control Module

- **If the OnStar system responds to some, but not all voice commands**

Refer to **OnStar Description and Operation** for tips on proper pronunciation

- **If the OnStar system responds to all voice commands**
4. All OK.

Repair Instructions

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

Control Module References for telematics communication interface control module replacement, programming, and setup.

REPAIR INSTRUCTIONS

MOBILE TELEPHONE MICROPHONE REPLACEMENT

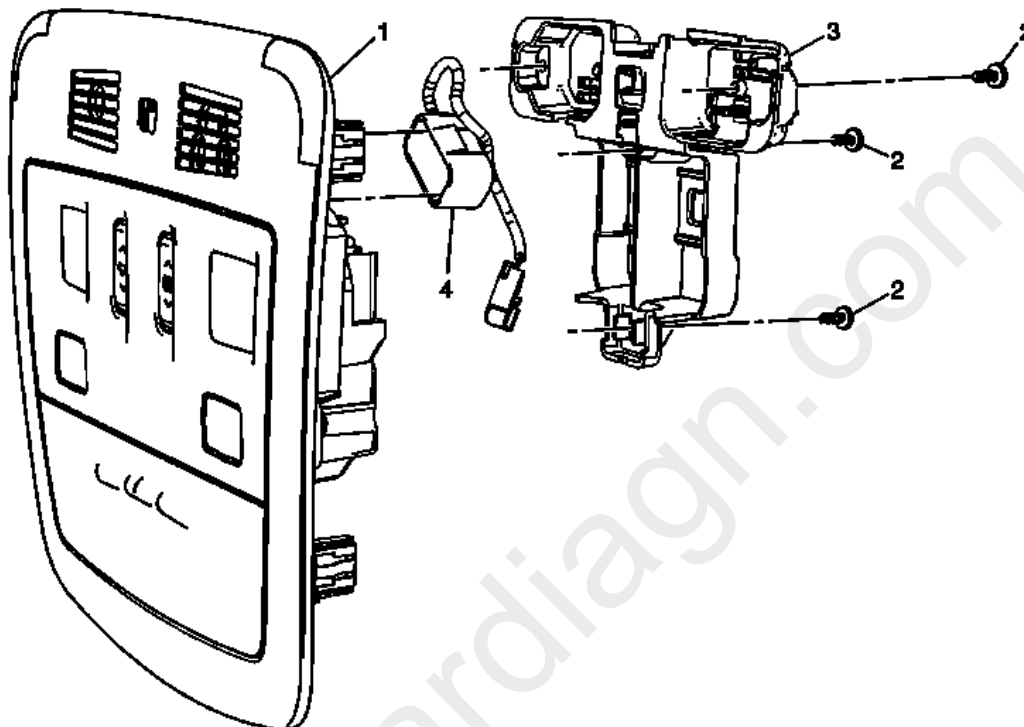


Fig. 19: Mobile Telephone Microphone
Courtesy of GENERAL MOTORS COMPANY

Mobile Telephone Microphone Replacement

Callout	Component Name
1	Front Overhead Console Assembly Refer to <u>Roof Console Replacement</u> .
2	Front Overhead Console Reinforcement Bracket Screw (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2 N.m (18 lb in)
3	Front Overhead Console Reinforcement Bracket

COMMUNICATION INTERFACE MODULE REPLACEMENT

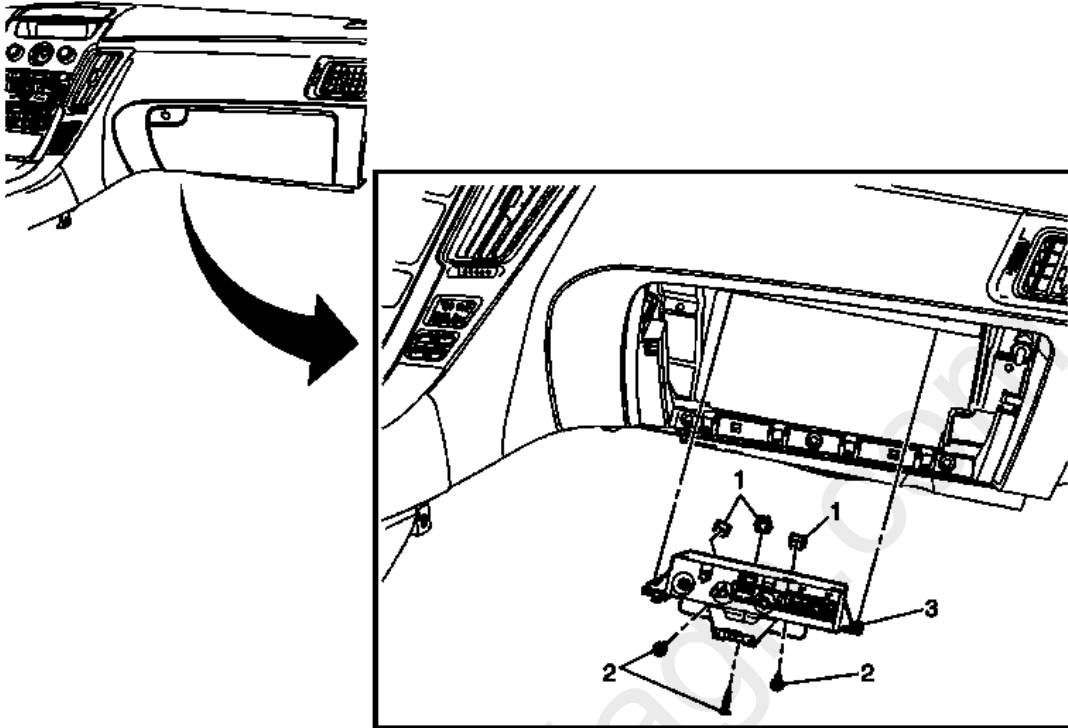


Fig. 20: Identifying Communication Interface Module

Courtesy of GENERAL MOTORS COMPANY

Communication Interface Module Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel compartment. Refer to <u>Instrument Panel Compartment Replacement (Right Hand Drive)</u> , <u>Instrument Panel Compartment Replacement (Left Hand Drive)</u> .	
1	Communication Interface Module Nut (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 N.m (79 lb in)
2	Communication Interface Module Bolt Screw (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> .

	Tighten 2.5 N.m (22 lb in)
3	Communication Interface Module Procedure 1. Disconnect the electrical connections. 2. If replacing the communication interface module be sure to transfer Bluetooth antenna, if equipped. 3. For programming and set up procedures, refer to <u>Control Module References</u> .

WIRELESS COMMUNICATION INTERFACE ANTENNA REPLACEMENT

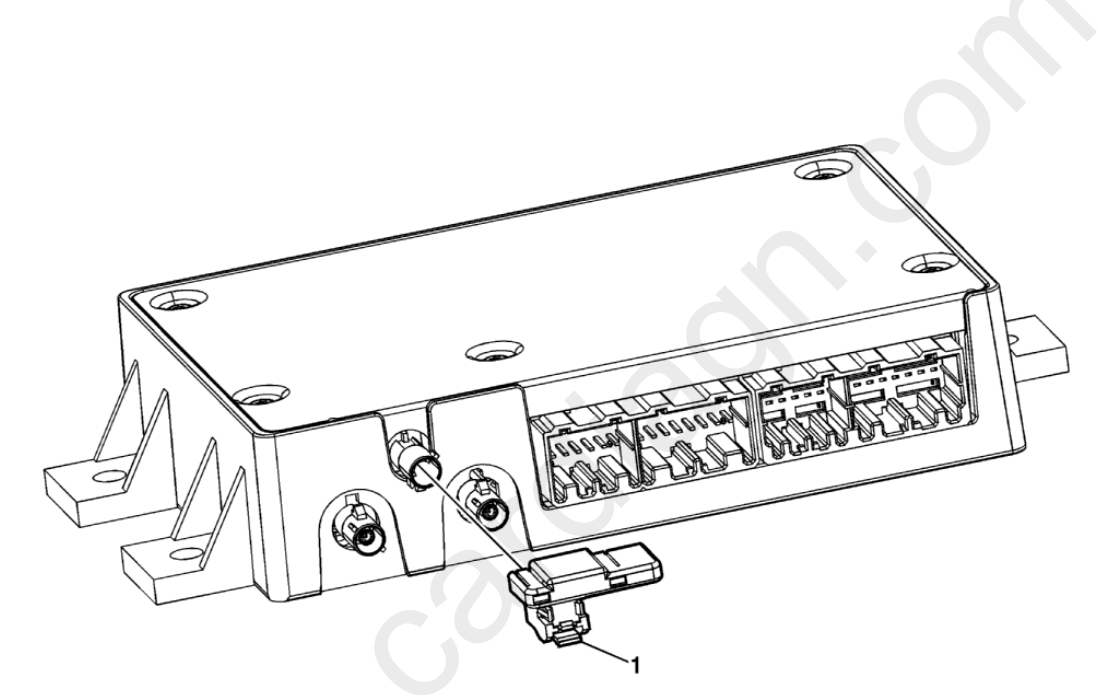


Fig. 21: Identifying Wireless Communication Interface Antenna
 Courtesy of GENERAL MOTORS COMPANY

Wireless Communication Interface Antenna Replacement

Callout	Component Name
Preliminary Procedure Remove the communication interface module. Refer to <u>Communication Interface Module Replacement</u>	
1	Wireless Communication Interface Antenna Bluetooth Module Procedure

Unsnap the Antenna from Communication Module.

RADIO REPLACEMENT

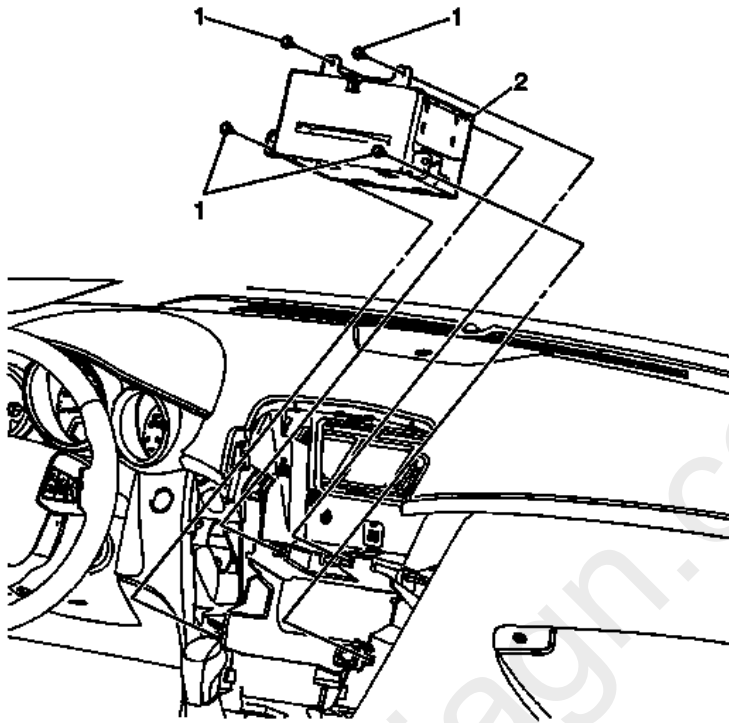


Fig. 22: Radio

Courtesy of GENERAL MOTORS COMPANY

Radio Replacement

Callout	Component Name
Preliminary Procedure Remove the AM/FM Stereo and Clock and Audio Disc Player Radio Control Assembly. Refer to <u>Radio Control Assembly Replacement (with Navigation Display)</u> , <u>Radio Control Assembly Replacement (without Navigation Display)</u> .	
1	Radio Screw (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 N.m (80 lb in)
2	Radio Assembly Procedure

1. Disconnect the electrical connections.
2. Refer to **Control Module References** for programming and setup information.

RADIO CONTROL ASSEMBLY REPLACEMENT (WITH NAVIGATION DISPLAY)

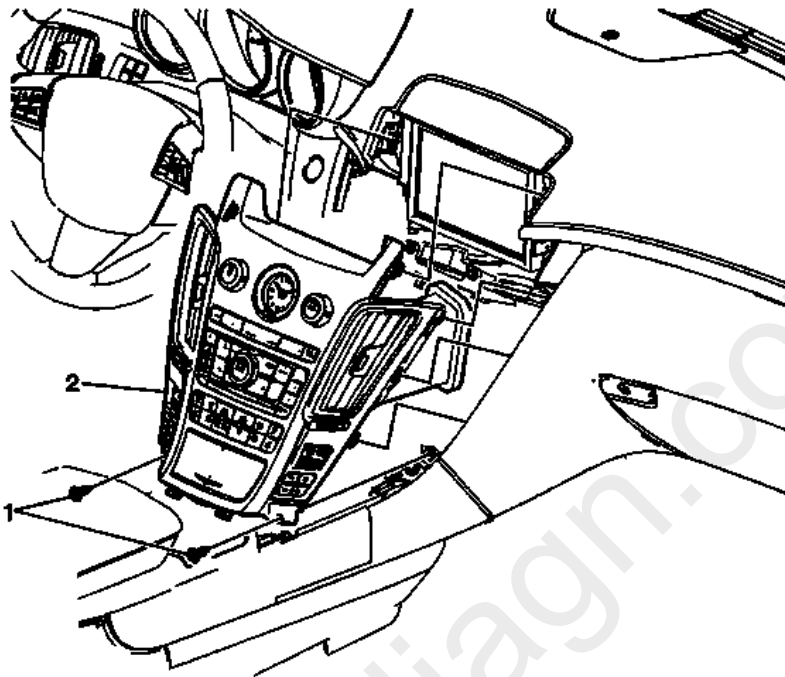


Fig. 23: Radio Control Assembly (with Navigation Display)

Courtesy of GENERAL MOTORS COMPANY

Radio Control Assembly Replacement (with Navigation Display)

Callout	Component Name
Preliminary Procedure	
1.	Remove the front floor console transmission shifter trim plate assembly. Refer to <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Right Hand Drive Automatic Trans)</u> , <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Right Hand Drive Manual Transmission)</u> , <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Left Hand Drive Automatic Trans)</u> , <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Left Hand Drive Manual Transmission)</u> .
2.	Remove the instrument panel trim plate applique - center. Refer to <u>Instrument Panel Center Trim Plate Applique Replacement (Left Hand Drive)</u> , <u>Instrument Panel Center Trim Plate Applique Replacement (Right Hand Drive)</u> .
3.	Remove the instrument panel trim plate applique - right side. Refer to <u>Instrument Panel Trim Plate Applique Replacement - Right Side (Left Hand Drive)</u> , <u>Instrument Panel Trim Plate Applique Replacement - Right Side (Right Hand Drive)</u> .

1	AM/FM Stereo and Clock and Audio Disc Player Radio Control Screw (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	AM/FM Stereo and Clock and Audio Disc Player Radio Control Assembly Procedure 1. Use a flat-bladed plastic trim tool in order to release the retainer clips securing the AM/FM stereo and clock and audio disc player radio control assembly to the instrument panel. 2. Disconnect the electrical connections. 3. When replacing the AM/FM stereo and clock and audio disc player radio control assembly, transfer all necessary components. 4. Refer to <u>Control Module References</u> for programming and setup information. TIP: Wire harness for the radio control assembly could get trapped and interfere with storage bin function. Please note harness routing during installation and perform functional check on components to ensure proper operation after component replacement.

RADIO CONTROL ASSEMBLY REPLACEMENT (WITHOUT NAVIGATION DISPLAY)

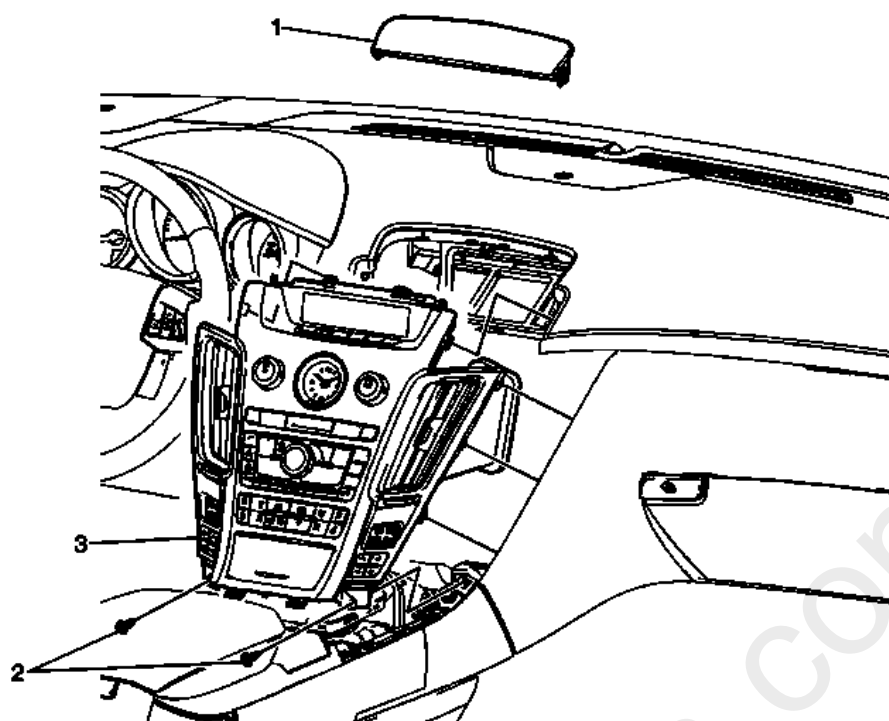


Fig. 24: Radio Control Assembly (without Navigation Display)
 Courtesy of GENERAL MOTORS COMPANY

Radio Control Assembly Replacement (without Navigation Display)

Callout	Component Name
Preliminary Procedure	
1. Remove the front floor console transmission shifter trim plate assembly. Refer to <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Right Hand Drive Automatic Trans)</u> , <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Right Hand Drive Manual Transmission)</u> , <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Left Hand Drive Automatic Trans)</u> , <u>Front Floor Console Transmission Shift Opening Trim Plate Replacement (Left Hand Drive Manual Transmission)</u> . 2. Remove the instrument panel trim plate applique - center. Refer to <u>Instrument Panel Center Trim Plate Applique Replacement (Left Hand Drive)</u> , <u>Instrument Panel Center Trim Plate Applique Replacement (Right Hand Drive)</u> . 3. Remove the instrument panel trim plate applique - right side. Refer to <u>Instrument Panel Trim Plate Applique Replacement - Right Side (Left Hand Drive)</u> , <u>Instrument Panel Trim Plate Applique Replacement - Right Side (Right Hand Drive)</u> .	
1	Instrument Panel Upper Cover Refer to <u>Instrument Panel Upper Trim Cover Replacement (Right Hand Drive)</u> , <u>Instrument Panel Upper Trim Cover Replacement (Left Hand Drive)</u> .
	AM/FM Stereo and Clock and Audio Disc Player Radio Control Screw (Qty: 2) CAUTION:

2	Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
3	AM/FM Stereo and Clock and Audio Disc Player Radio Control Assembly Procedure 1. Use a flat-bladed plastic trim tool in order to release the retainer clips securing the AM/FM Stereo and Clock and Audio Disc Player Radio Control Assembly to the instrument panel. 2. Disconnect the electrical connections. 3. When replacing the AM/FM Stereo and Clock and Audio Disc Player Radio Control Assembly, transfer all necessary components. 4. Refer to <u>Control Module References</u> for programming and setup information. TIP: Wire harness for the radio control assembly could get trapped and interfere with storage bin function. Please note harness routing during installation and perform functional check on components to ensure proper operation after component replacement.

