2007 ACCESSORIES & EQUIPMENT

Cellular, Entertainment and Navigation - Outlook

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Audio/Video Disc Player Adapter Screw	2 N.m	18 lb in
Front Floor Console Extension Accessory Upper Bezel Screws	2 N.m	18 lb in
Front Side Door Speaker Screw	3 N.m	25 lb in
Heater and A/C and Radio Control Module Screws	2 N.m	18 lb in
Radio Antenna Base Nut	9 N.m	80 lb in
Radio Front Floor Console Speaker Screws	9 N.m	80 lb in
Radio Front Speaker Screw	2.5 N.m	22 lb in
Radio Rear Quarter Trim Speaker Assembly Screw	3 N.m	25 lb in
Radio Screw	2.5 N.m	22 lb in
Radio Speaker Amplifier Screw	2.5 N.m	22 lb in
Rear Side Door Speaker Screw	3 N.m	25 lb in
Video Display Assembly Screws	2 N.m	18 lb in

SCHEMATIC AND ROUTING DIAGRAMS

ENTERTAINMENT/COMMUNICATION SCHEMATIC ICONS

Entertainment/Communication Schematic Icons

Icon	Icon Definition
	CAUTION: **When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to SIR DISABLING AND ENABLING . Failure to observe the correct procedure could cause deployment of the SIR components, personal injury or unnecessary SIR system repairs.**

RADIO/NAVIGATION SYSTEM SCHEMATICS

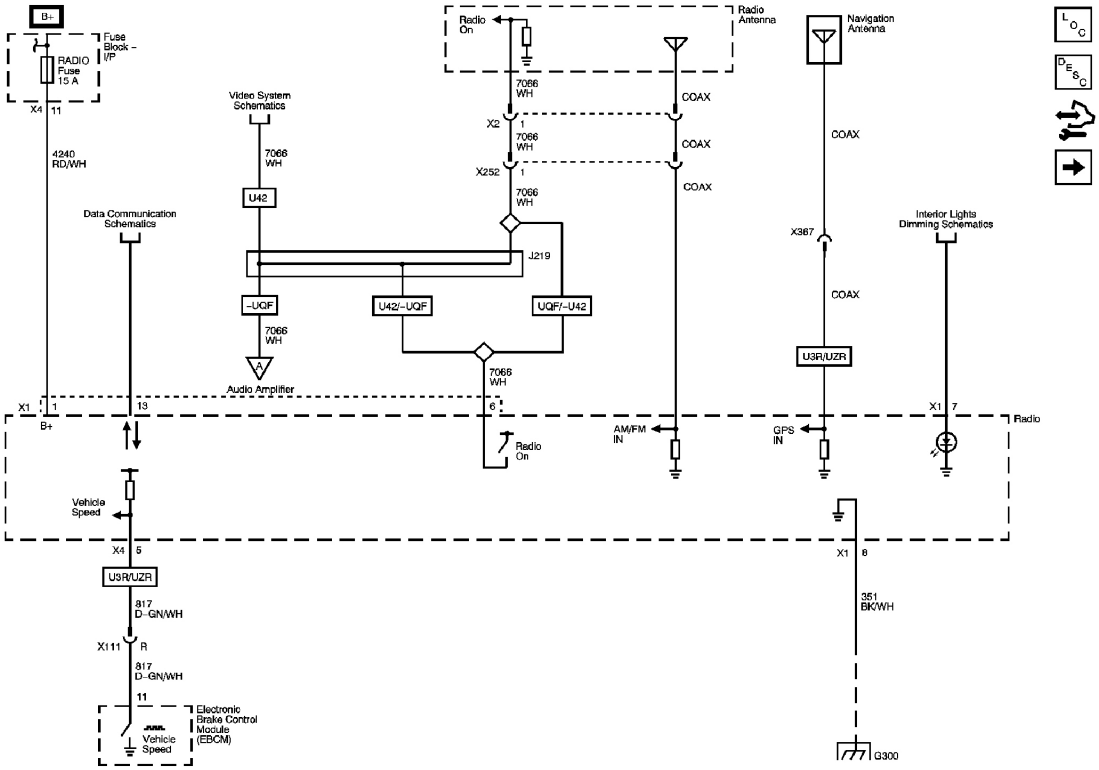


Fig. 1: Radio Antennas, Data Communication, Lighting, Power & Vehicle Speed Signal Schematic

Courtesy of GENERAL MOTORS CORP.