RADIO VOLUME COMPENSATOR INTERIOR NOISE MICROPHONE REPLACEMENT

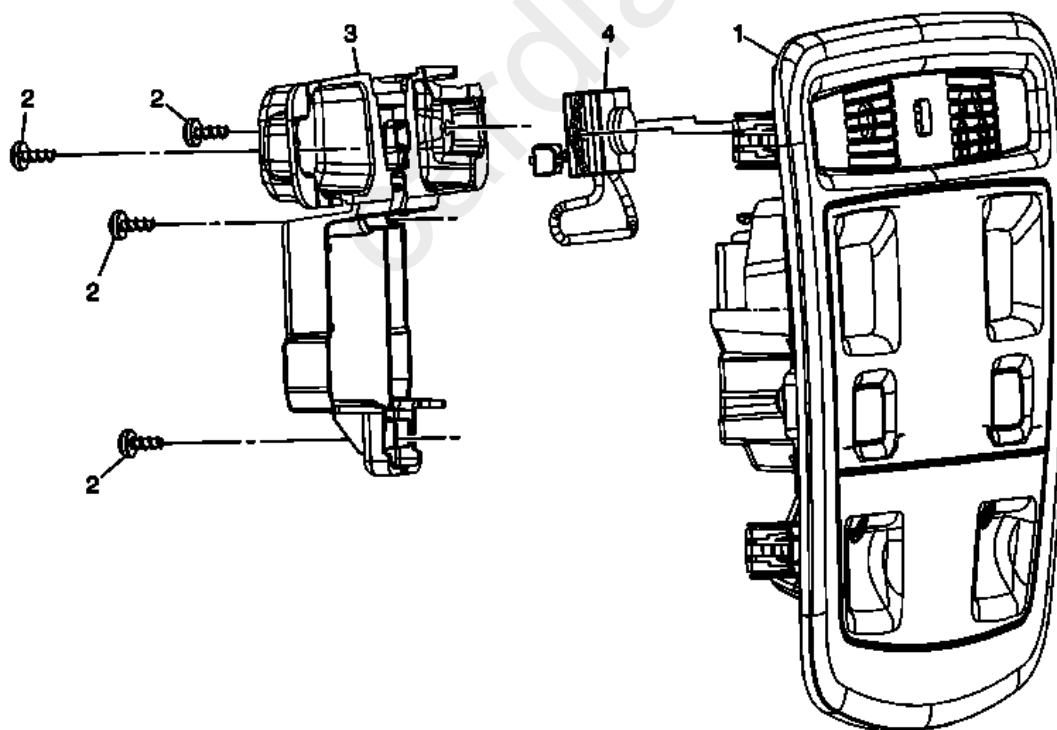


Fig. 25: Radio Volume Compensator Interior Noise Microphone

Courtesy of GENERAL MOTORS COMPANY

Radio Volume Compensator Interior Noise Microphone Replacement

Callout	Component Name
1	Front Overhead Console Assembly Refer to Roof Console Replacement .
2	Front Overhead Console Reinforcement Bracket Screw (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 2 N.m (18 lb in)
3	Front Overhead Console Reinforcement Bracket
4	Radio Volume Compensator Interior Noise Microphone Assembly

RADIO SPEAKER AMPLIFIER REPLACEMENT (WAGON WITH UQA)

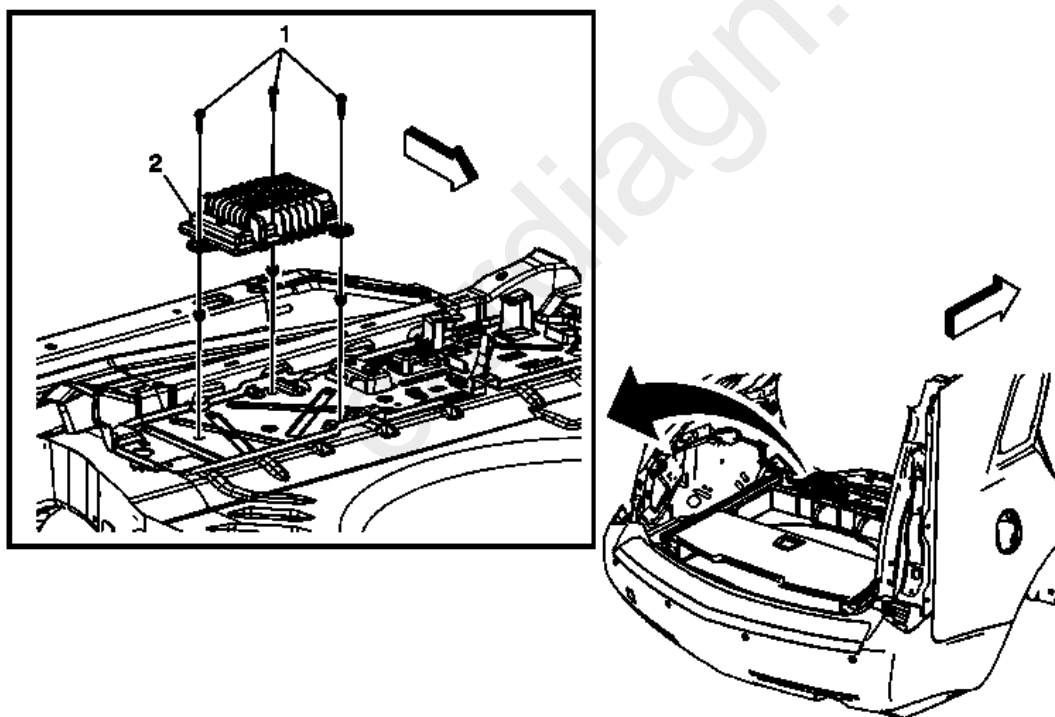


Fig. 26: Radio Speaker Amplifier (Wagon With UQA)

Courtesy of GENERAL MOTORS COMPANY

Radio Speaker Amplifier Replacement (Wagon with UQA)

Callout	Component Name

Preliminary Procedure

1. Fold the left side rear seat forward. 2. Pull up on the stowage compartment cover. Refer to <u>Rear Compartment Floor Stowage Compartment Cover Replacement (Wagon)</u>	
1	Radio Speaker Amplifier Bolts (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Radio Speaker Amplifier Assembly Procedure Disconnect the electrical connections.

RADIO SPEAKER AMPLIFIER REPLACEMENT (WAGON WITH UQS)

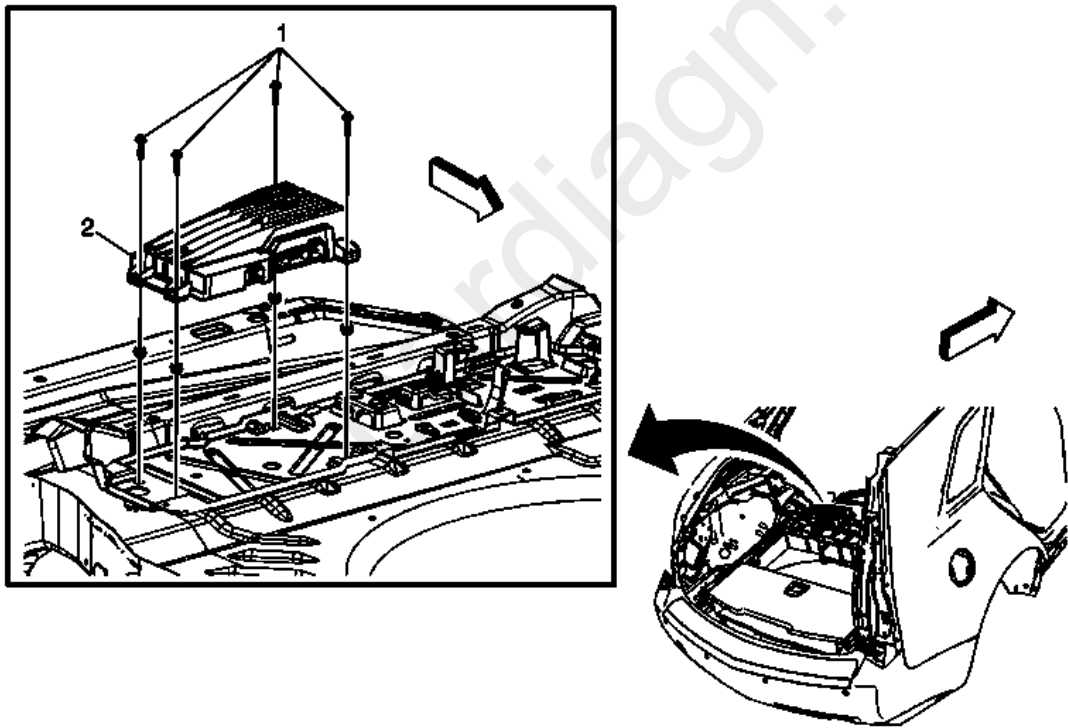


Fig. 27: Radio Speaker Amplifier (Wagon With UQS)
Courtesy of GENERAL MOTORS COMPANY

Radio Speaker Amplifier Replacement (Wagon with UQS)

Callout	Component Name

Preliminary Procedure

1. Fold the left side rear seat forward.
2. Pull up on stowage compartment cover. Refer to **Rear Compartment Floor Stowage Compartment Cover Replacement (Wagon)**

1	Radio Speaker Amplifier Bolts (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Radio Speaker Amplifier Assembly Procedure 1. Disconnect the electrical connections. 2. For programming and set up, refer to <u>Control Module References</u>

RADIO SPEAKER AMPLIFIER REPLACEMENT (COUPE WITH UQA)

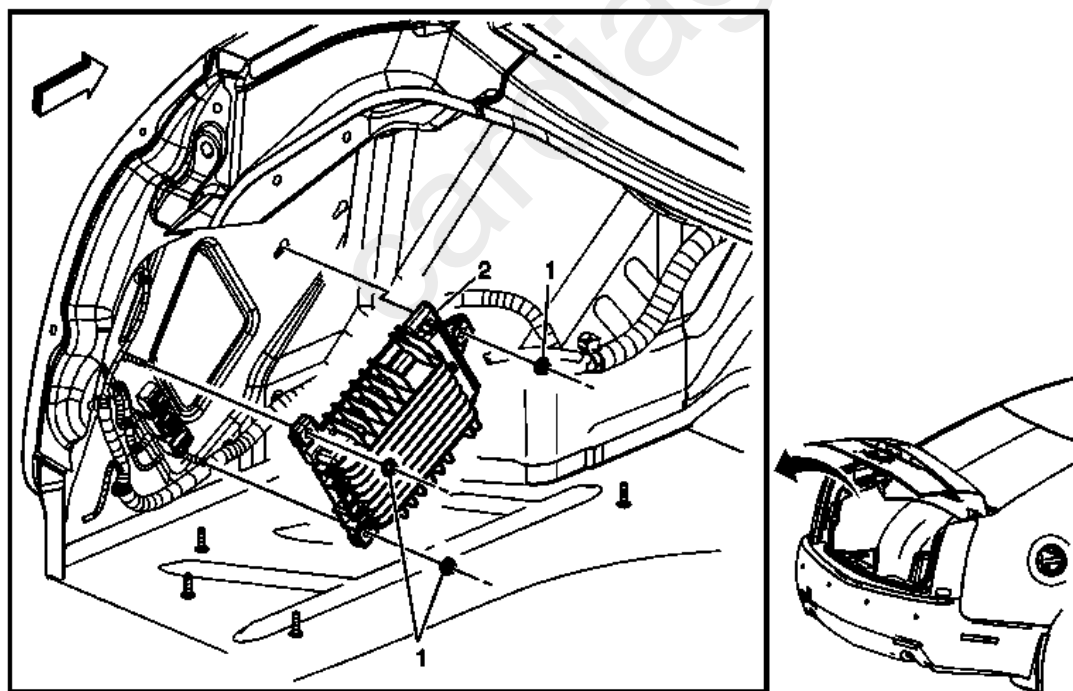


Fig. 28: Radio Speaker Amplifier (With UQA)
Courtesy of GENERAL MOTORS COMPANY

Radio Speaker Amplifier Replacement (Coupe With UQA)

Callout	Component Name
Preliminary Procedure Remove the rear compartment side trim panel. Refer to <u>Rear Compartment Side Trim Panel Replacement (Coupe)</u> .	
1	Radio Speaker Amplifier Nut (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 6 N.m (54 lb in)
2	Radio Speaker Amplifier Assembly Procedure Disconnect the electrical connections.

RADIO SPEAKER AMPLIFIER REPLACEMENT (COUPE WITH UQS)

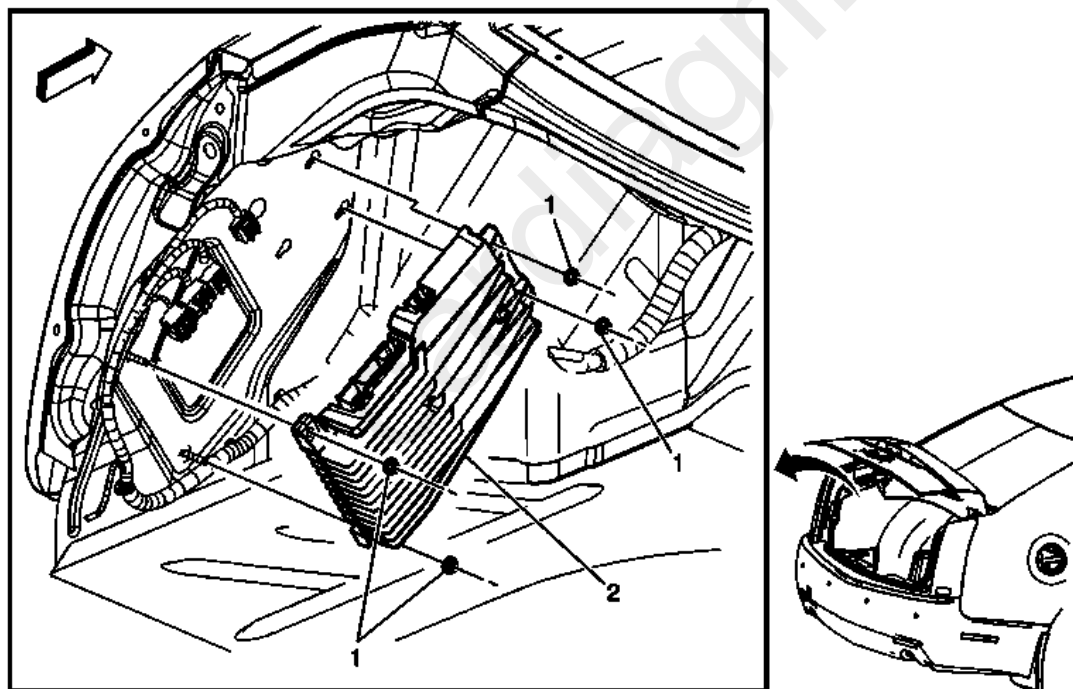


Fig. 29: Radio Speaker Amplifier (with UQS)
Courtesy of GENERAL MOTORS COMPANY

Radio Speaker Amplifier Replacement (Coupe With UQS)

Callout	Component Name
Preliminary Procedure	

Remove the rear compartment side trim panel, left side. Refer to Rear Compartment Side Trim Panel Replacement (Coupe) .

1	Radio Speaker Amplifier Nut (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 6 N.m (54 lb in)
2	Radio Speaker Amplifier Assembly Procedure 1. Disconnect the electrical connections. 2. For programming and set up, refer to <u>Control Module References</u>

NAVIGATION INFORMATION DISPLAY OPENING COVER REPLACEMENT

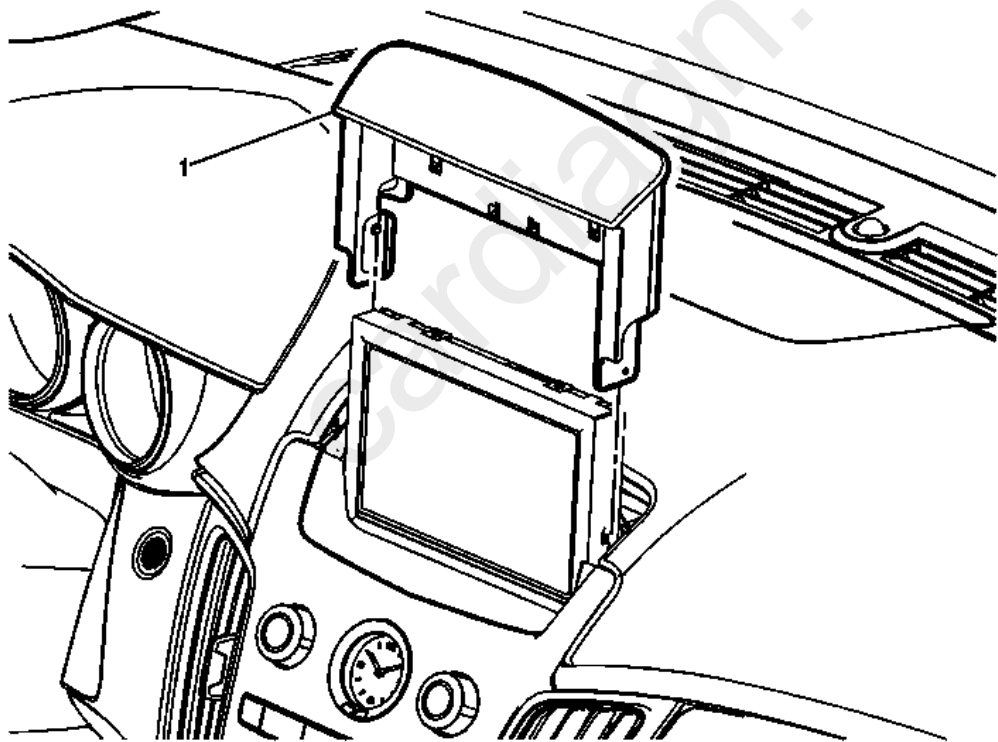


Fig. 30: Navigation Information Display Opening Cover
Courtesy of GENERAL MOTORS COMPANY

Navigation Information Display Opening Cover Replacement

Callout	Component Name

	Navigation Information Display Opening Cover Assembly
	Procedures
1	1. Position the Radio and Video and Audio Disc Player and Navigational Information Display in the up position. 2. Slide a flat-bladed plastic trim tool between the information display screen and the navigation information display opening cover along each side to release the two tabs retaining the bezel to the display screen.

MOBILE TELEPHONE DIGITAL ANTENNA REPLACEMENT

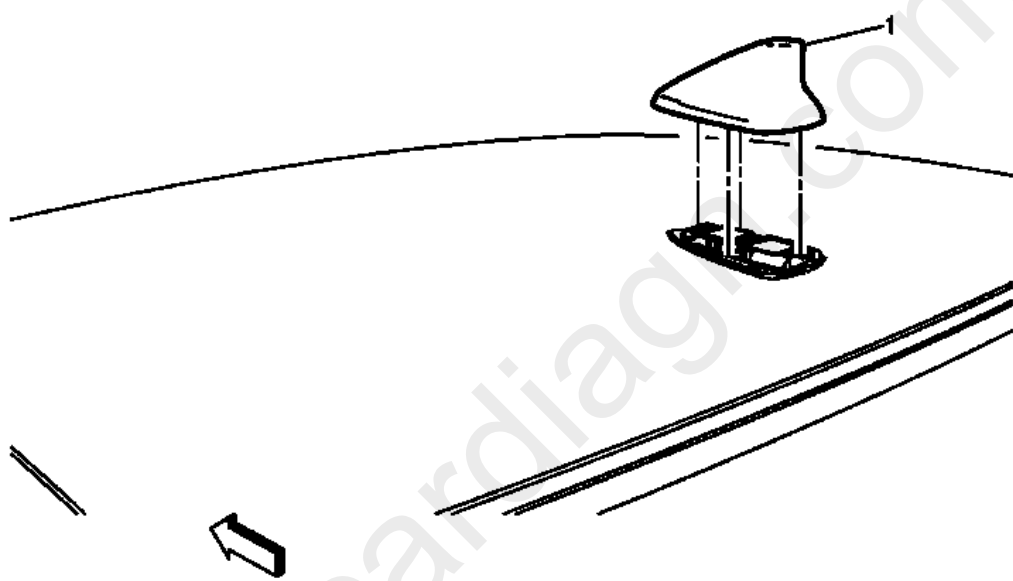


Fig. 31: Mobile Telephone Digital Antenna
 Courtesy of GENERAL MOTORS COMPANY

Mobile Telephone Digital Antenna Replacement

Callout	Component Name
1	Mobile Telephone Digital Antenna Procedure Using the appropriate tool, gently remove the antenna cover from the base. The antenna is secured in four places.

RADIO ANTENNA COIL REPLACEMENT (WAGON)

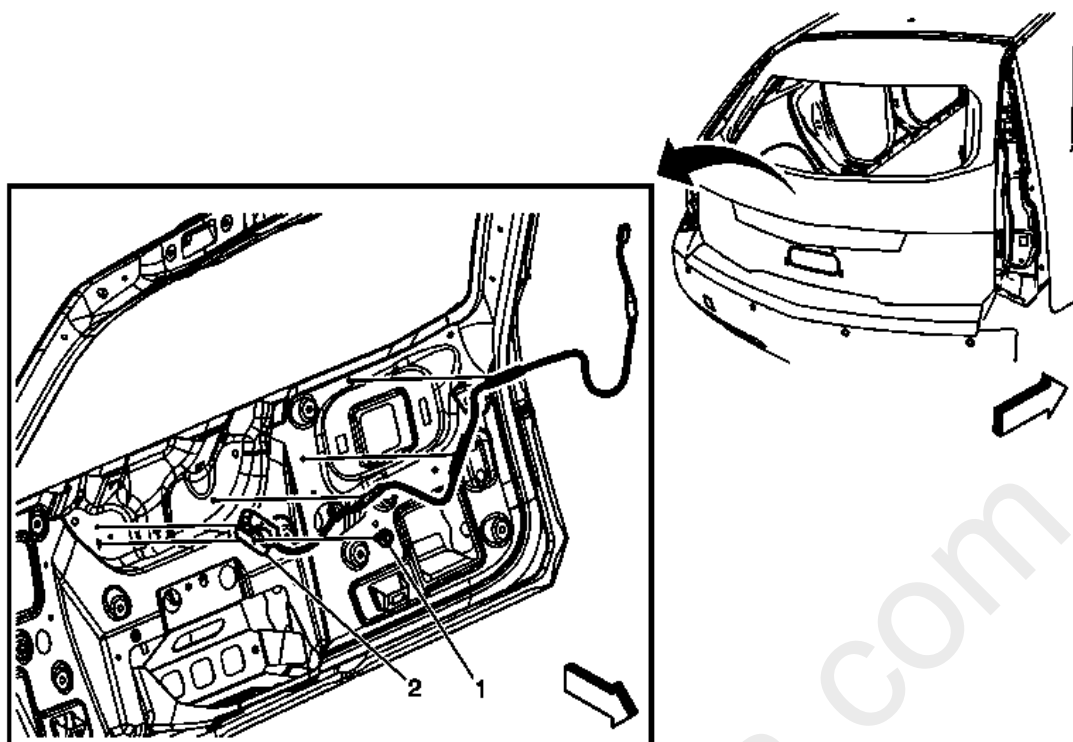


Fig. 32: Radio Antenna Coil (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Radio Antenna Coil Replacement (Wagon)

Callout	Component Name
Preliminary Procedure Remove the liftgate lower trim finish panel. Refer to <u>Liftgate Lower Trim Finish Panel Replacement (Wagon)</u> .	
1	Radio Antenna Module Coil Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten 10 N.m (89 lb in)
2	Radio Antenna Coil Procedure Disconnect the electrical connection and the four integral retainers.

TELEVISION ANTENNA AMPLIFIER REPLACEMENT

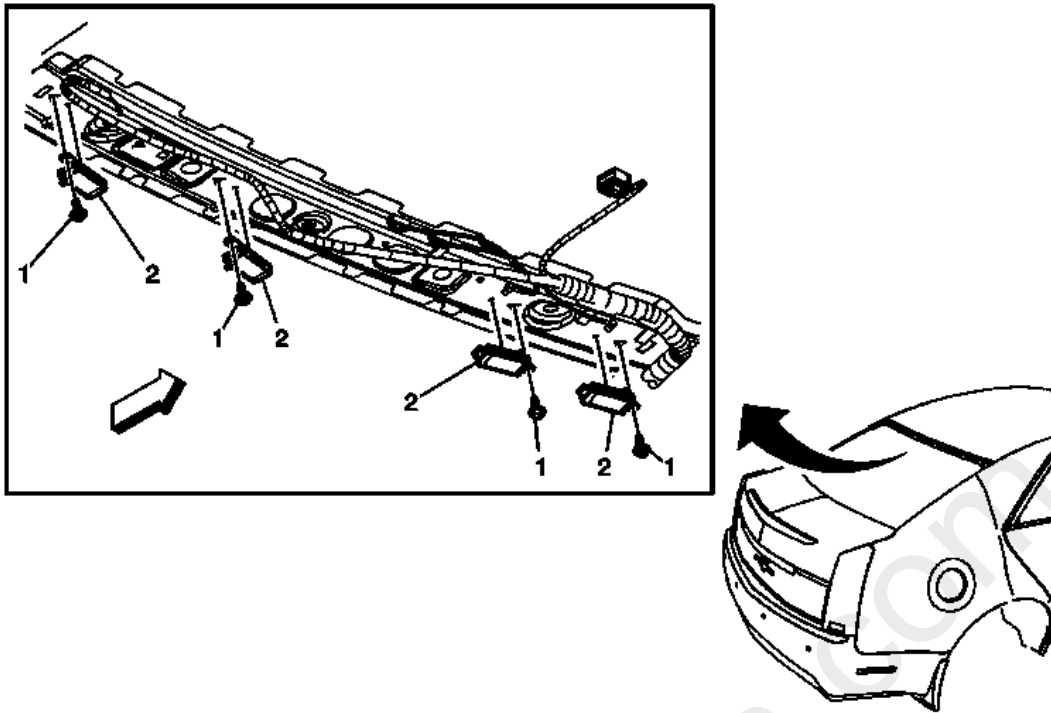


Fig. 33: Television Antenna Amplifier
 Courtesy of GENERAL MOTORS COMPANY

Television Antenna Amplifier Replacement

Callout	Component Name
Preliminary Procedure Lower the rear of the headliner trim panel to access the antenna amplifiers. Refer to <u>Headlining Trim Panel Replacement (Coupe)</u> , <u>Headlining Trim Panel Replacement (Wagon)</u> .	
1	Television Antenna Amplifier Bolt (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 10 N.m (89 lb in)
2	Television Antenna Amplifier Assembly Procedure 1. Disconnect the electrical connections. 2. Disconnect the antenna cables.

RADIO ANTENNA MODULE REPLACEMENT (WAGON)

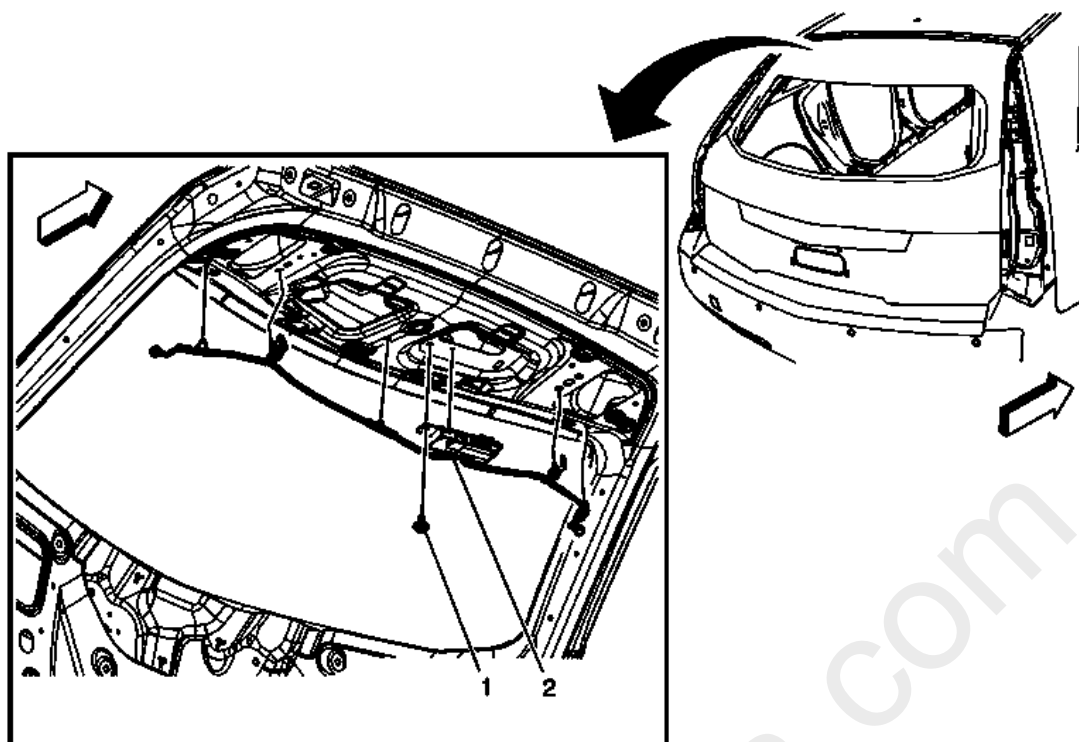


Fig. 34: Radio Antenna Module (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Radio Antenna Module Replacement (Wagon)

Callout	Component Name
Preliminary Procedure Remove the liftgate upper trim finish panel. Refer to <u>Liftgate Upper Trim Finish Panel Replacement (Wagon)</u> .	
1	Radio Antenna Module Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten 10 N.m (89 lb in)
2	Radio Antenna Module Assembly Procedure 1. Disconnect the electrical connections. 2. Disconnect the four integral retainers and the two integral bolt screws.

RADIO ANTENNA MODULE REPLACEMENT (COUPE)

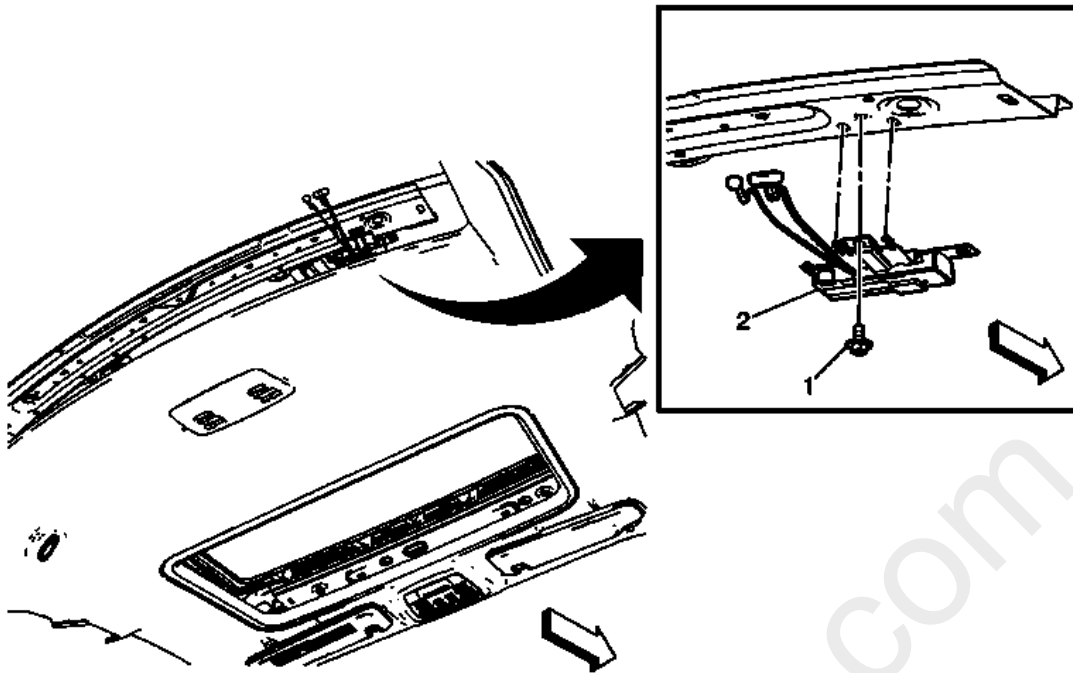


Fig. 35: Radio Antenna Module & Bolt (Coupe)
 Courtesy of GENERAL MOTORS COMPANY

Radio Antenna Module Replacement (Coupe)

Callout	Component Name
Preliminary Procedure Lower the rear of the headliner trim panel to access the antenna amplifiers. Refer to <u>Headlining Trim Panel Replacement (Coupe)</u> .	
1	Radio Antenna Module Bolt (Qty: 1) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 N.m (80 lb in)
2	Radio Antenna Module Assembly Procedure 1. Disconnect the electrical connections. 2. Disconnect the antenna cables from the rear glass.

TELEVISION ANTENNA CABLE REPLACEMENT

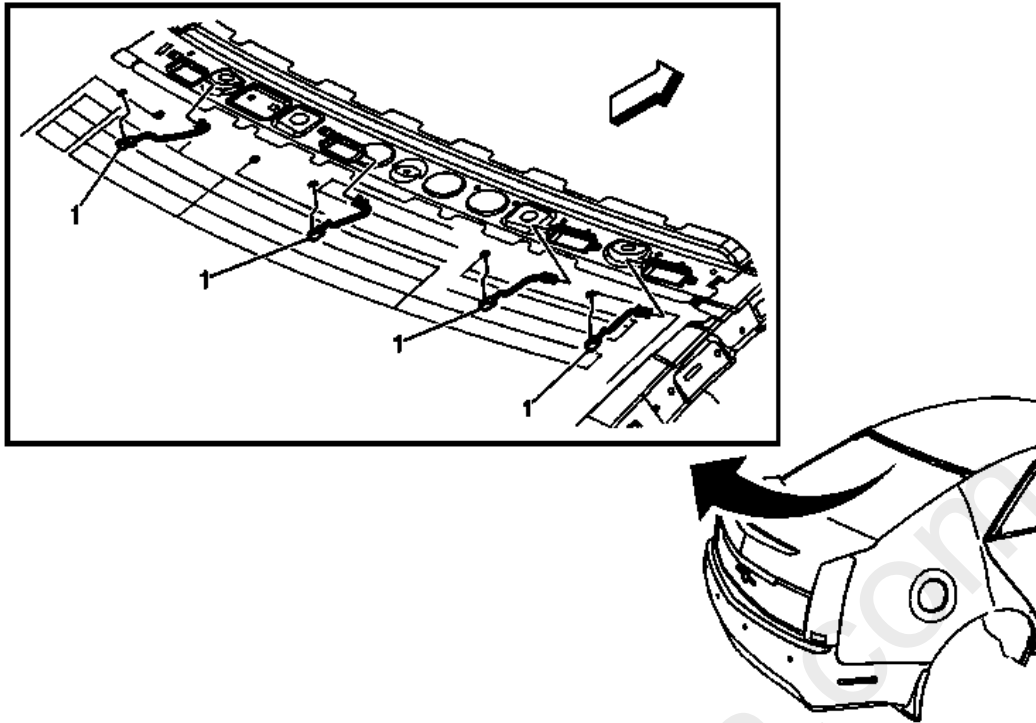


Fig. 36: Television Antenna Cable
 Courtesy of GENERAL MOTORS COMPANY

Television Antenna Cable Replacement

Callout	Component Name
Preliminary Procedure Lower the rear of the headliner trim panel to access the antenna amplifiers. Refer to <u>Headlining Trim Panel Replacement (Coupe)</u> , <u>Headlining Trim Panel Replacement (Wagon)</u> .	
1	Television Antenna Amplifier Cables Procedure Disconnect the cables from the rear window grid and the antenna amplifiers.

TELEVISION TUNER REPLACEMENT

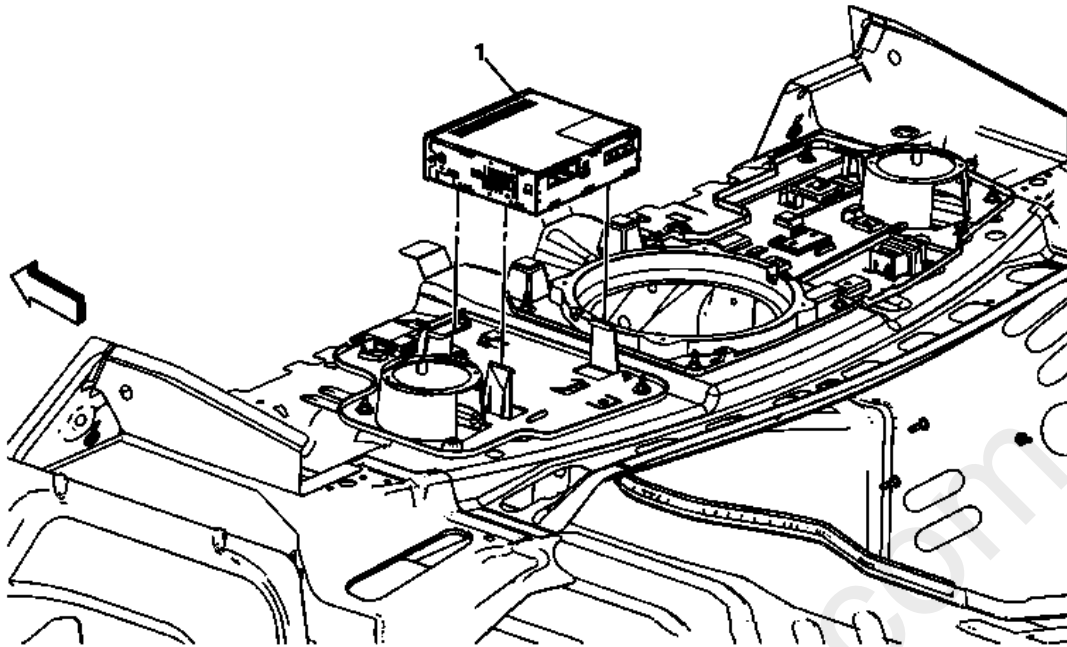


Fig. 37: Television Tuner
 Courtesy of GENERAL MOTORS COMPANY

Television Tuner Replacement

Callout	Component Name
Preliminary Procedure	
Remove the rear window shelf trim panel. Refer to Rear Window Panel Trim Replacement (Coupe) .	
1	Television Tuner Assembly Procedure 1. Disconnect the electrical connection. 2. For programming and set up, refer to Control Module References .

DIGITAL RADIO, MOBILE TELEPHONE, AND VEHICLE LOCATION BASE REPLACEMENT

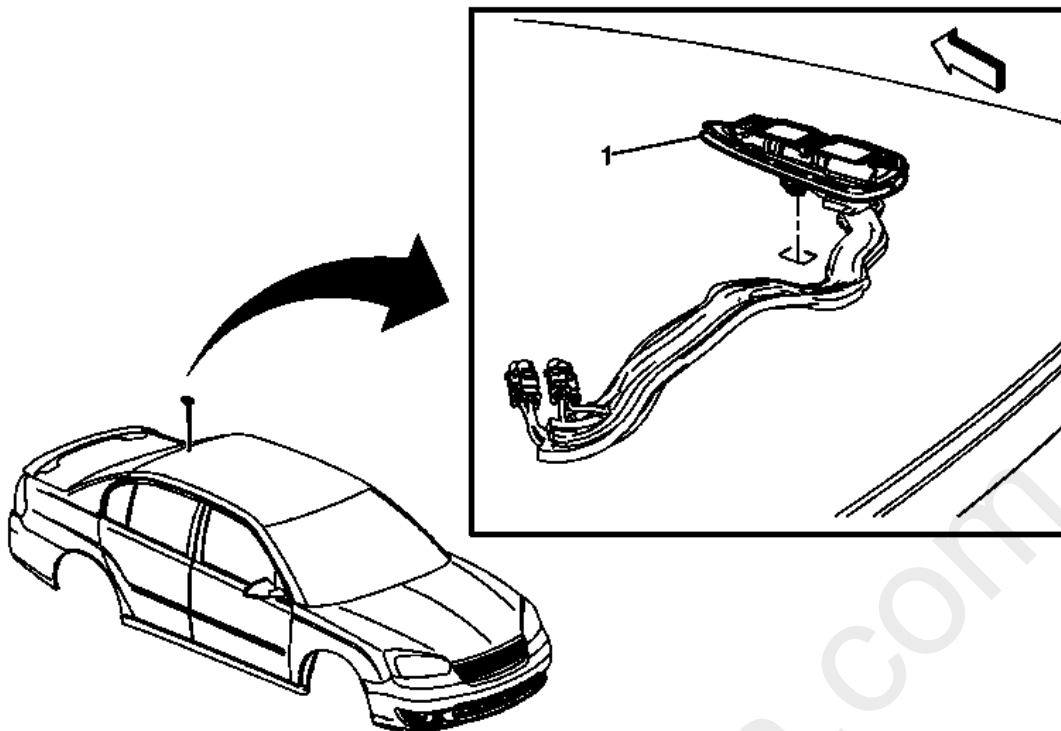


Fig. 38: Digital Radio, Mobile Telephone, and Vehicle Location Base
 Courtesy of GENERAL MOTORS COMPANY

Digital Radio, Mobile Telephone, and Vehicle Location Base Replacement

Callout	Component Name
Preliminary Procedure	
1. Remove the mobile telephone digital antenna. Refer to <u>Mobile Telephone Digital Antenna Replacement</u> . 2. Lower the headliner trim panel to access the antenna base fastener. Refer to <u>Headlining Trim Panel Replacement (Coupe)</u> , <u>Headlining Trim Panel Replacement (Wagon)</u> .	
1	Digital Radio and Mobile Telephone and Vehicle Location Base Assembly CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Loosen the integral nut. 2. Disconnect the electrical connections. 3. Disconnect the antenna cables. 4. Feed the wiring and cable up through the hole in the roof panel.