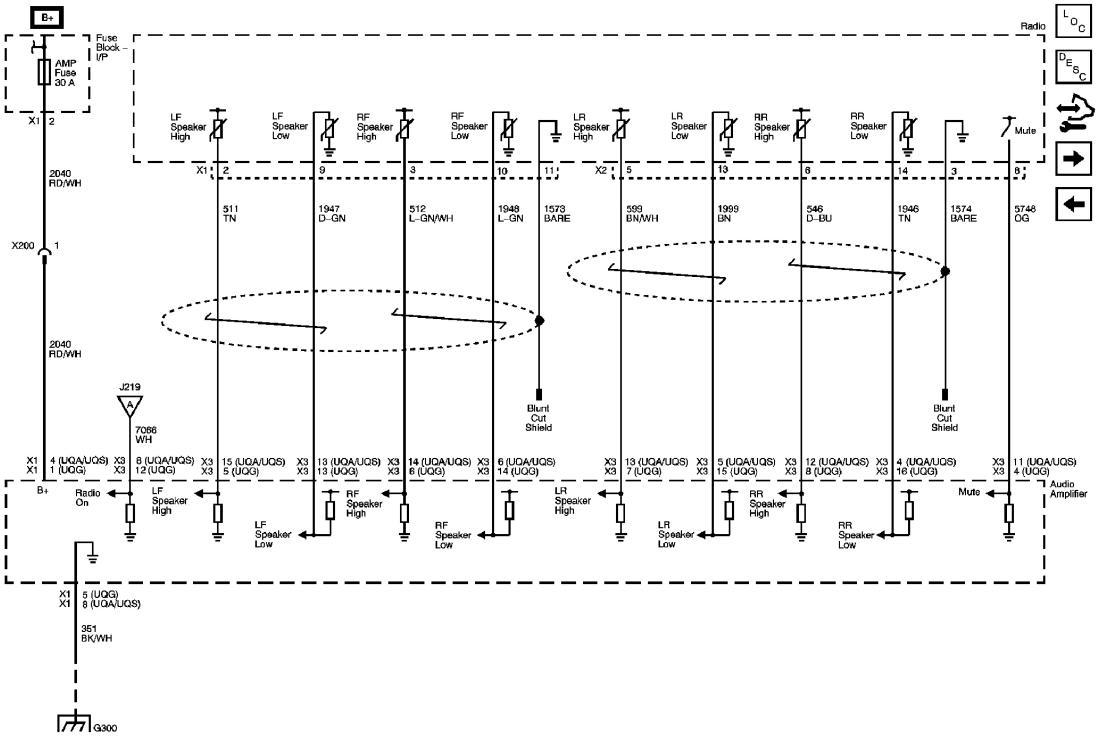


Fig. 2: Audio Amplifier Power, Ground & All Audio Inputs - UQG, Front & Rear Audio Inputs Schematic - UQA/UQS

Courtesy of GENERAL MOTORS CORP.