Tighten
10 N.m (89 lb in)

NAVIGATION AND TRAFFIC DATA ANTENNA REPLACEMENT (WITH U2X)

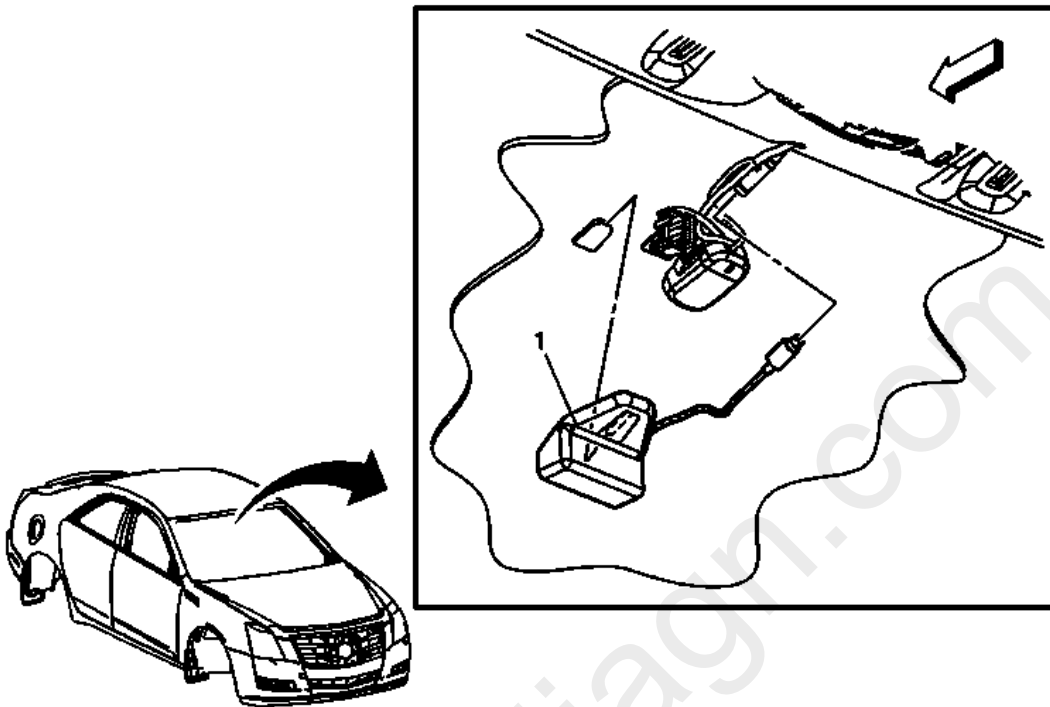


Fig. 39: Navigation and Traffic Data Antenna
Courtesy of GENERAL MOTORS COMPANY

Navigation and Traffic Data Antenna Replacement (With U2X)

Callout	Component Name
Preliminary Procedure Lower the front of the headliner trim panel to access the navigation and traffic data antenna wiring. Refer to <u>Headlining Trim Panel Replacement (Coupe)</u> , <u>Headlining Trim Panel Replacement (Wagon)</u> .	
1	Navigation and Traffic Data Antenna Assembly Procedure 1. Disconnect the electrical connections. 2. Unsnap the navigation and traffic data antenna from the antenna bracket mounted on the windshield.

NAVIGATION ANTENNA REPLACEMENT (WITH UAV OR U2Y)

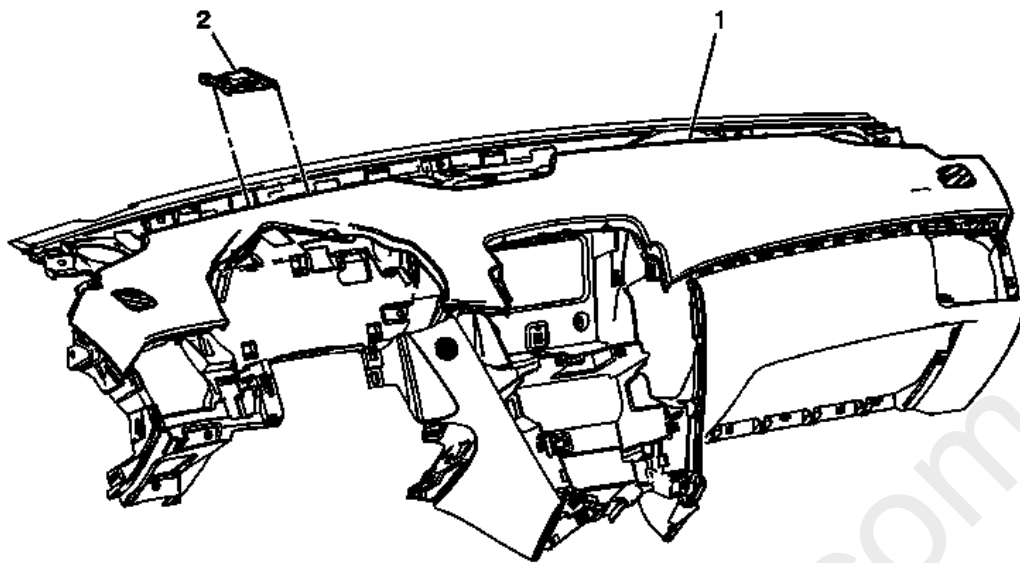


Fig. 40: Navigation Antenna
 Courtesy of GENERAL MOTORS COMPANY

Navigation Antenna Replacement (With UAV or U2Y)

Callout	Component Name
1	Instrument Panel (I/P) Lower Trim Panel Refer to <u>Instrument Panel Lower Trim Panel Replacement (Left Hand Drive)</u> , <u>Instrument Panel Lower Trim Panel Replacement (Right Hand Drive)</u>
2	Navigation Antenna Assembly Procedure 1. Note the routing of the navigation antenna wiring to the I/P lower trim panel to ensure proper reinstallation. 2. Disconnect the electrical connections from the I/P trim panel.

RADIO ANTENNA CABLE REPLACEMENT

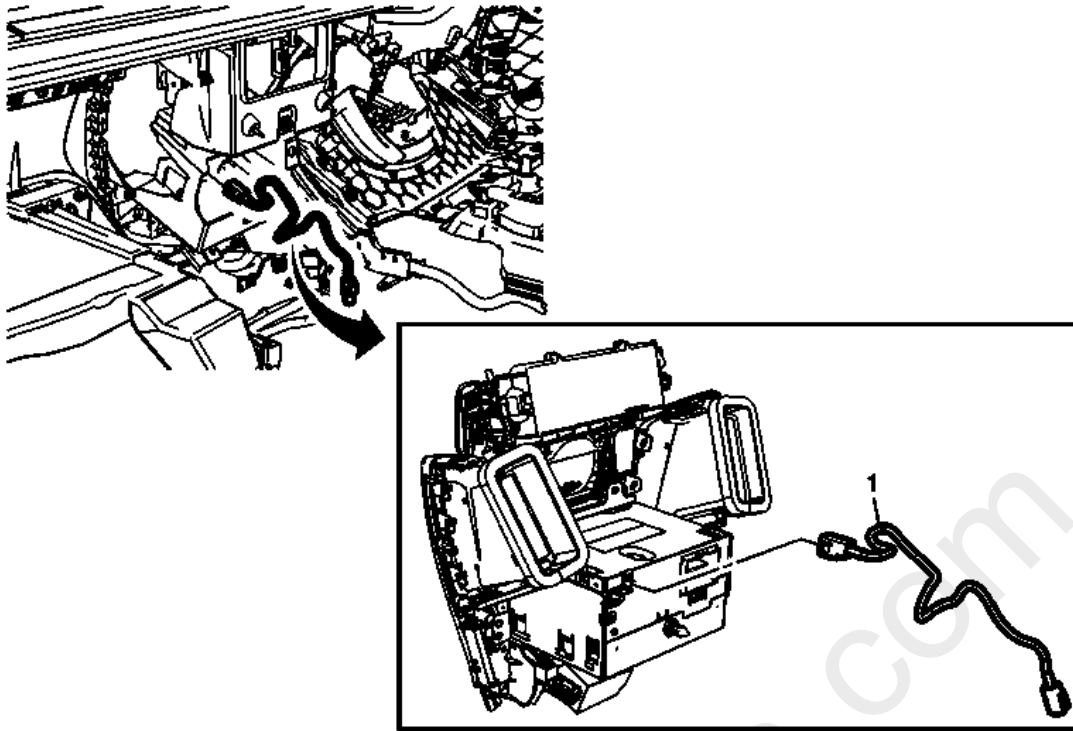


Fig. 41: Radio Antenna Cable
 Courtesy of GENERAL MOTORS COMPANY

Radio Antenna Cable Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the radio. Refer to <u>Radio Replacement</u>. 2. Remove the instrument panel compartment. Refer to <u>Instrument Panel Compartment Replacement (Right Hand Drive)</u> , <u>Instrument Panel Compartment Replacement (Left Hand Drive)</u> .	
1	Radio Antenna Cable Procedure 1. Disconnect the electrical connectors at each end of the antenna. 2. If the antenna cable is taped into the wiring harness then cut the ends off the old antenna and route the new antenna as close to the old one as possible using tie straps to secure the new cable.

RADIO, VIDEO, AND AUDIO PLAYER AND NAVIGATION INFORMATION DISPLAY REPLACEMENT

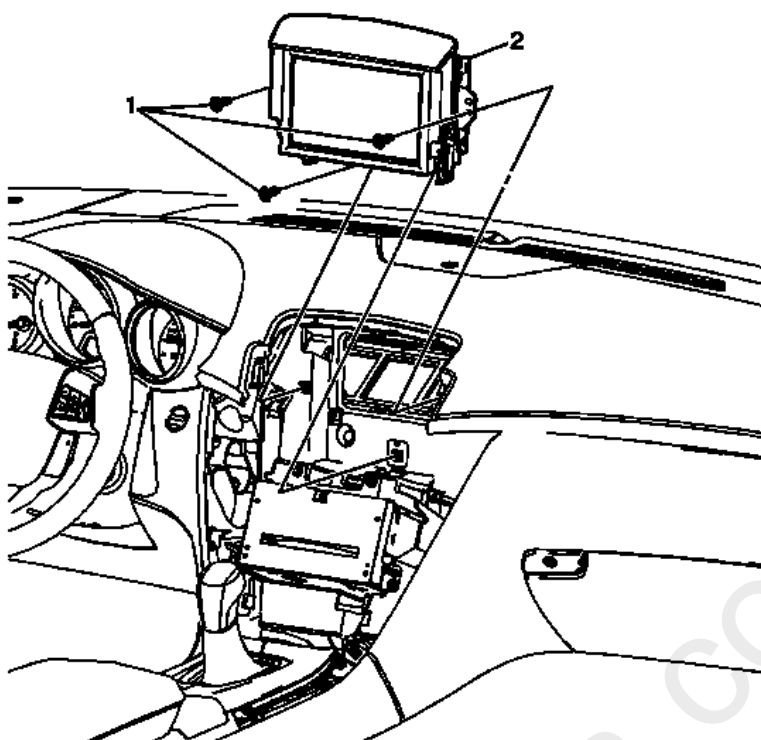


Fig. 42: Radio, Video, Audio Disc Player, and Navigation Information Display
Courtesy of GENERAL MOTORS COMPANY

Radio, Video, and Audio Player and Navigation Information Display Replacement

Callout	Component Name
Preliminary Procedure Remove the AM/FM stereo and clock and audio disc player radio control assembly. Refer to <u>Radio Control Assembly Replacement (with Navigation Display)</u> , <u>Radio Control Assembly Replacement (without Navigation Display)</u> .	
1	Radio and Video and Audio Disc Player and Navigational Information Display Screw (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Radio and Video and Audio Disc Player and Navigational Information Display Assembly Procedure 1. Disconnect the electrical connections. 2. When replacing the radio and video and audio disc player and navigational information display, transfer the navigation opening cover. Refer to <u>Navigation</u>

Information Display Opening Cover Replacement.

3. Refer to **Control Module References** for programming and setup information.

RADIO FRONT SPEAKER REPLACEMENT

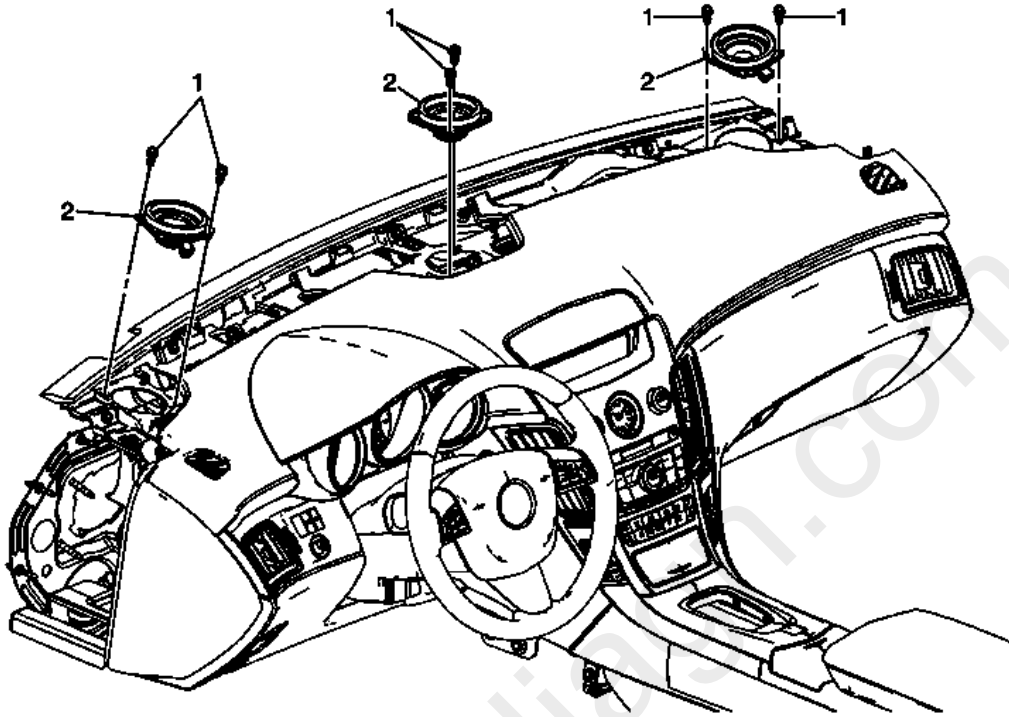


Fig. 43: Radio Front Speaker

Courtesy of GENERAL MOTORS COMPANY

Radio Front Speaker Replacement

Callout	Component Name
Preliminary Procedure Remove the windshield defroster nozzle grille. Refer to <u>Windshield Defroster Nozzle Grille Replacement (Left Hand Drive)</u> , <u>Windshield Defroster Nozzle Grille Replacement (Right Hand Drive)</u> .	
1	Radio Front Speaker Bolt/Screw (Qty: 6) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Radio Front Speaker Procedure

Disconnect the electrical connectors.

RADIO FRONT SIDE DOOR LOWER SPEAKER REPLACEMENT

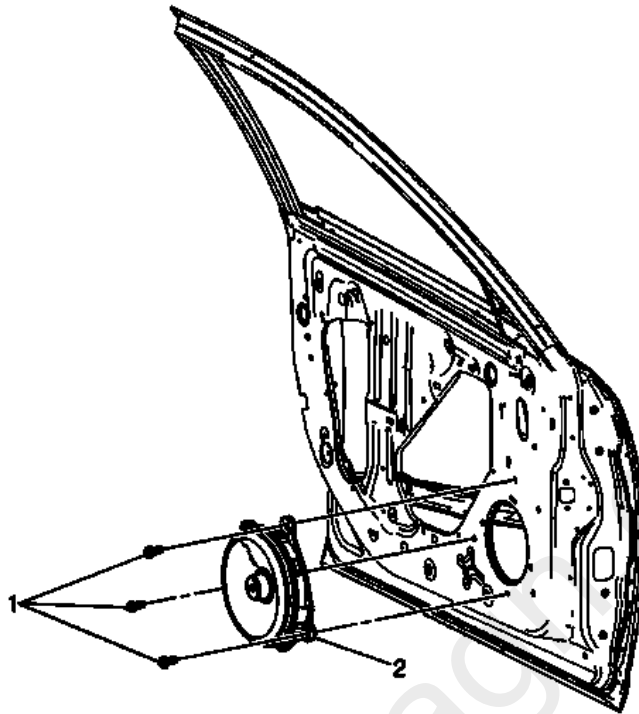


Fig. 44: Radio Front Side Door Lower Speaker
Courtesy of GENERAL MOTORS COMPANY

Radio Front Side Door Lower Speaker Replacement

Callout	Component Name
Preliminary Procedure Remove the front side door trim panel. Refer to Front Side Door Trim Panel Replacement (Coupe) , Front Side Door Trim Panel Replacement (Wagon) .	
1	Radio Front Side Door Speaker Bolt/Screw (Qty: 6) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Radio Front Side Door Lower Speaker Procedure Disconnect the electrical connectors.

RADIO REAR SPEAKER REPLACEMENT (COUPE)

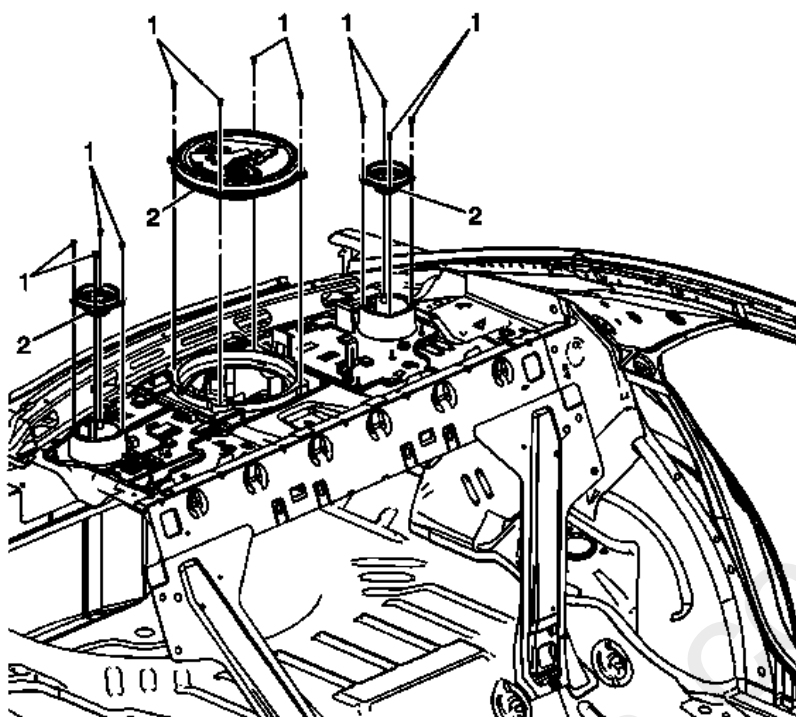


Fig. 45: Radio Rear Speaker
 Courtesy of GENERAL MOTORS COMPANY

Radio Rear Speaker Replacement (Coupe)

Callout	Component Name
Preliminary Procedure Remove the rear window shelf trim panel. Refer to Rear Window Panel Trim Replacement (Coupe) .	
1	Radio Rear Speaker Bolt/Screw (Qty: 12) CAUTION: Refer to Fastener Caution . Tighten 1.5 N.m (13 lb in)
2	Radio Rear Speaker Procedure Disconnect the electrical connectors.

RADIO CONTROL SWITCH REPLACEMENT - STEERING WHEEL

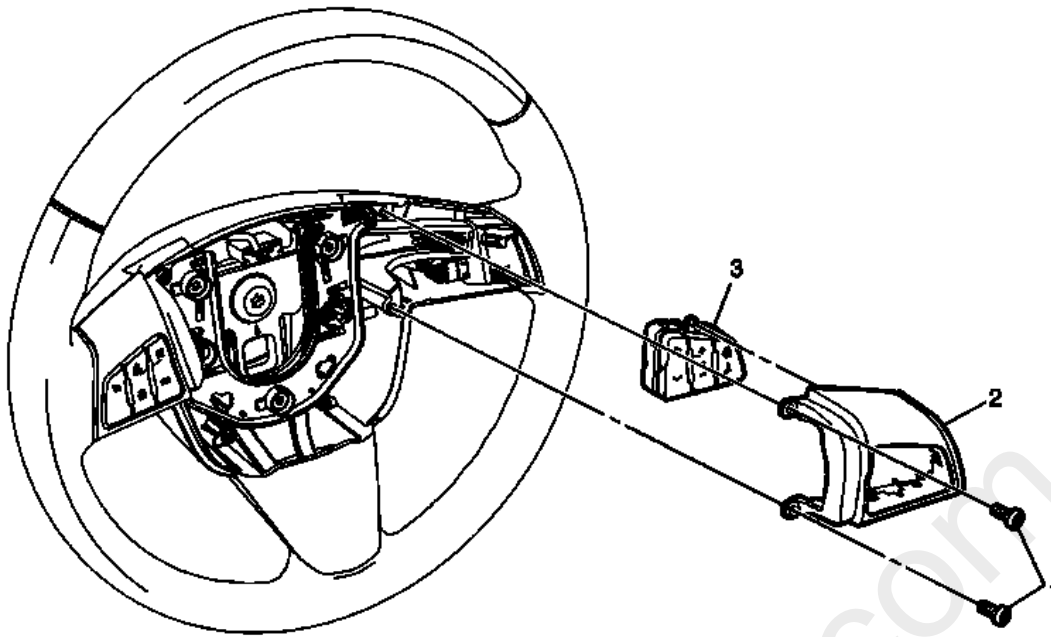


Fig. 46: Identifying Radio Control Switch, Cover & Bolts - Steering Wheel
 Courtesy of GENERAL MOTORS COMPANY

Radio Control Switch Replacement - Steering Wheel

Callout	Component Name
WARNING: Refer to <u>SIR Warning</u> .	
Preliminary Procedure Remove the inflatable restraint steering wheel module. Refer to <u>Airbag Steering Wheel Module Replacement</u> .	
1	Radio and Telephone Control Switch Cover Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2 N.m (18 lb in)
2	Radio and Telephone Control Switch Cover
3	Radio and Telephone Control Switch Procedure 1. Disconnect the electrical connectors.

2. Make sure the steering wheel control switches are properly seated to the steering wheel trim cover during installation.

RADIO REAR SIDE DOOR SPEAKER REPLACEMENT (WAGON)

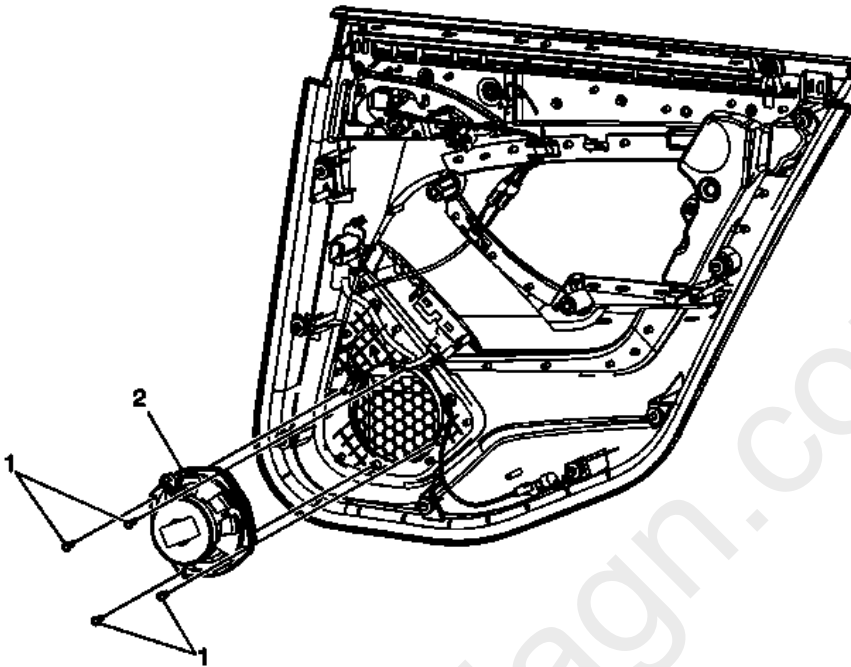


Fig. 47: Radio Rear Side Door Speaker
Courtesy of GENERAL MOTORS COMPANY

Radio Rear Side Door Speaker Replacement (Wagon)

Callout	Component Name
Preliminary Procedure Remove the rear side door trim panel. Refer to Rear Side Door Trim Panel Replacement (Wagon) .	
1	Radio Rear Side Door Speaker Bolt/Screw (Qty: 8) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Radio Rear Side Door Lower Speaker Procedure Disconnect the electrical connectors.

RADIO REAR SIDE DOOR SPEAKER REPLACEMENT (COUPE)

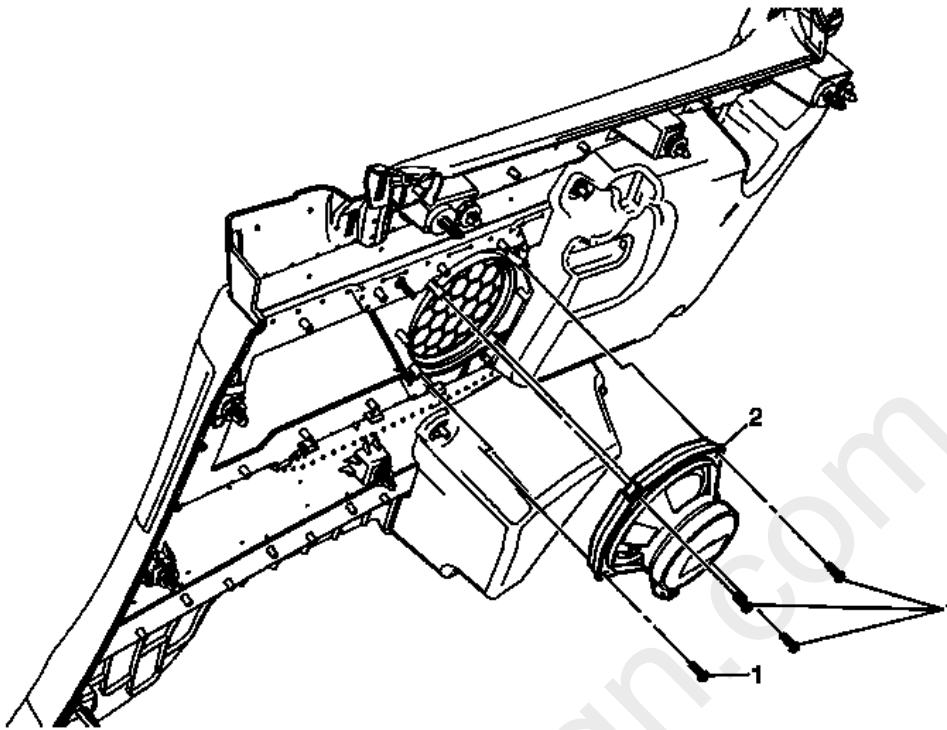


Fig. 48: Radio Rear Side Door Speaker & Bolts (Coupe)

Courtesy of GENERAL MOTORS COMPANY

Radio Rear Side Door Speaker Replacement (Coupe)

Callout	Component Name
Preliminary Procedure Remove the body side front lower trim panel. Refer to <u>Body Side Front Lower Trim Panel Replacement (Coupe)</u> .	
1	Radio Rear Side Door Speaker Bolt/Screw (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Radio Rear Side Door Lower Speaker Procedure Disconnect the electrical connectors.

RADIO REAR CORNER UPPER GARNISH MOLDING SPEAKER REPLACEMENT (WAGON)

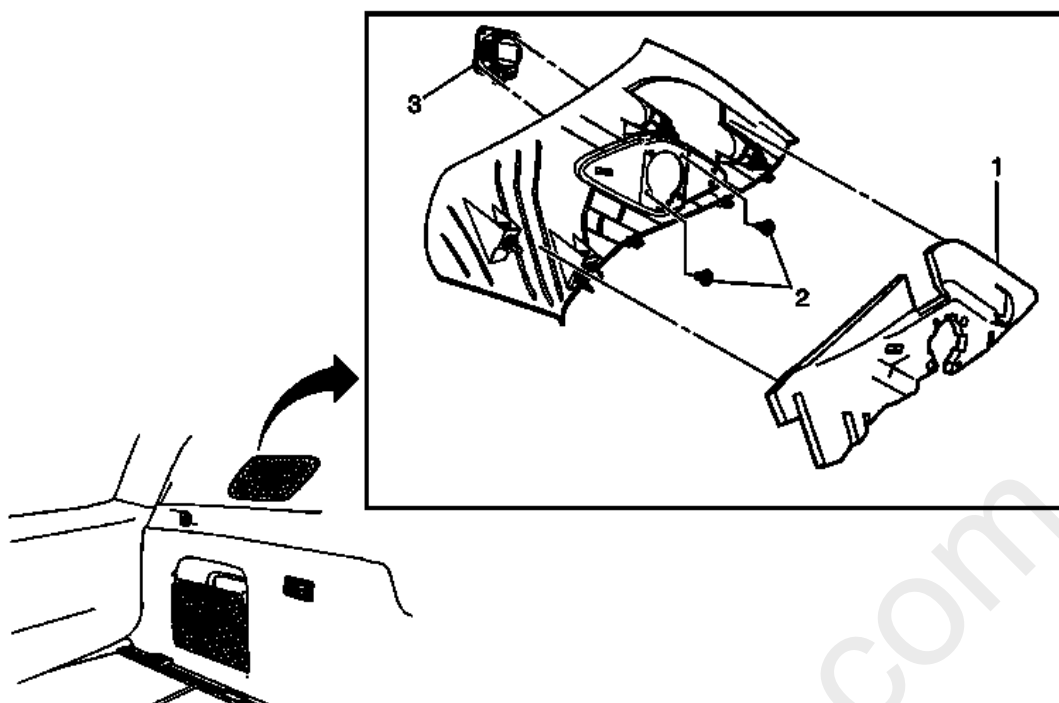


Fig. 49: Radio Rear Corner Upper Garnish Molding Speaker, Bolts & Insulator Panel (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Radio Rear Corner Upper Garnish Molding Speaker Replacement (Wagon)

Callout	Component Name
Preliminary Procedure	
1. Remove the body side window rear garnish molding. Refer to <u>Body Side Window Rear Garnish Molding Replacement (Wagon)</u> 2. Remove the radio body rear corner upper garnish molding speaker grille. Refer to <u>Radio Body Rear Corner Upper Garnish Molding Speaker Grille Replacement (Wagon)</u>	
1	Insulator Panel
2	Radio Rear Corner Upper Garnish Molding Speaker Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 10 N.m (89 lb in)
3	Radio Rear Corner Upper Garnish Molding Speaker Procedure Disconnect the electrical connection.

RADIO BODY REAR CORNER UPPER GARNISH MOLDING SPEAKER GRILLE (WAGON)

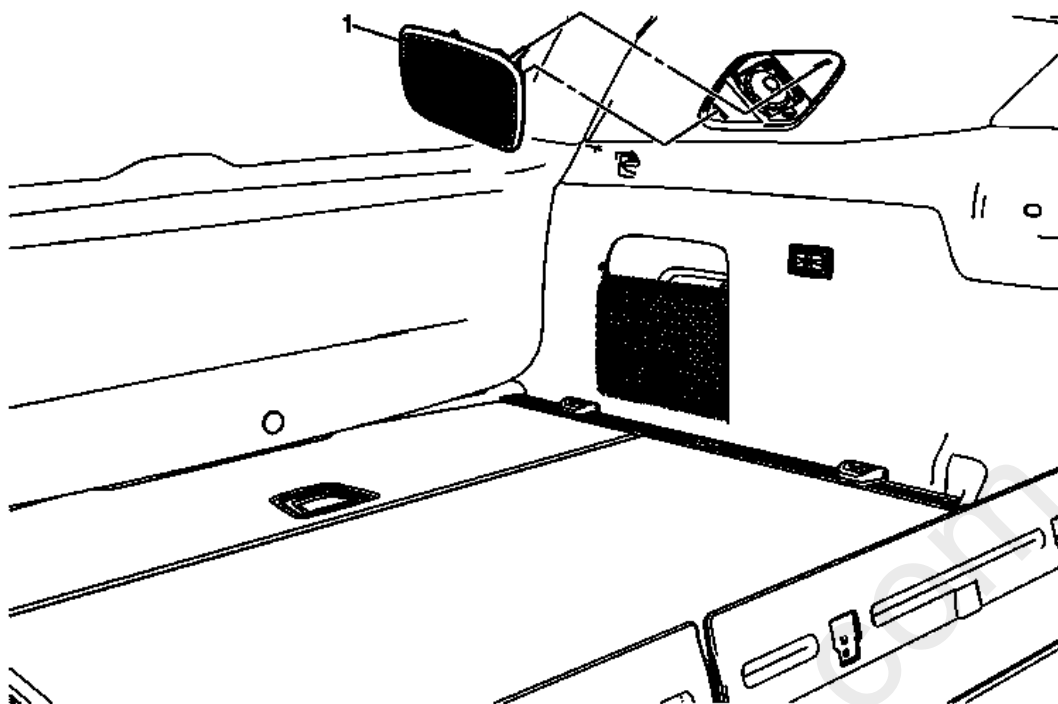


Fig. 50: Radio Body Rear Corner Upper Garnish Molding Speaker Grille (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Radio Body Rear Corner Upper Garnish Molding Speaker Grille Replacement (Wagon)

Callout	Component Name
Preliminary Procedure Remove the radio rear corner upper garnish molding speaker bolts. Refer to <u>Radio Rear Corner Upper Garnish Molding Speaker Replacement (Wagon)</u>	
1	Radio Body Rear Corner Upper Garnish Molding Speaker Grille Procedure Using a flat bladed tool, release speaker grille from the body side window rear garnish molding. The grille is attached with two integral clips.

RADIO REAR COMPARTMENT SPEAKER REPLACEMENT (WAGON)

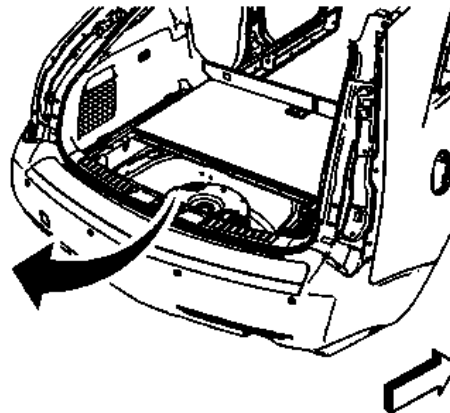
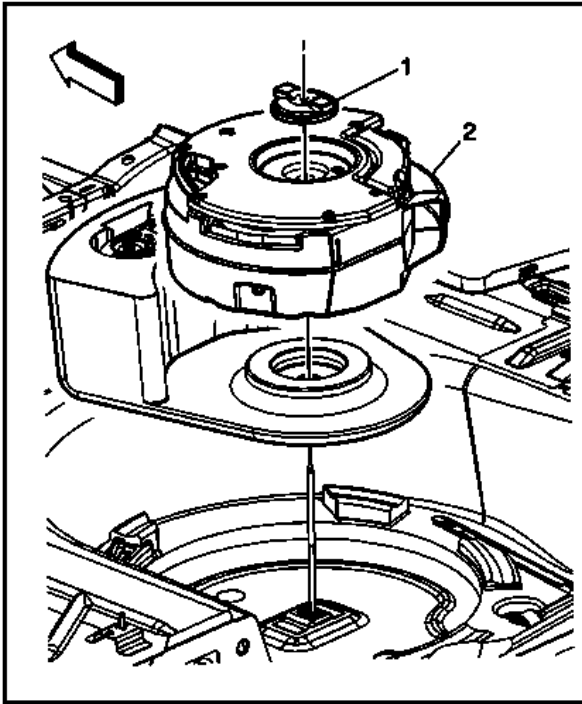


Fig. 51: Radio Rear Compartment Speaker (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Radio Rear Compartment Speaker Replacement (Wagon)

Callout	Component Name
Preliminary Procedure	
Position open the rear compartment floor stowage compartment cover.	
1	Retainer CAUTION: Refer to <u>Fastener Caution</u> . Tighten 3 N.m (27 lb in)
2	Radio Rear Compartment Speaker Assembly Procedure Disconnect electrical connectors.

DESCRIPTION AND OPERATION

NAVIGATION SYSTEM DESCRIPTION AND OPERATION

Navigation System Components

The navigation system contains the following components:

- Infotainment faceplate control module
- Navigation radio
- Touch-screen color display module
- Color display module actuator
- Global positioning system (GPS) antenna
- Remote auxiliary jack/USB adapter

The export navigation system contains the following additional components:

- Vehicle information communication system (VICS) module
- VICS optical beacon antenna
- Four TV antennae integrated into the rear window glass
- VICS FM antenna integrated into the rear glass
- TV antenna module to control antenna selection
- Antenna amplifier

Infotainment Faceplate Control Module

The operator interfaces with the radio system through the buttons and control knobs located on the Infotainment Faceplate Control Module or faceplate. The operator is able to control system power, volume, fade, balance, bass, and treble equalizations. When the operator turns a knob or pushes a button, a module in the faceplate sends a signal to the radio on a UART - based bus called CAN Graphical Interface (CGI). The CGI bus circuit is part of a wiring harness that connects the faceplate and radio.

Navigation Radio

This component acts as the operator interface for the navigation system, provides the data input from the operator to the navigation system and provides navigation information to the operator via the display screen. The navigation radio is located in the center of the instrument panel behind the faceplate. The navigation radio provides the following:

- A hard disk drive (HDD) capable of at least 9 GB maximum memory capacity for storage of media files.
- Soft keys on the display to allow selection from menus and to operate the navigation system, the audio system and the (export) TV system
- The navigation system map with routing information displayed on the navigation radio screen
- Plan a route and provide turn-by-turn route and map guidance with voice prompts
- Select a destination from various areas and choices, such as:
 - Street address
 - Intersections
 - Previous destinations
 - Points of interest

Touch - Screen Color Display Module

Battery power is supplied to the Color Display Module through a 15-amp RADIO fuse located in the Rear BEC.

When the navigation radio is on, a discrete 12 volt signal is supplied on the remote enable circuit to the Color Display Module. This signal is used to control the power state of the module, which is now in the active state. The radio sets the appropriate DTC when a fault is detected on the circuit.

The radio communicates with the Color Display Module over the CAN Graphical Interface (CGI) serial data circuit. The CGI circuit is a UART - based serial data interface used to transfer messages and high rate display graphics.

When the Color Display Module is in the active state, the radio needs to determine if the module is communicating properly. The radio initiates the message to the module and waits for a proper status response message back from the module. If after 30 communication attempts without a proper response, the radio holds down the reset circuit to the module in an attempt to reset the module. The radio sets the appropriate DTC when communication is lost.

Color Display Module Actuator

The Color Display Module attaches to the Display Module Actuator. Battery power is supplied to the actuator through a 10-amp NAV MOTOR fuse located in the UHBEC. The ground circuit for the actuator is attached to G305.

When the navigation radio is on, a discrete 12 volt signal is supplied on the remote enable circuit to the Display Module Actuator. This signal is used to control the power state of the actuator, which is now in the active state. The radio sets the appropriate DTC when communication is lost.

Pressing the NAV button, located on the Infotainment Faceplate Control Module or faceplate, sends a 5 volt signal on the Popup Position Control circuit to the Display Module Actuator. The 5 volt signal sets the position of the Display Module Actuator commanding the display to the Up position. Pressing the NAV button again removes the signal on the circuit commanding the display to the Down position.

When the display is commanded to the Up position, the motor controller, located in the actuator, sends a 5 volt signal on the Popup Position circuit to the radio. The circuit is a hard wired input from the motor controller to the radio. This signal is read by the radio in order to know which graphics to render on the touch-screen display. The radio will set the appropriate DTC when this circuit is open, shorted to ground or battery.

Remote Auxiliary Jack/USB Adapter

A remote 3.5 mm auxiliary stereo jack and USB connector allows playback of audio signals from remote devices (e.g., laptop computer, IPOD, MP3 player, etc.). The Aux jack is a five wire connector interface. The USB is a four wire plus shield USB cable interface. The USB connector uses the USB standards, 1.1 and 2.0. This type of connector supports rates for low speed (1.5 Mb/s), full speed (12 Mb/s), and high speed (480 Mb/s). The remote Aux jack/USB adapter is located in the rear console bin.

The radio detects the presence or absence of an audio mini-plug through the AuxJackDetect input. When the audio mini-plug is inserted in the Aux Detect Switch the mechanical switch closes. When removed the switch is

open.

Global Positioning System (GPS) Antenna

The global positioning system (GPS) locates the current position of the vehicle using signals sent by GPS satellites. The GPS antenna is attached to the instrument panel (I/P) carrier and can be accessed by removing the I/P retainer. The GPS antenna is powered through the same coaxial cable used to send the signals to the navigation radio. Interference to the system may occur if any of the following exist:

- Signals are obstructed by objects such as, tall buildings or trees.
- Metallic objects located on the dashboard
- Aftermarket glass tinting has been applied to the vehicles windshield.

TV and VICS Antenna

These several antennas are conductive traces placed on the inside of the rear window glass.

TV Antenna Module

The TV antenna module is located under the rear window shelf. The TV antenna module is used by the navigation radio to automatically select the antenna combination that provides the strongest TV signal to the navigation radio. The TV antenna module also provides the vehicle information communication system (VICS) FM signal to the VICS module.

TV Antenna Amplifier

The TV antenna amplifier is mounted behind the trim on 1 side of the rear window. The TV antenna amplifier is powered by the TV antenna module through the same coaxial cable used to carry their signals to the TV antenna module. They are attached to the 4 TV antenna trace patterns in the rear window glass.

VICS Module

The vehicle information communication system (VICS) module, an export only dealer-installed option, uses signals from the optical/microwave beacon antenna and the rear glass VICS antenna via the TV antenna module to convey routing information to the navigation radio. The navigation radio either revises planned routing or relays the VICS information to the operator through the screen of the navigation radio and the voice guidance system.

VICS Optical Beacon Antenna

The vehicle information communication system (VICS) optical beacon antenna is a dealer-installed option. The antenna, which is mounted on the right side of the instrument panel, picks up signals through the front window glass. A coaxial cable carries the power to and signals from this antenna to the navigation radio.

Browser

IMPORTANT: This function is for view files on disk only. The navigation radio cannot get

external files from the World-Wide Web or other sources other than an inserted disk.

The navigation radio will allow HTML files to be displayed. The files will only be able to be accessed and viewed. No user input is capable.

Planning a Route

To plan a route a destination must be set. There are various types of destinations available, as listed above. Pressing "Calc" once the destination has been entered will plan the route. To start the route guidance start driving the vehicle. The route guidance will begin automatically after a short distance.