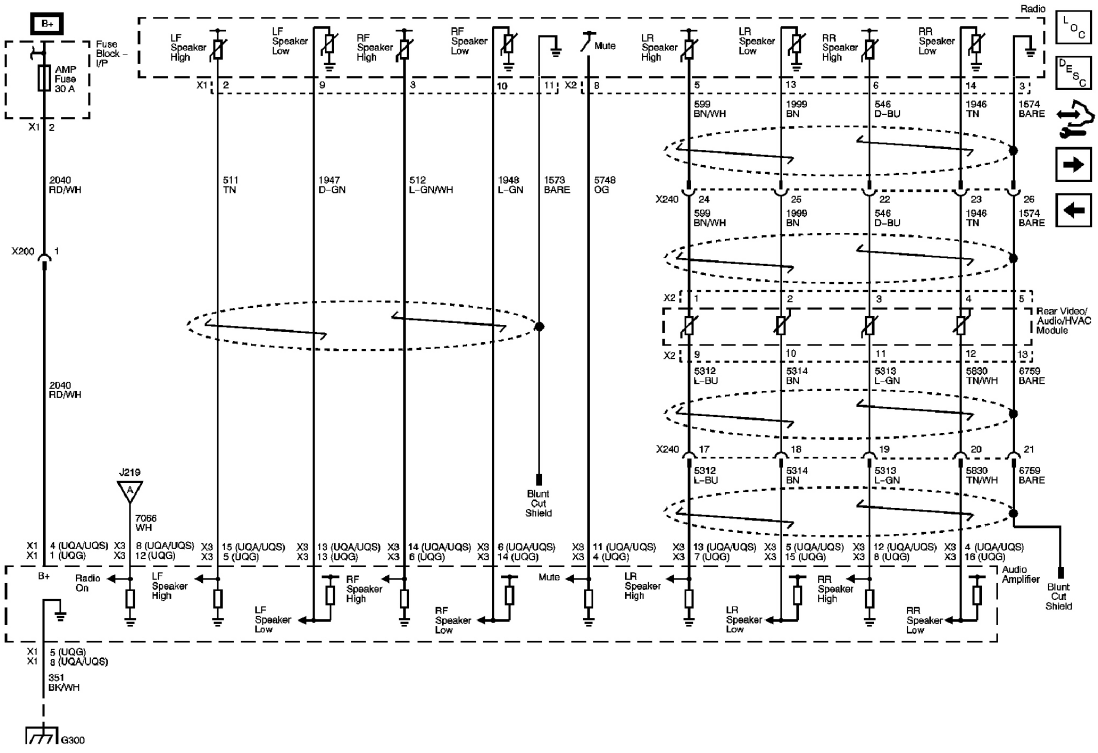


Fig. 3: Audio Amplifier Power, Ground and All Audio Inputs - UQG+UK6, Front & Rear Audio Inputs Schematic - UQA/UQS+UK6

Courtesy of GENERAL MOTORS CORP.

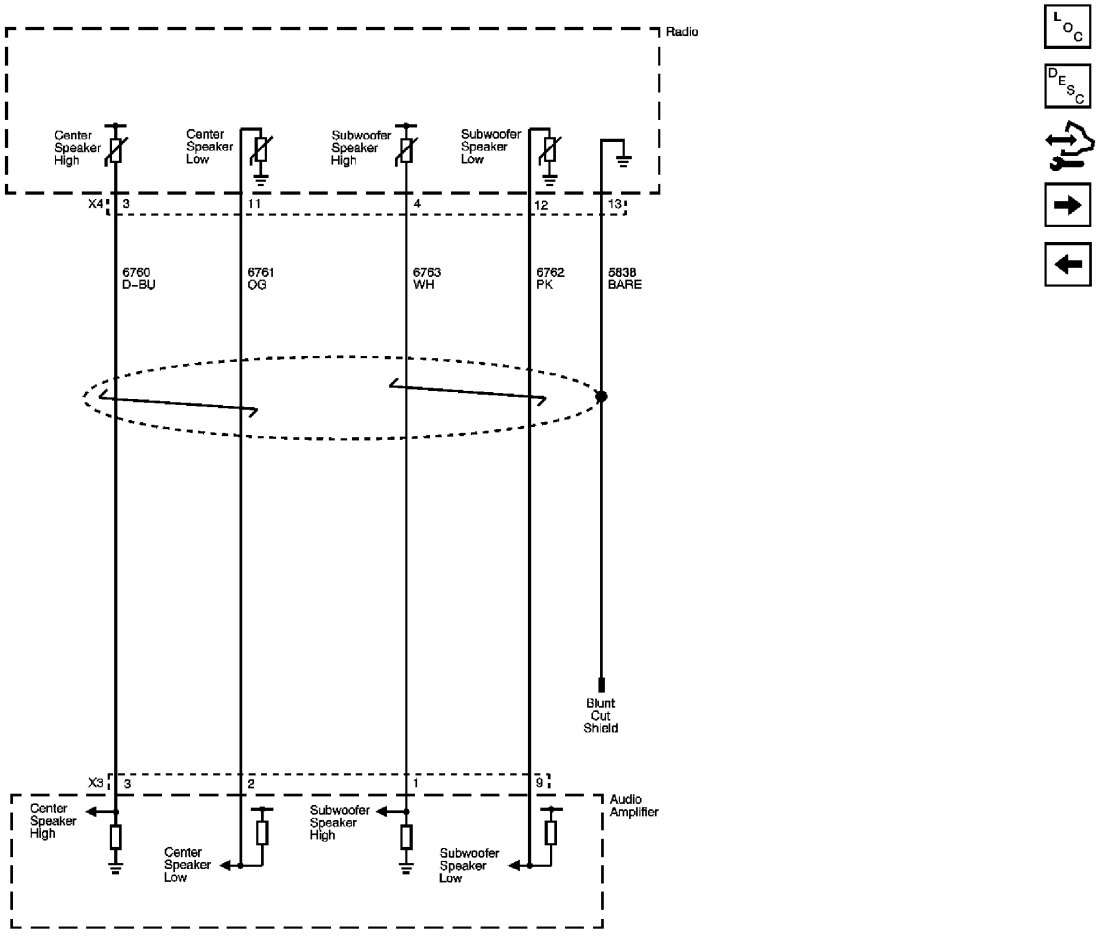


Fig. 4: Audio Amplifier Center & Subwoofer Audio Inputs Schematic - UGA/UQS
Courtesy of GENERAL MOTORS CORP.