Beam

The beam function allows data to be sent by a PALM hand held computing device directly into the navigation system. The IR port for the beam function is located in the upper right corner of the navigation radio.

Voice Recognition

The Navigation Systems voice recognition allows for hands-free operation of navigation and audio system features. The voice recognition can be used when the ignition is in accessory or ON, or when retained accessory power (RAP) is active. This feature only works if the map DVD is inserted and the AGREE button has been pressed. The memory seats can also be able to be set and selected using the voice recognition feature. For a complete list of available commands, refer to the Owners Manual Navigation Supplement and/or Personalization in the Owners manual.

ONSTAR DESCRIPTION AND OPERATION

This OnStar® system consists of the following components:

- Telematics communication interface control module
- OnStar® three button assembly
- Microphone
- Cellular antenna
- Navigation antenna
- Bluetooth® antenna (If equipped)
- Back up battery (If equipped)

This system also interfaces with the factory installed vehicle audio system.

Telematics Communication Interface Control Module

The telematics communication interface control module is a cellular device that allows the user to communicate data and voice signals over the national cellular network. Power is provided by a dedicated, fused B+ circuit. Ground is provided through the vehicle wiring harness attached to the module. The ignition state is determined by the telematics communication interface control module through serial data messaging.

Dedicated circuits are used to connect the telematics communication interface control module to a microphone, the button assembly, and to command the status LED. The telematics communication interface control module communicates with the rest of the vehicle over the serial data bus.

The module houses 2 technology systems, one to process GPS data, and another for cellular information. The cellular system connects the OnStar® system to the cellular carrier's communication system by interacting with the national cellular infrastructure. The module sends and receives all cellular communications over the cellular antenna and cellular antenna coax. GPS satellites orbiting earth are constantly transmitting signals of their current location. The OnStar® system uses the GPS signals to provide location on demand.

The module also has the capability of activating the horn, initiating door lock/unlock, or activating the exterior lamps using the serial data circuits. These functions can be commanded by the OnStar® Call Center per a customer request.

OnStar® Three Button Assembly

Base Mirror

- The OnStar® button assembly may be part of the rearview mirror, or a separate, stand alone unit. The button assembly is comprised of 3 buttons and a status LED. The buttons are defined as follows:
 - The answer/end call button, which is black with a white phone icon, allows the user to answer and end calls or initiate speech recognition.
 - The blue OnStar® call center button, which displays the OnStar® logo, allows the user to connect to the OnStar® call center.
 - The emergency button, which displays a white cross with a red background, sends a high priority emergency call to the OnStar® call center when pressed.

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button completes a circuit across a resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed.

The OnStar® status LED is located with the button assembly. The LED is green when the system is ON and operating normally. When the status LED is green and flashing, it is an indication that a call is in progress. When the LED is red, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call.

If the mirror has the rear vision camera display in the mirror, the LED's are then interior to the mirror and controlled via data communication on the Low Speed GMLAN bus from the Telematics Communication Interface Control Module to the mirror.

If the LED does not illuminate, this may indicate that the customers OnStar® subscription is not active or has expired. Push the blue OnStar button to connect to an advisor who can then verify the account status.

Each LED is controlled by the telematics communication interface control module over dedicated LED signal circuits. Ground for the LED is provided by the wiring harness attached to the button assembly.

Prismatic Mirror (If Equipped)

- The OnStar® button assembly is apart of the rearview mirror. The button assembly is comprised of 3 capacitive touch buttons and a status LED. The buttons are defined as follows:
 - The answer/end call button, which is a white driver figure seated with voice signals near it's face, allows the user to answer and end calls or initiate speech recognition.
 - The blue OnStar® call center button, which displays the blue OnStar® logo, allows the user to connect to the OnStar® call center.
 - The emergency button, which displays red letters "SOS" as an illuminated Indicator, sends a high priority emergency call to the OnStar® call center when pressed.

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button press is processed and completes a circuit across an internal resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed.

The OnStar® status LED is located within the mirror near the buttons. The LED is green when the system is ON and operating normally. When the status LED is green and flashing, it is an indication that a call is in progress. When the LED is red, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the LED will flash red during the call.

If the LED does not illuminate, this may indicate that the customers OnStar® subscription is not active or has expired. Push the blue OnStar button to connect to an advisor who can then verify the account status.

Each LED is controlled by the telematics communication interface control module over dedicated LED signal circuits. Ground for the LED is provided by the wiring harness attached to the button assembly.

Electrochromic Mirror (If Equipped)

- The OnStar® button assembly is apart of the rearview mirror. The button assembly is comprised of 3 capacitive touch buttons and an error indicator. The buttons are defined as follows:
 - The answer/end call button, which is a white driver figure seated with voice signals near it's face, allows the user to answer and end calls or initiate speech recognition.
 - The blue OnStar® call center button, which displays the blue OnStar® logo, allows the user to connect to the OnStar® call center.
 - The emergency button, which displays red letters "SOS" as an illuminated Indicator, sends a high priority emergency call to the OnStar® call center when pressed.

The telematics communication interface control module supplies 10 volts to the OnStar® button assembly on the keypad supply voltage circuit. When pressed, each button press is processed and completes a circuit across an internal resistor allowing a specific voltage to be returned to the telematics communication interface control module on the keypad signal circuit. Depending upon the voltage range returned the telematics communication interface control module is able to identify which button has been pressed and illuminate associated indicator above each button.

The OnStar® error indicator is located within the mirror above the buttons between the OnStar® indicator and emergency "SOS" indicator. All three indicators associated with a button press are illuminated when the system is ON and operating normally. When any indicator is illuminated and flashing, it is an indication that a call is in progress. When the OnStar® error indicator is illuminated, this indicates a system malfunction is present. In the event there is a system malfunction and the OnStar® system is still able to make a call, the OnStar® error indicator will remain illuminated during the call.

If the indicators do not illuminate, this may indicate that the customer's OnStar® subscription is not active or has expired. Push the blue OnStar button to connect to an advisor who can then verify the account status.

Secondary OnStar® Controls

Some vehicles may have an additional button that when pushed can engage the OnStar® system. The button may be a symbol of a face with sound waves, or may say MUTE, or be a symbol of a radio speaker with a slash through it.

By engaging the OnStar® system with this feature, the user can interact with the system by use of voice commands. A complete list of these commands is supplied in the information provided to the customer. If the information is not available for reference, at any command prompt the user can say "HELP" and the telematics communication interface control module will return an audible list of available commands.

OnStar® Microphone

The OnStar®, or cellular microphone, can be a part of the rearview mirror assembly, or on some vehicle lines, a separate, stand alone unit. In either case, the telematics communication interface control module supplies approximately 10 volts to the microphone on the cellular microphone signal circuit, and voice data from the user is sent back to the telematics communication interface control module over the same circuit. A cellular microphone low reference circuit or a drain wire provides a ground for the microphone.

Cellular and GPS Antennas

This vehicle will be equipped with one of the following types of antennas:

- A combination cellular and navigation antenna, which brings the functions of both into a single part
- A cellular, GPS, and digital radio receiver antenna, which also incorporates the functionality of the digital radio receiver satellite antenna (XM).
- A cellular, GPS, and digital radio receiver antenna, which also incorporates the AM/FM antenna.

The cellular antenna is the component that allows the OnStar® system to send and receive data over airwaves by means of cellular technology. The antenna is connected at the base to a coax cable that plugs directly into the telematics communication interface control module.

The GPS antenna is used to collect the signals of the orbiting GPS satellites. Within the antenna is housed a low noise amplifier that allows for a more broad and precise reception of this data. The antenna is connected at the base to a coax cable that plugs directly into the telematics communication interface control module. The cable also provides a path for DC current for powering the antenna.

The OnStar® Call Center also has the capability of communicating with the vehicle during an OnStar® call to retrieve the latest GPS location and transmit it to the OnStar® Call Center. A history location of the last recorded position of the vehicle is stored in the module and marked as aged, for as long as the module power is not removed. Actual GPS location may take up to 10 minutes to register in the event of a loss of power.

OnStar® RemoteLink

OnStar® RemoteLink is a mobile app to link mobile devices to a vehicle for limited diagnostics and feature controls. After downloading the app and registering the device, vehicle owners with an eligible vehicle can use their mobile devices to access real-time data from their vehicle and perform specific commands remotely.

All communication between the app and the vehicle is powered by OnStar's® advanced connected vehicle technology. An active OnStar® account as well as a valid OnStar® username and password are required to use the app. The remote commands must be enabled by logging into the user's OnStar® account prior to using the app.

Vehicle Control Features

- Lock/Unlock doors
- Start vehicle remotely
- Activate your Horn & Lights
- Contact an OnStar Advisor, Roadside Assistance or your Preferred Dealer

Available Vehicle Data:

- Real-time fuel information, including fuel range, fuel remaining, and lifetime MPG
- Lifetime mileage
- Remaining oil life
- Current tire pressure information
- OnStar® account information

Compass Heading

The telematics communication interface module has a compass feature to calculate vehicle direction which is displayed via the instrument panel cluster or designated display. The compass heading is determined by dead reckoning until the GPS 3d fix is established. The dead reckoning is accomplished by using the yaw rate sensors and wheel ticks to determine heading changes from a GPS known heading. The GPS 3d fix heading is determined by the differential of two locations.

Bluetooth® (If Equipped)

Bluetooth® wireless technology is a short-range communications technology intended to replace the cables connecting portable and/or fixed devices while maintaining high levels of security. Only vehicles with steering wheel controls will have Bluetooth® functionality. In order to utilize the vehicle's Bluetooth® system, a Bluetooth® equipped cellular phone is required.

The Bluetooth® antenna is a small fixed antenna connected directly to the telematics communication interface control module and is used to send and receive signals from a Bluetooth® enabled cellular phone. The antenna utilizes no cabling and is not external to the vehicle. The available features and functions are determined by the software within the device being used and the telematics communication interface control module. The operating range of the signal from the vehicle is approximately 30 feet. Note that the operating range is dependent upon the cellular phone being used and battery level of the phone.

With Bluetooth® technology customers can experience hands-free calling as their Bluetooth® capable cellular phones are wirelessly connected to the vehicle. It will allow customers to place and receive calls using the steering wheel controls and voice recognition. The vehicle audio system will allow you to listen to your call through the vehicle speakers and adjust volume through steering wheel or radio controls.

Not all Bluetooth® cellular phones are guaranteed to work with the vehicle's Bluetooth® system. Based on the cellular phone's service provider and the manufacturer's implementation of Bluetooth®, not all phones support all available Bluetooth® functionality. Bluetooth® enabled cellular phones will be tested for vehicle compatibility and a feature compatibility list will be provided via the GM Bluetooth® website:
<http://www.gm.com/vc/bluetooth/>

Bluetooth® Features Supported

The following is a list of features supported by the Bluetooth® system. Note that not all devices will support all of the listed functions.

- Automatic reconnection - highest priority phone will automatically be connected to vehicle when vehicle ignition is on
- Hands-free dialing- via digits, redial, name tags (phone number saved to a nametag via voice recognition)
- Answering a call
- Ending a call
- Mute a Call
- Rejecting a call - ignore an incoming call
- Call Waiting
- Three-way Calling - initiated from hands-free system
- Send Number During a Call - this is used when calling a menu-driven phone system
- Transfer a Call - transfer call from vehicle to cellular phone and visa versa
- Voice Pass-Thru - allow access to the voice recognition commands on the cellular phone

Pairing a Bluetooth® Cellular Phone to the Vehicle

In order to use hands-free calling, the cellular phone must be paired to the vehicle. Up to five devices can be paired to the vehicle at one time, but only one can be connected at any given time. To pair a phone, the customer must know how to operate the Bluetooth® functionality of their phone. The pairing process must only be done one time for each phone, unless that phone's information is deleted. For safety reasons, the pairing process is disabled while the vehicle is moving.

Once the Bluetooth® cellular phone has been paired with vehicle, it will automatically connect to the vehicle

when the ignition is on and the device is on. When more than one paired phone is in the vehicle, the phone with the highest priority will be connected. If the cellular phone is in use while getting into the vehicle, the phone can be switched to hands-free mode with the press of a button. In addition, a call in progress can be transferred from the vehicle hands-free mode to the phone to continue the call as the customer exits the vehicle.

Complete pairing instructions are provided in the Vehicle Owners Manual.

Back-up Battery (If Equipped)

IMPORTANT: Do not disconnect the main vehicle battery or remove the OnStar® fuse with the ignition key in any position other than OFF. Disconnecting power to the OnStar® module in any way while the ignition is ON or with retained accessory power activated may cause activation of the OnStar® Back-Up Battery. This action is per design as the back-up battery is designed to provide power to the telematics communication interface control module so an emergency notification call can be made after an event where the main battery is disabled. Once the Back-Up Battery is activated it will stay on until the power is restored back to the telematics communication interface control module. The telematics communication interface control module naturally chooses the main supply voltage as it's default supply, but if the main supply is removed or lost for any reason the OnStar® module will use the Back-Up Battery as a power supply as long as the default supply can not be detected. The back-up battery is not rechargeable and once discharged below 9.5 volts the back-up battery must be replaced.

Certain OnStar® equipped vehicles may also be equipped with a back-up battery. The back-up battery is a non-rechargeable, lithium battery intended to provide an auxiliary power source for the telematics communication interface control module in the event where power from the main vehicle battery is lost.

The back-up battery is intended to have a limited life span of approximately 4 years and is designed to maintain an open circuit voltage between 16 V and 9 V throughout this period. This allows the battery to power the basic functions of the telematics communication interface control module for least one 200 second (5 minute) call at the end of the 4 year span, should the main vehicle battery be lost. In the case of a vehicle losing vehicle battery power, OnStar will switch over to the backup battery based on an internal algorithm. It will look for an air-bag deploy, or near-deploy, messages from the SDM. If there are no messages the OnStar module will stay awake for a few minutes longer and monitor the buttons in the mirror. If not pressed, the modules will power down and shut off completely.

The back-up battery is connected to the telematics communication interface control module through the back-up battery positive voltage circuit and back-up battery ground circuit and is protected from a short circuit by means of an internal fuse. In the event the back-up battery, battery positive voltage circuit is shorted to the back-up battery ground circuit or chassis ground, the fuse will open and render the back-up battery permanently inoperable. The status of the back-up battery and its associated wiring is monitored by the telematics communication interface control module.

Audio System Interface

When the OnStar® requires audio output, a serial data message is sent to the audio system to mute all radio

functions and transmit OnStar® originated audio. The OnStar® audio is transmitted to the vehicle audio system by a dedicated signal circuit and a low reference circuit.

The audio system will mute and an audible ring will be heard through the speakers if the vehicle receives a call with the radio ON.

On some vehicles, the HVAC blower speed may be reduced when the OnStar® system is active to aid in reducing interior noise. When the system is no longer active, the blower speed will return to its previous setting.

OnStar® Sleep Cycle

The OnStar® system uses a unique sleep cycle to allow the system to receive cellular calls while the ignition is in the OFF position and retained accessory power mode has ended. This cycle enables the telematics communication interface control module to perform remote functions, such as door unlock, as commanded over the air by the OnStar® Call Center, and to continue to maintain an acceptable level of battery electrical drain.

The OnStar® system uses 4 states of readiness, depending upon the type of cellular market the vehicle is in when the ignition is put into the OFF state:

- High power
- Low power
- Sleep
- Digital standby

The high power state is in effect whenever the ignition is in the ON or RUN position, or retained accessory power is enabled, and the OnStar® system is sending or receiving calls or when the system is performing a remote function.

The low power state is in effect when the OnStar® system is idle with the ignition in the ON or RUN position, or with retained accessory power enabled.

The sleep state is entered after the vehicle has been shut off and the retained accessory power has timed out while in an analog cellular area. At a predetermined time recorded within the telematics communication interface control module, the system re-enters the low power state to listen for a call from the OnStar® Call Center for 1 minute. After this interval, the system will again return to the sleep state for 9 minutes. If a call is sent during the 1 minute interval, the OnStar® system will receive the call and immediately go into the high power mode to perform any requested functions. If no call is received during the 1 minute interval, the system will go back into the sleep mode for another 9 minutes. This process will continue for up to 48 hours, after which the OnStar® system will turn off until the ignition is turned to the ON or RUN position.

The digital standby power state is entered after the vehicle has been shut off and the retained accessory power has timed out while in a digital cellular area. When in digital standby mode, the OnStar® module is able to perform all remote functions as commanded by an OnStar® advisor at any time, for a continuous 120 hours. After 120 hours, the OnStar® module will go into sleep mode until a wake up signal from the vehicle is seen by the telematics communication interface control module. If the OnStar module loses the digital cellular signal it will revert to analog mode and follow the standard sleep state (9 minutes OFF, 1 minute standby) based on the time of the GPS signals, this will continue until a digital cellular signal is again received.

If the OnStar® system loses battery power while the system is in a standby or sleep mode, the system will remain OFF until battery power is restored and the ignition is turned to the ON or RUN position.

Features

OnStar® Personal Calling

The hands free, OnStar® personal calling cellular phone feature is an additional feature of the OnStar® system. This feature is embedded within the telematics communication interface control module; however it must be activated by an OnStar® advisor. OnStar® personal calling operates similar to most hand held cellular phones in that the availability for its usage is based on minutes or units. The customer must have a current OnStar® subscription, as this feature cannot be utilized without it. To use OnStar® personal calling, the customer must also purchase units (minutes) as outlined in the owners guide provided with the OnStar® system. Units begin to deplete, 1 unit is equal to 1 minute, as the customer makes outbound phone calls, answers inbound phone calls, or while connected to the OnStar® virtual advisor. In addition, units may also have an expiration date, depending upon the type of units purchased.

Customers have the ability to store telephone numbers within the module, referenced by a nametag for the convenience of frequently dialed numbers. After storing a nametag, the user can dial this number by initiating the OnStar® personal calling feature, speaking the word "call," and repeating the nametag assigned.

Turn by Turn Navigation

Turn by Turn Navigation allows the driver to contact OnStar® to obtain directions for driving from a current location to a desired location. The Turn by Turn Navigation system stores your planned route and continually checks your position along that route, when you deviate from the planned route, the system will recognize this and prompt the driver with verbal prompts for how to proceed. The driver then responds verbally to direct the system to continue the current routing or to recalculate the route because of a missed turn.

Advisor Record Feature

The Advisor Record Feature allows the user to store any information given during a call with an OnStar® Advisor. Recording is activated by pressing the blue OnStar button during a call; pressing the button a second time stops the recording. The stored information can be played back by pressing the phone button on the three button assembly and using the voice command "Advisor Playback".

Deactivated OnStar® Accounts

In the event a customer has not renewed their OnStar® account after expiration or the account was never activated, OnStar® will make a discrete cellular call to the vehicle to deactivate the OnStar® system. Before taking this action, customers are notified that the OnStar® system in their vehicle will be deactivated unless they elect to renew the account. After the OnStar® account has been deactivated, customers will experience the following:

- The OnStar® status LED will not illuminate.
- The OnStar® system will NOT attempt to connect to the OnStar® Call Center in the event of a collision or if the vehicle's front air bags deploy for any other reason.

- An emergency button press will play a demo message indicating the service has been deactivated.
- An OnStar® Call Center button press will connect the customer with a dedicated sales team who can sell an OnStar® subscription and reactivate the vehicle. Depending on the type of OnStar® hardware in the vehicle, the customer may first hear a demonstration message stating there is no current OnStar® subscription for the vehicle, and directing the customer what to do to activate services.
- OnStar® personal calling will not be available, as this feature requires the customer to have a current OnStar® account. Attempts to use this feature may result in cellular connection failure messages and the inability to connect to the number dialed.

Certain vehicles that have never had an active OnStar® account, or that have been deactivated, may be unable to establish a connection with the OnStar® Call Center. When normal published diagnostic procedures do not indicate a possible cause for the no connect concern, the vehicle may have been deactivated. For deactivated vehicles, a no connect response should be considered normal operation. Further diagnosis and subsequent repair is only necessary should the customer elect to become an active OnStar® subscriber or renew the account subscription.

OnStar® Cellular, GPS, and Diagnostic Limitations

The proper operation of the OnStar® System is dependent on several elements outside the components integrated into the vehicle. These include the National Cellular Network Infrastructure, the cellular telephone carriers within the network, and the GPS.

The cellular operation of the OnStar® system may be inhibited by factors such as the users range from an analog or digital cellular tower, the state of the cellular carrier's equipment, and the location where the call is placed. Making an OnStar® key press in areas that lack sufficient cellular coverage or have a temporary equipment failure will result in either the inability of a call to complete with a data transfer or the complete inability to connect to the OnStar® Call Center. The OnStar® system may also experience connection issues if the identification numbers for the module, station identification number, electronic serial number or manufacturers electronic ID, are not recognized by the cellular carriers local signal receiving towers.

The satellites that orbit earth providing the OnStar system with GPS data have almost no failures associated with them. In the event of a no GPS concern, the failure will likely lie with the inability of the system to gain GPS signals because of its location, i.e. in a parking structure, hardware failure, or being mistaken with an OnStar® call which has reached the Call Center without vehicle data.

During diagnostic testing of the OnStar® system, the technician should ensure the vehicle is located in an area that has a clear unobstructed view of the open sky, and preferably, an area where analog or digital cellular calls have been successfully placed. These areas can be found by successfully making an OnStar® keypress in a known good OnStar® equipped vehicle and confirming success with the OnStar® Call Center advisor. Such places can be used as a permanent reference for future OnStar® testing.

Mobile Identification Number and Mobile Directory Number

The telematics communication interface control module utilizes 2 numbers for cellular device identification, call routing and connection, a mobile identification number and a mobile directory number. The mobile identification number represents the number used by the cellular carrier for call routing purposes while the mobile directory number represents the number dialed to reach the cellular device.

Operation of the OnStar® Speech Recognition Systems

OnStar® users communicate with 2 speech recognition systems. Speech recognition allows the user to speak to one computer in the vehicle, and one reached over a phone line. The computer tries to understand the users command, and responds by speaking back, or by taking the appropriate action, e.g. dialing the phone.

- Personal Calling uses a speech recognition system that resides in the vehicle. When the user presses the phone button, the system states, Ready, and listens for the user's command. The user can speak commands to control the hands-free phone.
- Virtual advisor is a remote speech recognition system that the caller can access by making a phone call. The user connects to virtual advisor by requesting it during personal calling use. The user is then transferred to the virtual advisor server and talks to it via a cellular connection.

The OnStar® speech recognition systems use speech technology that is designed to understand a wide range of American English speakers. Although there is no one right way to speak English, the system will work best when users try to modify their pronunciation should they encounter difficulty. Users who do not obtain good results are advised to try the tips and workarounds found in this section.

General Tips for Better Speech Recognition

Concern	Tip for Better Result
Noise	Noise may confuse the speech recognition system. You usually get better performance from the system in quieter conditions: • The HVAC fan creates noise. Turn it down or OFF for better speech system performance. • Driving at high speeds creates louder engine noise and wind noise. You may get better results at lower speeds. • An open window or an open sunroof allows more noise to enter the vehicle. Close all windows for better results. • Noisy rainstorms can also reduce performance. • If passengers are talking while you use the speech system, it may be confused by their speech. You will get better results if all occupants of the vehicle are quiet while the system is listening for commands.
When to Speak	In Personal Calling, the system is only listening after it prompts you to speak with a beep. • When the system prompts you to speak, you have about 5 seconds to respond. If the system does not hear a response, it will prompt you again, or cancel the transaction. • If you begin to speak too soon, try pausing for a half second before speaking after the beep. • In the Virtual Advisor, the system is always listening for commands, even while it is speaking.
How to Speak	Speak forcefully, and clearly.

	• The noisier the environment, the louder you need to speak. If you are in the driver seat, speak facing the front of the car. If you are a passenger, speak facing the rearview mirror. • Speak calmly, and naturally. The system may sometimes fail your repeated attempts to give a command. If your speech is distorted by shouting or frustration, this may cause more errors. • People with high-pitched voices may have better results by speaking in a deeper, lower-pitched voice. However, do not lower the volume of the voice. • Avoid speaking with a rising intonation, like asking a question. Use a flat or falling intonation, like giving an answer.
What to Say	Personal Calling: One-word commands • The Personal Calling system listens for only one word at a time. There are some exceptions, 2-word phrases that are spoken and understood as a single word, e.g. "virtual advisor", "voice feedback", and "my number". You can enter phone numbers only one digit at a time, and the system repeats each digit as it hears it. • Say "Help" at the Ready prompt to hear the list of Personal Calling commands. • Virtual Advisor can understand sentences with more than one word. It also expects to hear a 4-digit number all at once when it asks for your PIN. • Say, "What are my choices?" to hear a list of commands that the Virtual Advisor understands.
Entering a phone number	• If you have trouble getting numbers correctly into the system, store your frequently-called number in the directory, so the system will remember them. After you have stored a number with a nametag, then you simply say "call" and the nametag in order to call the number. • If the system cannot understand your numbers, ask another person to help you enter your frequently-called numbers. This person can speak the numbers, then you can speak the nametag.
Storing or dialing a number	When you have finished speaking your phone number, you do not need to say "store" or "dial" to indicate that you are done. If you pause and say nothing, the system will ask you if you want to store or dial. Say "yes".
Creating nametags	• Short nametags that are similar may be easily confused by the system. You may get better recognition of your nametags if you make them longer, for example "George Washington" without pause, instead of "George" only. • If you want to use nametags while driving, it is best to store the nametag with some vehicle noise in the background. If you are in park while you are storing nametags, you can turn the fan on low or open windows in order to create some background noise.

Virtual Advisor 4-digit PIN	Say the 4 digits in a natural way, without pausing between digits.
Interrupting	• When the Virtual Advisor is speaking, you can interrupt it with another command. The first word in your command helps to get its attention. • If the Virtual Advisor has trouble understanding your commands when you interrupt, try speaking the first word loudly and clearly, then pause for an instant, then continue with the rest of the command. For example: "Get ... my weather" or "Lookup... a quote for General Motors".

RADIO/AUDIO SYSTEM DESCRIPTION AND OPERATION

The entertainment system on this vehicle may have several different configurations available to it. To determine the specific configuration of the vehicle, please see the Service Parts ID Label, and refer to **RPO Code List** .

The entertainment system on this vehicle is configured with either a base or an uplevel system. The base and uplevel systems each contain a radio, antenna, speakers, and on some systems an audio amplifier. The uplevel system differs from the base system by providing the customer with enhanced audio system features. Some of those features may include the radio data system (RDS), an audio amplifier, programmable equalizer (EQ), and digital satellite radio (U2K).

Each item in the list below represents topics covered in detail below.

- Radio Circuit Operation
- Radio Faceplate
- Antenna System
- AM/FM Reception
- Digital Radio Receiver
- Speaker Operation
- Audio Amplifier
- Radio Data System (RDS)
- Radio Data System (RDS) Messages
- MP3/CD Formatting Information for MP3/CD Radios (If equipped)
- Integral Multi Disc CD Changer (IMDX)
- Theft Deterrent
- Radio Error Messages
- OnStar ®
- Steering Wheel Controls
- Auxiliary Input Jack
- USB Port
- Noise Compensation
- Speed Compensated Volume (SCV)

Radio Circuit Operation

Radio Power

The radio is supplied power by a fused B+ circuit. The radio does not use a discrete ignition feed circuit for power moding. The power mode master (PMM) provides the system power mode to the radio via serial data messages. The PMM determines the system power mode by processing power mode information from ignition switch inputs. Serial data power modes supported by the radio are OFF, ACCESSORY, RUN, and CRANK REQUEST.

Radio Grounds

The vehicle harness provides a ground for the radio circuits. The radio may also be case grounded.

Radio Data Link Communication

The radio communicates with other modules via serial data.

Radio Outputs

At minimum volume, the plus (+) and minus (-) speaker outputs are approximately half battery voltage, measured to vehicle ground. As the volume increases, the plus and minus change to create a voltage difference between each other either driving the voice coil of the speaker, or being fed to an amplifier.

Radio Head Dimming

Dimming and backlighting levels are determined by the serial data messages the radio receives.

Radio Faceplate

The Radio Faceplate is a separate component from the radio. The faceplate contains the radio control knobs and buttons for all audio functions. In addition, the HVAC head controls are part of the faceplate. The faceplate communicates with the radio through serial data and directly connects to the radio. When the operator rotates a radio knob to change radio stations or increase the volume a message is sent to the radio over serial data. After receiving the message the radio will make the adjustment. Other messages communicated between the radio and the faceplate includes the following:

- The content for the monochrome display
- Button presses / knob rotations
- Commands for the state of indicators

Antenna System

IMPORTANT: Radio systems with the antenna(s) in the glass are subject to possible interference when an aftermarket window tint is applied.

Diversity Antenna

The diversity antenna system is designed to deliver the best radio signal reception possible. For all body styles, two FM antennas are located at the left and right of the rear glass window and look similar to the defogger grid. For coupe body styles, the AM antenna is located at the top of the rear glass window. For wagon body styles, the AM antenna is located at the CHMSL. The FM and AM antennas are not separately replaceable, and any damage to them requires the rear glass or CHMSL to be replaced, depending on which antenna is damaged and body style of vehicle.

The antenna reception signals are sorted out by the radio antenna module. The radio antenna module is enabled when the radio is turned on. When the AM band is selected on the radio, the antenna module connects the AM antenna directly to the radio. When the FM band is selected, an enable signal is sent to the antenna module. Superimposed on this enable signal is the strength of the signal being received by the radio tuner. The antenna module switches between the two FM antennas, monitoring the radio signal strength and combines the signals and phase aligns them to create one strong signal.

AM/FM Reception

Radio Signal

The radio signal is sent from a broadcast station and is then received by an antenna. The strength of the signal received depends on the following:

- The power output (wattage) of the broadcasting station
- The location of the vehicle (or receiver) relative to the broadcast tower.
- Obstacles between the tower and the receiver
- Atmospheric conditions
- What band (AM or FM) the station is broadcasting
- Type of antenna and the ground plane

AM Reception

The AM band has a lower frequency range than the FM band. These longer wavelengths:

- Bend around Obstacles
- Follow the curvature of the earth
- May reflect off the ionosphere (skip)

The AM frequencies have longer range due to the ground wave. The ground wave follows the curvature of the earth and is effected by its conductivity. Greater conductivity equates to less signal loss thus transmission over water is better than over land. The AM band has a range of 80-320 km (50-200 miles).

FM Reception

The shorter wavelengths of the higher frequency FM band:

- Reflect off obstacles

- Are absorbed by the ground
- Penetrate the ionosphere

Broadcasts in the FM band are limited to line of sight reception which is typically 40 km (25 miles). Even when out of a direct line of sight, the signal may be reflected into areas that would be in a shadow otherwise. Factors which affect the line of sight include:

- Height of the broadcast antenna
- Height of the receiving antenna
- Terrain and buildings in the broadcast path

Digital Radio Receiver (if equipped)

XM satellite radio provides digital radio reception. The XM signal is broadcast from two satellites and, where necessary, terrestrial repeaters. The high power satellites allow the antenna to receive the XM signal even when foliage and other partial obstructions block the antennas view of the satellite. Terrestrial repeaters are used in dense urban areas. These repeaters will receive the satellite signal and re-broadcast them at much higher power levels in order to ensure reception in areas with densely packed tall buildings. A service fee is required in order to receive the XM service.

The digital radio receiver (DRR) is internal to the Radio.

Speaker Operation

Speakers turn electrical energy into mechanical energy to move air, using a permanent magnet and an electromagnet. The electromagnet is energized when the radio or amplifier (if equipped) delivers current to the voice coil on the speaker. The voice coil will form a north and south pole that will cause the voice coil and the speaker cone to move in relation to the permanent magnet. The current delivered to the speaker is rapidly changing alternating current (A/C). This causes the speaker cone to move in two directions producing sound. When the speaker is at rest, such as when the volume at a minimum value, the voltage applied to each side of the speaker is 1/2 ignition system voltage. This way, the speaker cone can be moved in either direction.

Audio Amplifier (If equipped)

Amplifier Interface

A fused battery voltage circuit provides the main amplifier power. Serial data is used to control the power - state of the amplifier. To respond quickly to audio input and control signals, the amplifier is ON in all vehicle power modes except OFF and CRANK Request.

Amplifier Operation

The purpose of the amplifier is to increase the power of a voltage or current signal. The output signal of an amplifier may consist of the same frequencies as the input signal or it may consist of only a portion of the frequencies as in the case of a subwoofer or midrange speaker. The radio creates a low level stereo audio output signal, which is sent at the user-defined volume level to the audio amplifier. The audio amplifier amplifies the signal and sends it to the appropriate speakers.

Radio Data System (RDS) (If equipped)

The radio may be equipped with the Radio Data System (RDS). The RDS feature is available only on FM stations that broadcast RDS information. This system relies upon receiving specific information from these stations and only works when the information is available. While the radio is tuned to an FM-RDS station, the station name or call letters display.

RDS data is carried in what is known as a "subcarrier". A subcarrier is a frequency that the FM broadcaster is authorized to use to send data that is not audible in the main audio program.

- RDS functions will only work with FM broadcast stations that are broadcasting RDS data.
- Not all FM Broadcast stations broadcast RDS data or offer all of the RDS services.
- The information displayed is dependent upon the information broadcast by the particular station. The information may vary greatly between stations.
- RDS functions may not work properly when reception is weak, reception is of poor quality, or RDS is not implemented properly by the FM Broadcaster.
- In some cases, a radio station broadcasting incorrect information may cause the RDS features of the radio to appear to work improperly.

With RDS, the radio can do the following:

- Seek to stations broadcasting the selected type of programming
- Receive announcements concerning local and national emergencies
- Display messages from radio stations

RDS may display text information such as:

- The name of the station.
- The type of program.
- General information such as artist and song title, call in phone numbers, etc.

RDS Messages

- **ALERT!:** Alert warns of local or national emergencies. When an alert announcement comes on the current radio station, ALERT! displays. You will hear the announcement, even if the volume is low or a CD is playing. If a CD is playing, play stops during the announcement. Alert announcements cannot be turned off. ALERT! is not affected by tests of the emergency broadcast system. This feature is not supported by all RDS stations.
- **INFO (Information):** If the current station has a message, the information symbol or INFO displays. Press this button to see the message. The message can display the artist, song title, call in phone numbers, etc. If the entire message can not be displayed, parts of the message appear every three seconds. To scroll through the message, press and release the INFO button. A new group of words displays after every press of this button. Once the complete message has displayed, the information symbol or INFO disappears from the display until another new message is received. The last message is displayed by pressing the INFO button. View the last message until a new message is received or you tune to a different station.

MP3/CD Formatting Information for MP3/CD Radios

The MP3/CD equipped radios will play standard audio CDs, and MP3/WMA files that were recorded on a CD-R or CD-RW disc. Customers who record their own music CDs should be aware of the following:

- The radio will only play audio from a CD-R/RW, it cannot record audio.
- Standard audio and MP3/WMA files should not be mixed on a disc.
- Song title, artist name, and album can display when files are recorded using ID3 tags version 1 and 2.
- Long file, folder, or playlist names, or a combination of a large number of files and folders, or playlists can cause the player to be unable to play up to the maximum number of files, folders, playlists, or sessions.
- The radio supports multi-session discs, but only the files from the last session will be played.

Integral Multi Disc CD Changer (IMDX) (If equipped)

The integral multi disc CD changer has the capability of storing and playing up to six (6) compact discs. The integral multi disc CD changer has a shock-absorbing system. Only under extreme operating temperatures or severe shock or vibration should the compact disc player skip or mute. If the customer travels an abnormally rough road, a skip condition may be normal. Test drive the vehicle on a normal road with a known good CD. If the condition is still present, replace the radio. The use of CD lens cleaner discs is not advised, due to the risk of contaminating the lens of the CD optics with lubricants internal to the CD mechanism.

The CD mechanism within the ICDX radio will begin an initialization routine after a battery connect (e.g., connecting radio connector X1). The initialization process takes approximately 25 seconds to complete. It is very critical that the initialization is completed before removing battery power from the radio, in order for the complex moving parts of the CD mechanism to be positioned properly before shipping and/or handling purposes. Damage may result to the moving parts of the CD mechanism if battery power is removed during the initialization routine. The damage occurs to the CD mechanism during subsequent shipping or handling operations. The extent of the damage causes the CD mechanism not to recover and the mechanism becomes inoperative.

Theft Deterrent

The radio theft deterrent system is intended to disable radio functionality if incorrect vehicle information is received by the radio. The radio disables functionality if the vehicle identification number (VIN) sequence received by the radio (A VIN sequence is usually the last six digits of the VIN.) does not match the VIN information learned by the radio. The radio receives this information in a GMLAN frame form.

The radio provides the following theft operating modes as part of the radio theft deterrent system:

- No VIN Mode - A radio that has not received or learned a VIN. In this mode the radio has limited functionality.
- Normal Mode - A radio has received a VIN sequence. The radio only learns the VIN sequence if the VIN sequence contained all six digits. In this mode the radio has full functionality.
- Theft Detected Mode - A radio that had previously learned a VIN sequence and subsequently received a VIN sequence not matching the learned sequence. In this mode the radio has limited functionality.

Radio Error Messages

The Radio may display the following Error Messages (Not all messages may be applicable):

- ERR: This message is displayed when the radio is unable to play the inserted cassette or CD
- LOC: This message is displayed when the radio has entered Theft mode.
- CAL/CAL ERR: This message is displayed when the radio has detected an invalid calibration.
- CDX ERR: Displays if communication is lost with the remote CD changer.
- CHECK CD: Displays when the player encounters a focus or tracking error.
- CHK CDXX: Displays when the CD changer encounters a focus or tracking error .
- CHK TAPE: Displays if a tape has been inserted but is unable to be played due to an error.
- DOOR OPEN: Displays when the CD changer door has been left open.
- NO DISC: Displays when the radio expected a disc to be inserted.
- NONE: Displays when the radio is unable to detect the vehicle speed data information via the serial data circuit.

If an error message is displayed, perform the appropriate diagnostics.

OnStar ® (if equipped)

When OnStar is activated, a serial data message is sent to the radio that activates a software program. When the software begins its process, the fade goes to the front, Bass and Treble are set to the mid range, the outputs are mono, and the audio source is OnStar. OnStar takes priority over any other audio source. All of these actions are preset values stored in the radio.

For additional OnStar information, refer to **OnStar Description and Operation**.

Steering Wheel Controls (if equipped)

Some audio functions are available using the steering wheel controls. The steering wheel controls duplicate the function of the primary controls available on the radio.

For additional information on steering wheel controls, refer to **Steering Wheel Controls Description and Operation** .

Auxiliary Input Jack (if equipped)

A remote 3.5mm auxiliary stereo jack and USB connector allows playback of audio signals from remote devices (e.g., laptop computer, iPod, MP3 player, etc.). The remote Aux jack/USB adapter is located in the center console bin. The radio detects the presence or absence of an audio mini-plug through the AuxJackDetect input. When the audio mini-plug is inserted in the Aux Detect Switch the mechanical switch closes. When removed the switch is open.

This is not an audio output; do not plug a headphone set into the front auxiliary input jack.

USB Port (if equipped)

The USB connector uses the USB standards, 1.1 and 2.0. This type of connector supports rates for low speed (1.5 Mb/s), full speed (12 Mb/s), and high speed (480 Mb/s).

USB Supported Devices:

- USB Flash Sticks (Thumb Drives)
- Portable USB Hard Drives
- CompactFlash (or other portable media) adapters

Depending on the USB mass storage device, some devices may not be recognized. The HUB device is not supported. An iPod can be controlled using the radio buttons and knobs and display the iPod song information on the radio's display. A special iPod connection cable is needed. This feature supports the following iPod models:

- Fifth generation or later iPod
- First or Second generation or later iPod Nano

For proper operation, make sure the iPod has the latest firmware from Apple®. The iPod firmware can be updated using the latest iTunes application. See apple.com/itunes. To connect and control the iPod, connect one end of the specially purchased iPod connection cable to the iPod's dock connector. Connect the other end to both the USB port and the auxiliary input jack. The USB port and the auxiliary input jack are located in the center console bin. If the vehicle is on and the USB connection works, a GM logo appears on the iPod. The iPod music displays on the radio's display and begins playing through the vehicle's radio system. A standard iPod USB cable, like the one that came with the iPod, cannot be used to connect an iPod to the vehicle. The iPod connection cable that was purchased with the vehicle or that was made available from the dealer must be used in order for this feature to work.

Noise Compensation (If equipped)

A microphone mounted in the vehicle passenger compartment monitors background noise (such as wind noise from a window being opened) and digitally modifies the system's volume and equalization to ensure optimal sound and performance.

Speed Compensated Volume (If equipped)

With Speed Compensated Volume (SCV), the audio system will adjust automatically to make up for road and wind noise as you drive, by increasing the volume as vehicle speed increases. To use SCV, set the volume at the desired level, and then select either Low, Medium, or High. To turn SCV off, select the Off screen button.

VIDEO ENTERTAINMENT SYSTEM DESCRIPTION AND OPERATION (DUAL HEADREST DVD SYSTEMS)

Each item in the list below represents topics covered in detail below.

- Dual Headrest DVD Circuit Operation
- Dual Headrest DVD System Components

- Dual Headrest DVD Player
- Playing a Disc
- DVD Messages
- Parental Control
- Video Screen
- Remote Control
- Wireless Headphones
- AUX Inputs
- Audio Outputs
- Wired Headphone Jacks

Dual Headrest DVD Circuit Operation

Dual Headrest DVD Power

The Dual Headrest DVD uses a switched battery voltage feed circuit for power moding.