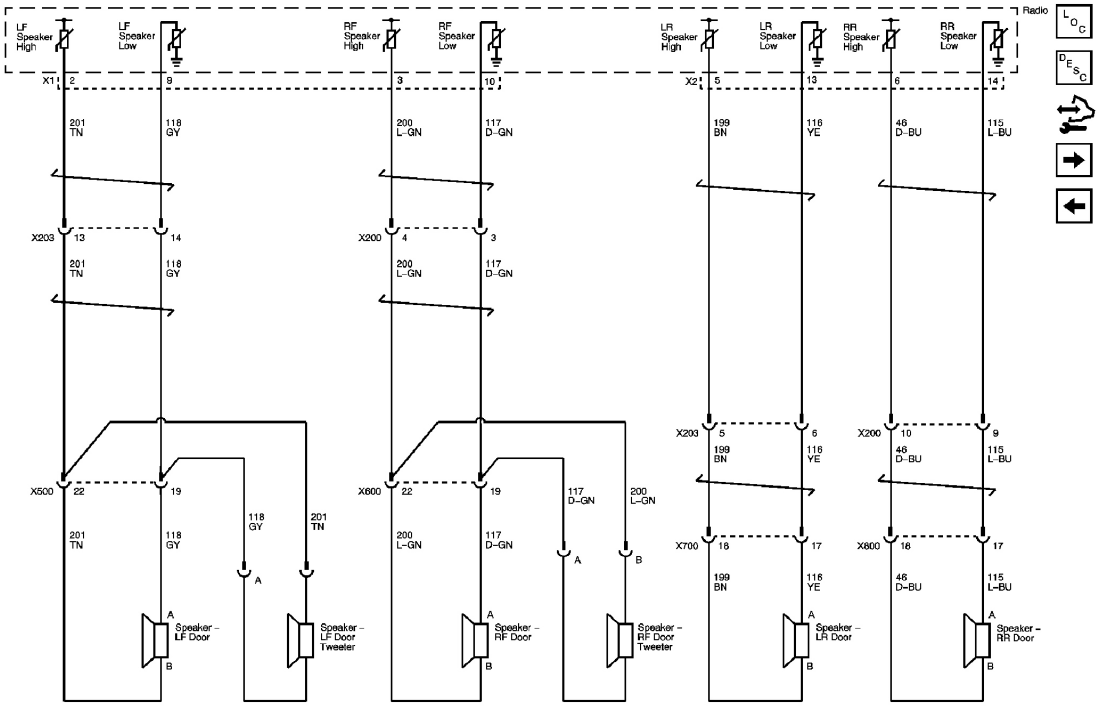


Fig. 5: Speakers Schematic - UQF
Courtesy of GENERAL MOTORS CORP.