Dual Headrest DVD Grounds

The vehicle harness provides a ground for the Dual Headrest DVD system.

Dual Headrest DVD Data Link Communication

The Dual Headrest DVD system does not communicate with serial data.

Dual Headrest DVD Outputs

The Dual Headrest DVD system can only output video to each screen and through the AV output for external devices such as a camcorder.

Dual Headrest DVD Components

The Dual Headrest DVD system includes:

- Two video display screens
- DVD Control Module
- A Digital Versatile Disc (DVD) player built into each monitor - If equipped with Dual Player
- Two sets of wireless infrared headphones
- A remote control
- Stereo audio and video inputs for playing an auxiliary device

Dual Headrest DVD Player

The DVD players are integrated the display screen. The DVD player can be controlled by both the buttons on

the DVD player and by the buttons on the remote control. The DVD player power may be turned on when the ignition is in the run, accessory, or retained accessory power (RAP) power modes. DVDs are manufactured with different region codes based on the country in which they are sold. Therefore, the DVD player is only compatible with the region code where the vehicle is sold. The DVD region code is printed on the jacket of most DVDs. Home recorded CDs, CD-R or CD-RW formats, may not play in the DVD player.

Playing a Disc

To play a disc, gently insert the disc with the label side facing the back of the vehicle, into the loading slot. The DVD player will continue to load the disc and the player will automatically start if the vehicle ignition is in an enabled power mode. If a disc is already in the player, press the play/pause button on the face of the DVD player or on the remote control. Some DVDs will not allow the user to fast forward or skip the copyright or previews. Some DVDs will automatically begin to play after the previews have finished. If the DVD does not begin to play the main title, refer to the on-screen instructions, and press play on the DVD player buttons or on the remote control.

DVD Messages

The following errors may be displayed on the video screen monitor.

Disc Format Error

This message will be displayed if a disc is inserted upside down, the disc is not able to be read, or if the disc format is not compatible with the DVD player.

Load / Eject Error

This message will be displayed if the disc is not able to properly load or eject.

Disc Play Error

This message will be displayed if the DVD player cannot play the disc. Severely damaged discs will cause this error.

Region Code Error

This message will be displayed if the region code of the DVD media is not compatible with the DVD player.

No Disc

This message will be displayed if the play button is pressed and there is no disc in the DVD player. If the disc is inserted wrong, the DVD player automatically ejects the disc and No Disc displays.

Parental Control

Part of the SETUP MENU lets users control the type of movie rating content (from G to Adult) that can be viewed and is only accessible when no disc is loaded. The parental control feature limits viewing to the selected

preference. If a disc is inserted into the DVD compartment slot and it exceeds the Parental Setting, the following message appears on display: "The Parental Setting of this player prohibits play. Would you like to allow this disc to play?"

If yes is selected, the six digit password must be entered for the disc to play. If the wrong password is entered, the following message appears: " This movie will not play due to the Parental Setting of the player. To create a six digit password, use the numeric keypad on the remote control. Press the ENTER button to confirm." The default password is 136900.

Video Screen

The rear display screen shows video from either DVD player, or an AUX input device, such as a video game console or camera. Each video screen has a dedicated video signal circuit to the DVD control. If the vehicle is equipped with rear seat entertainment, there is no way to source the movie from the rear seat entertainment to the Dual Headrest DVD screens.

DVD Control Module

The two video screens are linked together by the DVD Control Module. This module allows screen 1 to source the media being played on screen 2. Video, audio, power, and remote signals are sent from the DVD Control Module, to each of the video screens. Video and audio signals are sent from the screen to the control module, and then to both screens.

Remote Control

To use the remote control, aim it at the infrared window above the video screen and press the desired remote control button. Direct sunlight or very bright light may affect the ability of the entertainment system to receive signals from the remote control. If the remote control does not seem to be working, the batteries may need to be replaced. Objects blocking the line of sight may affect the function of the remote control.

If the remote control is to be stored for a long period of time, remove the batteries and keep them in a cool, dry place. Do not store the remote control in heat or direct sunlight. This could damage the remote control. Keep the remote control stored in a cool, dry place.

Wireless Headphones

Wireless headphones allow for rear seat passengers to use the Dual Headrest DVD player without disturbing the listening of front seat passengers. The wireless headphones receive audio signals from the infrared (IR) transmitters on the overhead console. This transmission is line of sight only, so audio quality will be degraded if anything blocks the transmitter signal from reaching the headphones, or if the headphones are placed in the front of the vehicle. On some models, the infrared transmitter will have red LEDs illuminated when activated.

The wireless headphones include 2 channels. This allows rear seat passengers to utilize both screens individually without disturbing one another.

Each set of headphones has a rotary volume control. To adjust the volume, adjust this control. The headphones may automatically turn OFF if they lose the infrared signal from the system for approximately 4 minutes in order to preserve their battery power. The signal may be lost if the system is turned off or if the headphones are

out of range of the infrared signal transmitters that are located near the video display screen.

AUX Inputs

The AUX input jacks are standard color-coded RCA-style jacks. Video is yellow, right audio is red, and left audio is white. The jacks are located on the front of the monitor. A number of devices may be plugged into the AUX jacks, including, but not limited to video game consoles, digital cameras, camcorders, or other devices. Audio only sources can be played through the AUX jacks from portable audio devices.

Audio Outputs

Audio from the DVD player or auxiliary inputs may be heard through the following possible sources:

- Wireless infrared headphones
- Vehicle speakers - via the FM transmitter (if equipped)
- Wired headphone jacks on each monitor

The Dual Headrest DVD system will always transmit the audio signal by infrared to the wireless headphones, if there is audio available. The Dual Headrest DVD system may be capable of outputting audio to the vehicle speakers via the FM transmitter. Once the correct FM frequency is selected as an audio source on the radio you may adjust the speaker volume on the radio to control the volume of the audio to the speakers. Only one audio source can be heard through the vehicle's speakers at a time. The audio source being used is specified by the A/V (audio/video) source selected on the driver side head restraint monitor.

The Dual Headrest DVD system is capable of outputting audio through the wired headphone jacks on the monitors.

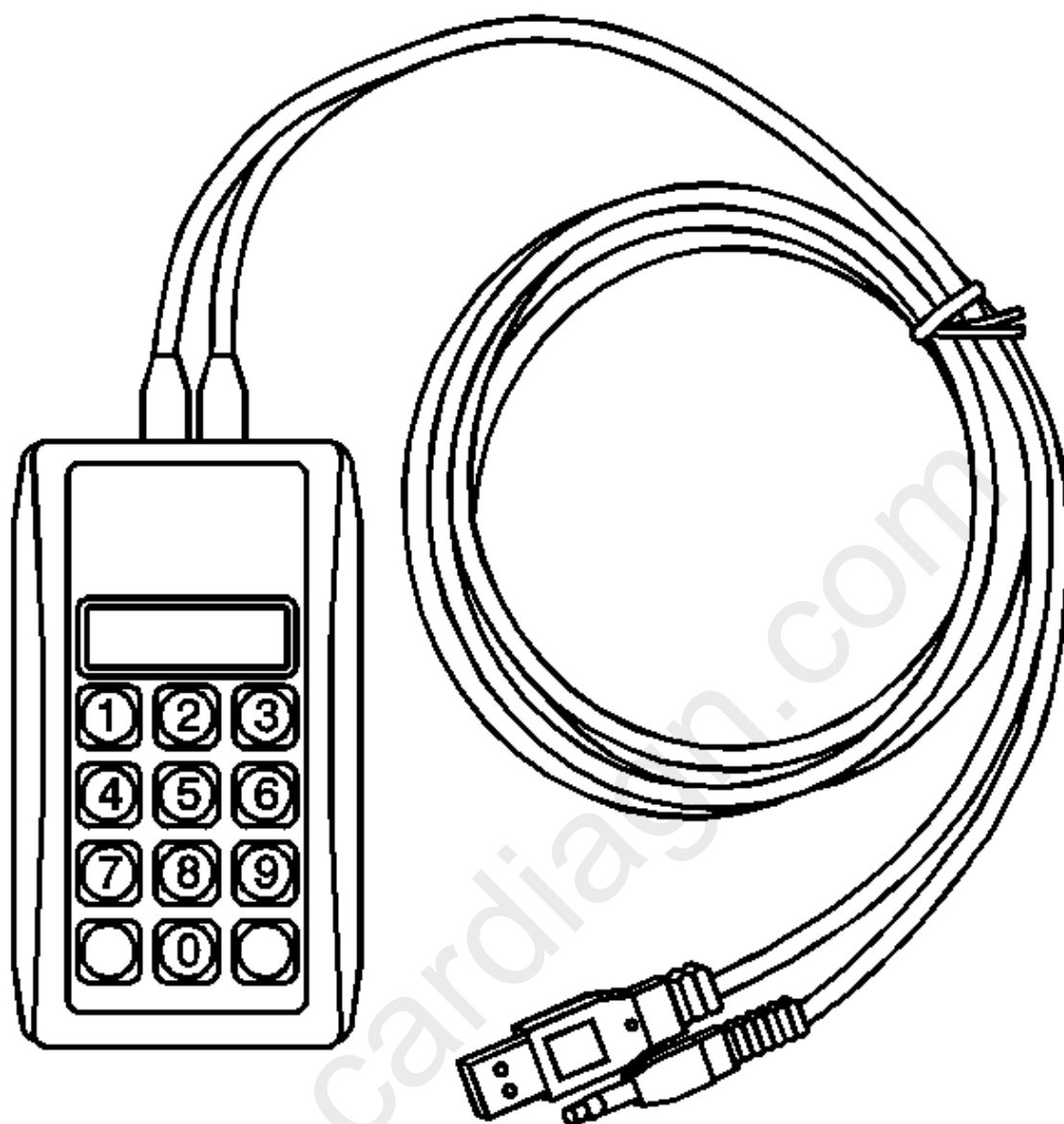
Wired Headphone Jacks

Each headrest monitor is equipped with a 2.5 mm jack for wired headphones. To use the wired headphones, plug the headphones into the jacks. The headphones can be used to listen to any source the Dual Headrest DVD system can source.

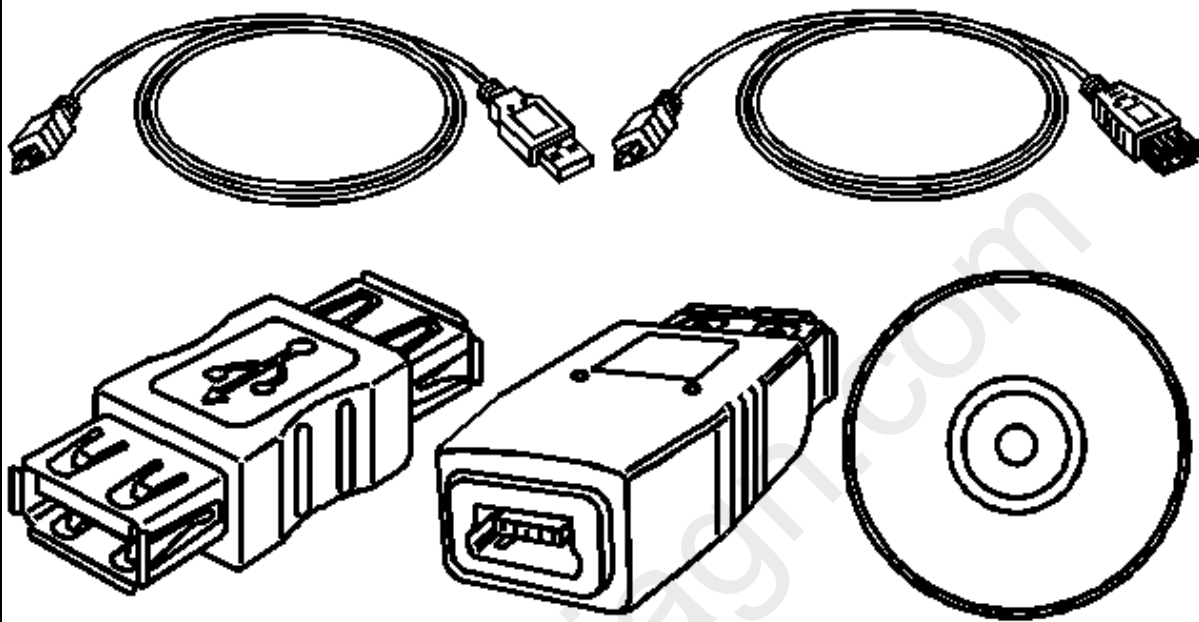
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Descrip

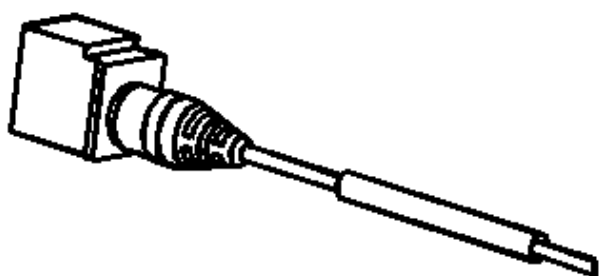


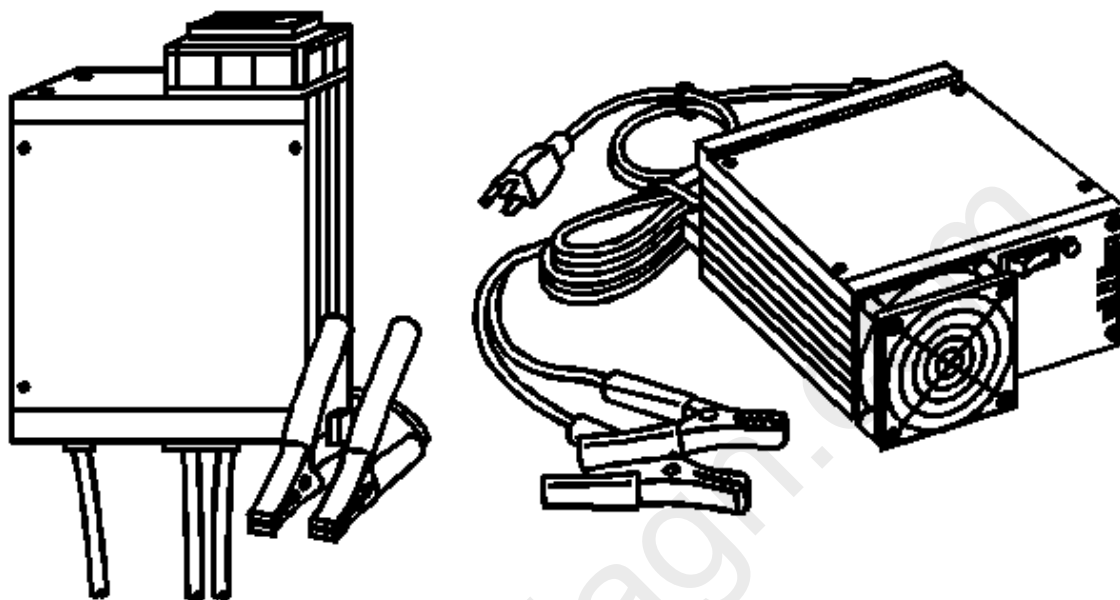
EL-50334-20
Multi-Media
Interface Teste
(MIT)



EL-50334-50
USB Cable and
Adapter Kit

EL-48028
Digital Radio Telemetry
Antenna





EL-49903
OnStar Antenn
Diagnostic Tool

SPECIAL TOOLS (MIT TOOL INSTRUCTIONS)

Bluetooth Pairing for Vehicles with Radio RPO: UF7

Either reset the pin code on the radio to 0000, or go under Device Info on the radio and see what the pin code is (to enter it later on the MIT).

1. Turn the BT discoverable ON in the radio Bluetooth settings.
2. Press Pair Device on radio (DO NOT PRESS SEARCH BLUETOOTH DEVICES ON THE RADIO).
3. Press the Pair button on the MIT.
4. When the three LED lights begin flashing on the MIT, enter the pin code (either 0000 if you reset it to that or what the radio pin code was).

5. MIT will then automatically connect with the radio and should show "MIT Connected" message.

Make test call and the audio streaming test.

Holden Radio Bluetooth Pairing Instructions

1. Using the radio controls, place the radio into "Discoverable Mode".
2. Place the MIT into Bluetooth mode by pressing TEST SELECTOR until the Bluetooth LED is illuminated.
3. With the MIT in Bluetooth mode Press and Release the #1 button (the Bluetooth LED will begin to slowly blink).
4. Now Press and release the PAIR/CALL button on the MIT (the Bluetooth LED will begin to blink a little faster).
5. On the radio Enter the PASSKEY when prompted: (press "0000" then Press "OK").
6. The MIT and radio will PAIR and CONNECT (the Bluetooth LED will be Fast Flashing).
7. Use as regular MIT at this point.

For all other Radios

Testing the Bluetooth Function

1. Verify connection of the MIT to the USB port.
2. Press and release the TEST SELECTOR button until the Bluetooth LED illuminates.
3. Disable all other Bluetooth devices present in the vehicle (ie. cell phones, laptops, etc.).

Standard Bluetooth Pairing/Bonding

1. Use the vehicle controls to place the radio into Bluetooth Pairing mode. The vehicle will prompt you with a security code.
2. Press and release the PAIR/CALL button. The Bluetooth LED will blink slowly while preparing to have a security code entered.
3. Wait for the all three LEDs to blink confirming it is ready to have the security code entered.
4. Enter the code with the MIT keypad and hit ENTER.
5. The Bluetooth LED will blink slowly while pairing/bonding and move to a quick flash once paired/bonded.

The vehicle should confirm pairing/bonding is complete.

Streaming Audio

1. Confirm pairing/bonding is complete - the Bluetooth LED will be in a quick flash mode.
2. On some radios the MIT automatically begins streaming audio via A2DP. The audio playback will confirm that the Bluetooth connection using streaming and the audio is working correctly.
3. On other radios you will need to select Bluetooth Audio from the Source menu to verify Audio

Streaming.

4. Audio playback confirms that the Bluetooth connection using Streaming Audio is working correctly.
5. Placing a test call will temporarily stop the streaming audio function, but upon disconnection of that test call,

the streaming audio from the MIT will resume.

To Place a Test Call

1. Confirm pairing/bonding is complete - the Bluetooth LED will be in a quick flash mode. If the vehicle is equipped with streaming audio, and the radio is set to play a Bluetooth audio file, the streaming audio playback will be audible.
2. Press and release PAIR/CALL button to place a test call. Streaming audio will be temporarily turned off.
3. Use the vehicle controls to answer the call.

NOTE: If the call is not answered within several rings, the MIT's audio files will not transmit, even though an active call is occurring.

4. Audio playback confirms that the Bluetooth connectivity is working correctly.

NOTE: The MIT will remain paired/bonded when the call is ended by the vehicle. To re-test the call function, place the MIT in Bluetooth mode and press and release the Pair button to reconnect. When testing is completed, delete MIT from the audio system before returning the vehicle to the customer.

5. Use the vehicle controls to end the call. If applicable, streaming audio will resume.

Testing the AUX/Line-In Function

1. Verify connection of the MIT as stated above.
2. Press and release the TEST SELECTOR button until the MIT AUX LED illuminates.
3. Use the vehicle controls to put the audio system into Audio (Line-In) mode.
4. Audio playback confirms that the audio input is working correctly.

Testing the USB Function

1. Verify connection of the MIT as stated above.
2. Press and release the TEST SELECTOR button until the MIT USB LED illuminates.
3. Use the vehicle controls to put the audio system into USB mode.

NOTE: Volume levels may vary dependent upon vehicle audio system.

4. Audio playback confirms that the USB is working correctly.

Troubleshooting Guide

If the MIT unit is still not working properly after following the below troubleshooting, the unit is malfunctioning and should be repaired or replaced.

Unit not Working

- Verify the MIT is powered on correctly as indicated by the green Power LED.
- If Power LED is not illuminated, verify USB power source is working properly.
- If USB power adapter is being used to power the MIT, check and, if necessary, replace the fuse in adapter.

Problem with Aux/Line-In Test

- Verify Aux/Line- In test cable is inserted properly into the vehicle audio input jack. Verify the MIT is in Aux/Line-In mode as indicated by the red AUX LED.
- Verify the vehicle audio system is in Auxiliary or Line-in mode. Verify the vehicle audio system volume is turned up and not in mute mode.

Problem with USB Test

- Verify MIT is in USB mode as indicated by the red USB LED. Verify the vehicle audio system is in USB mode.
- Verify the vehicle audio system volume is turned up and not in mute mode.

Problem with Bluetooth Pairing

- Delete previous devices stored in the device list of the radio and the pair the MIT
- Remove USB cable, and then reconnect to reset the MIT. Carefully follow the bonding instructions for the correct Passkey procedure.

Problem with Bluetooth Test Call Audio

- Verify the MIT is paired with the vehicle. This is indicated by the quick flashing Bluetooth LED.
- Audio system should have indicated the MIT is bonded.