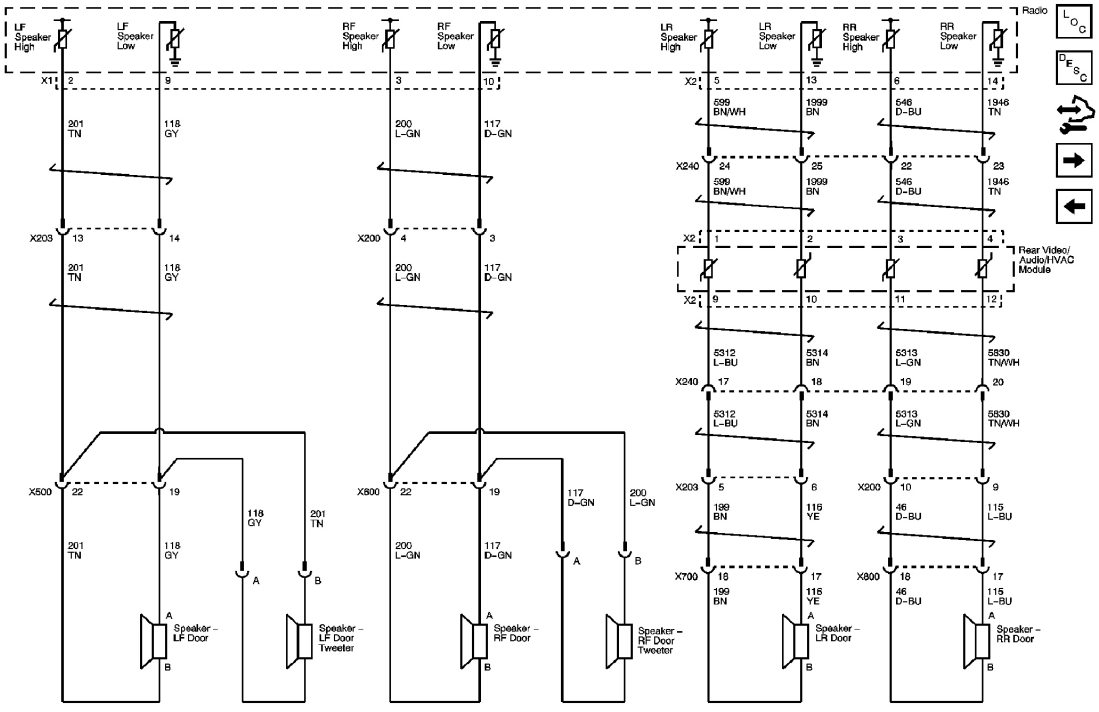


Fig. 6: Speakers Schematic - UQF+UK6
Courtesy of GENERAL MOTORS CORP.

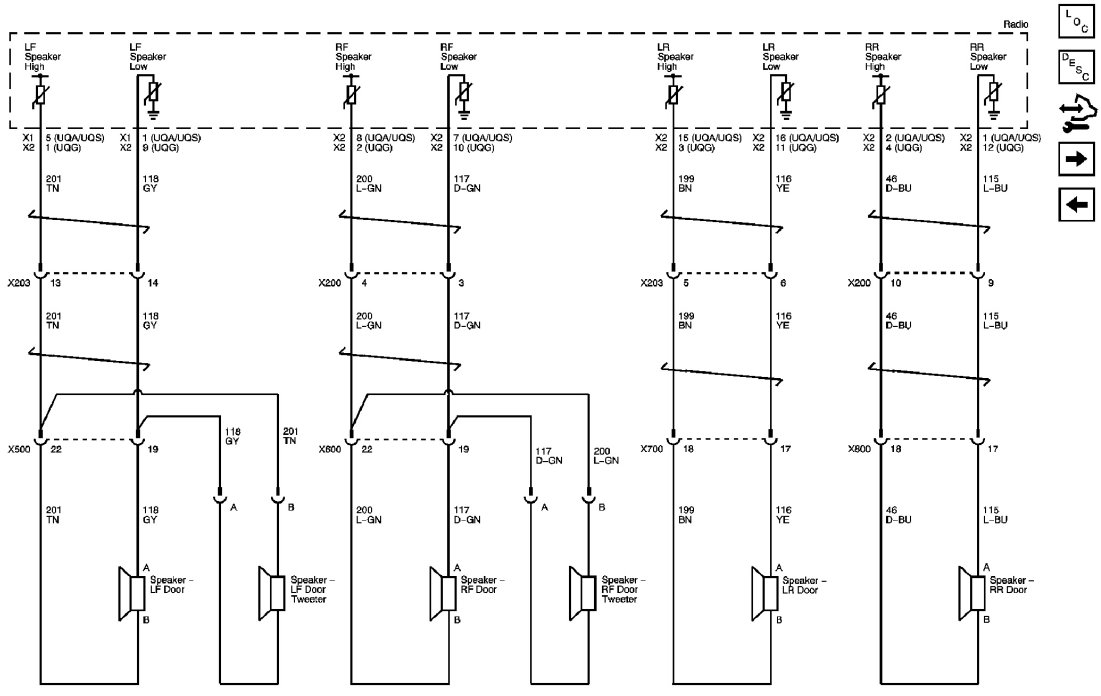


Fig. 7: Door Speakers Schematic - UQA/UQG/UGS
Courtesy of GENERAL MOTORS CORP.

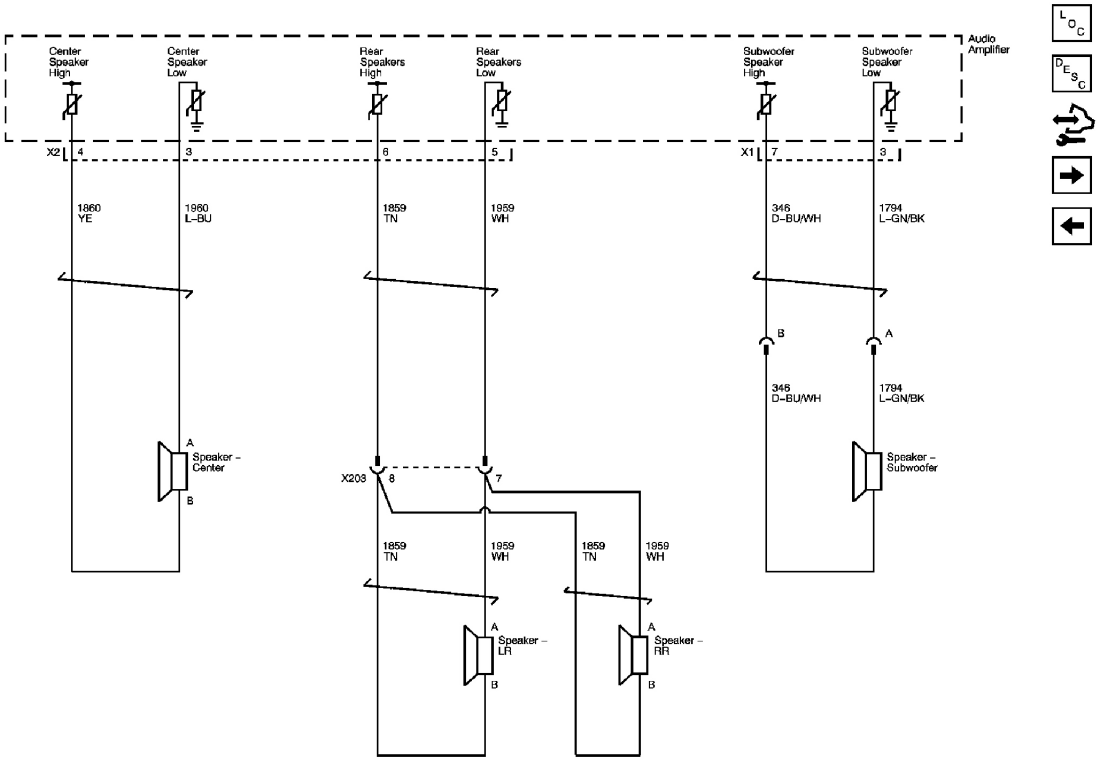


Fig. 8: Except Door Speakers Schematic - UQA/UQS
Courtesy of GENERAL MOTORS CORP.

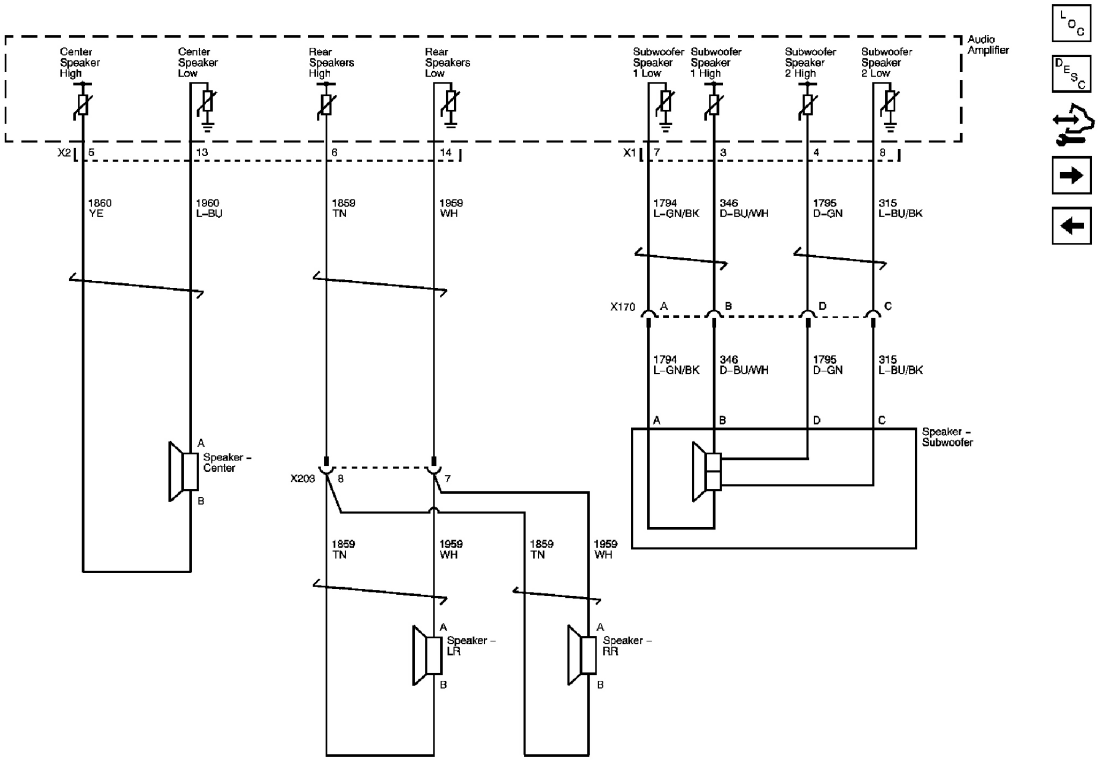


Fig. 9: Except Door Speakers Schematic - UQG
Courtesy of GENERAL MOTORS CORP.

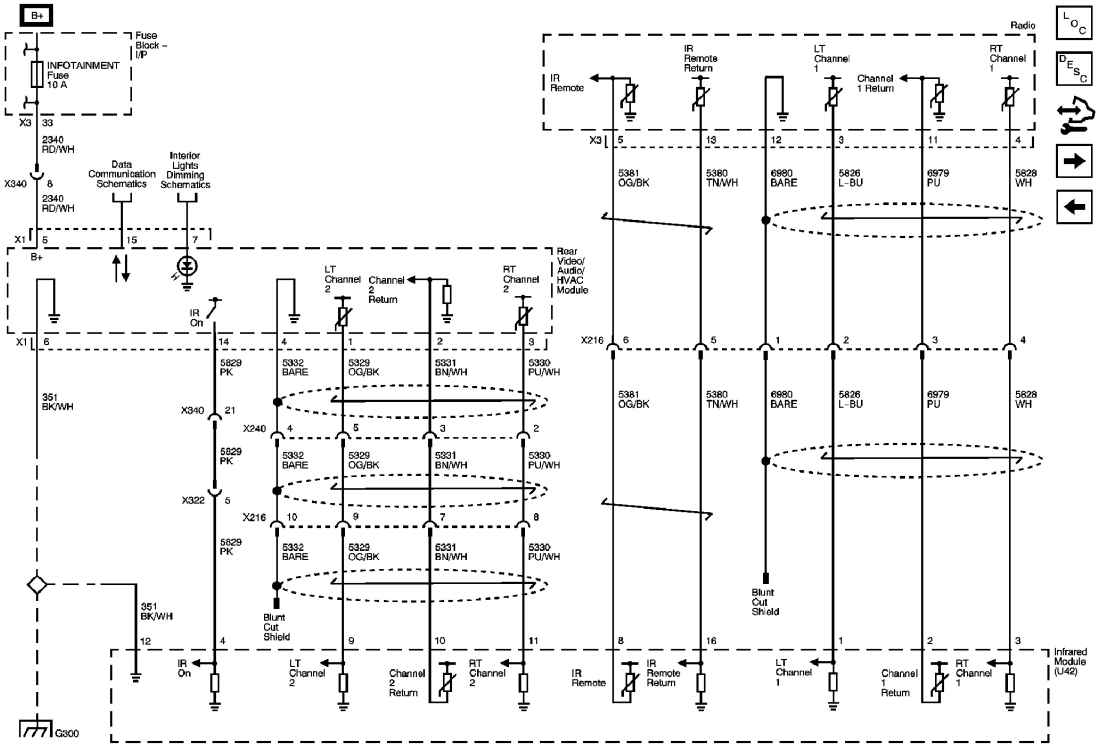


Fig. 10: Rear Video/Audio/HVAC Module Power, Ground, Lighting, Data Communication & Infrared Module Schematic
Courtesy of GENERAL MOTORS CORP.

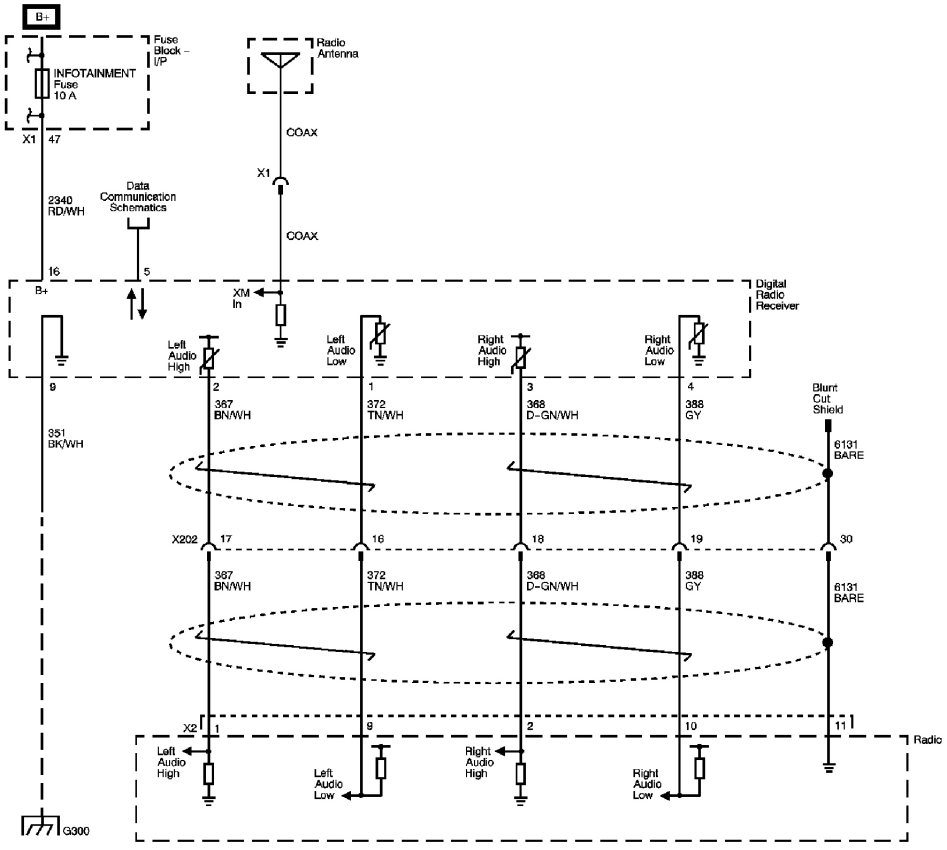


Fig. 11: XM Radio Schematic - U2K
Courtesy of GENERAL MOTORS CORP.

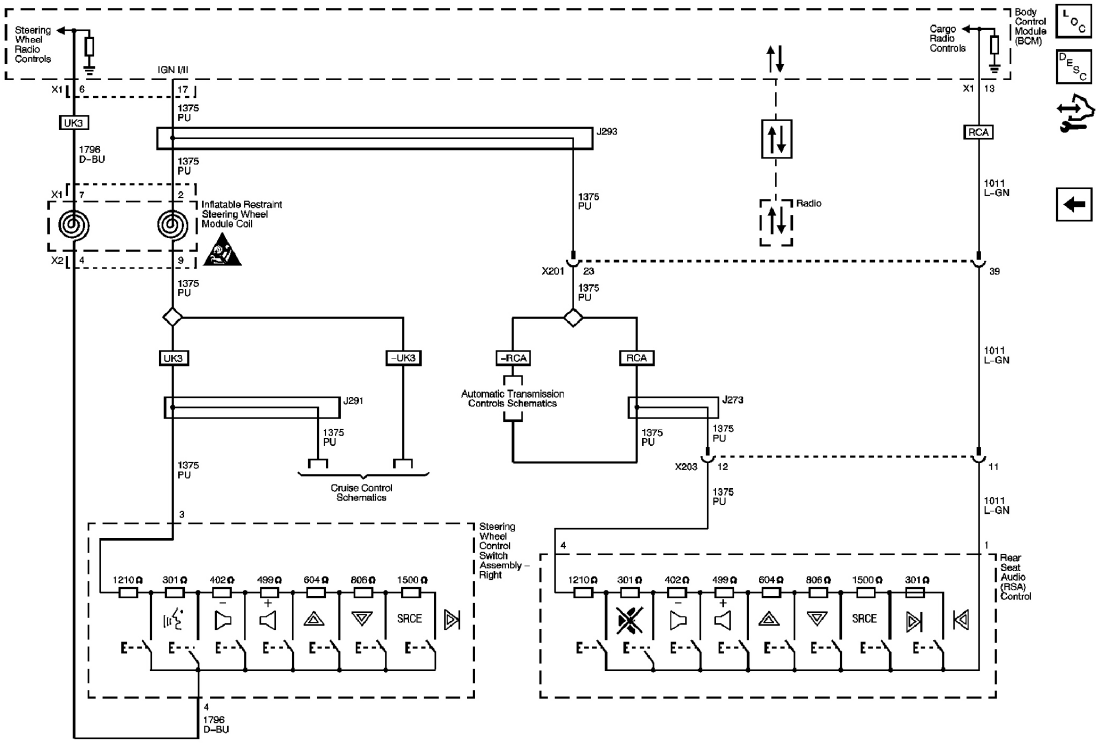


Fig. 12: Secondary Controls Schematic

Courtesy of GENERAL MOTORS CORP.

ONSTAR SCHEMATICS

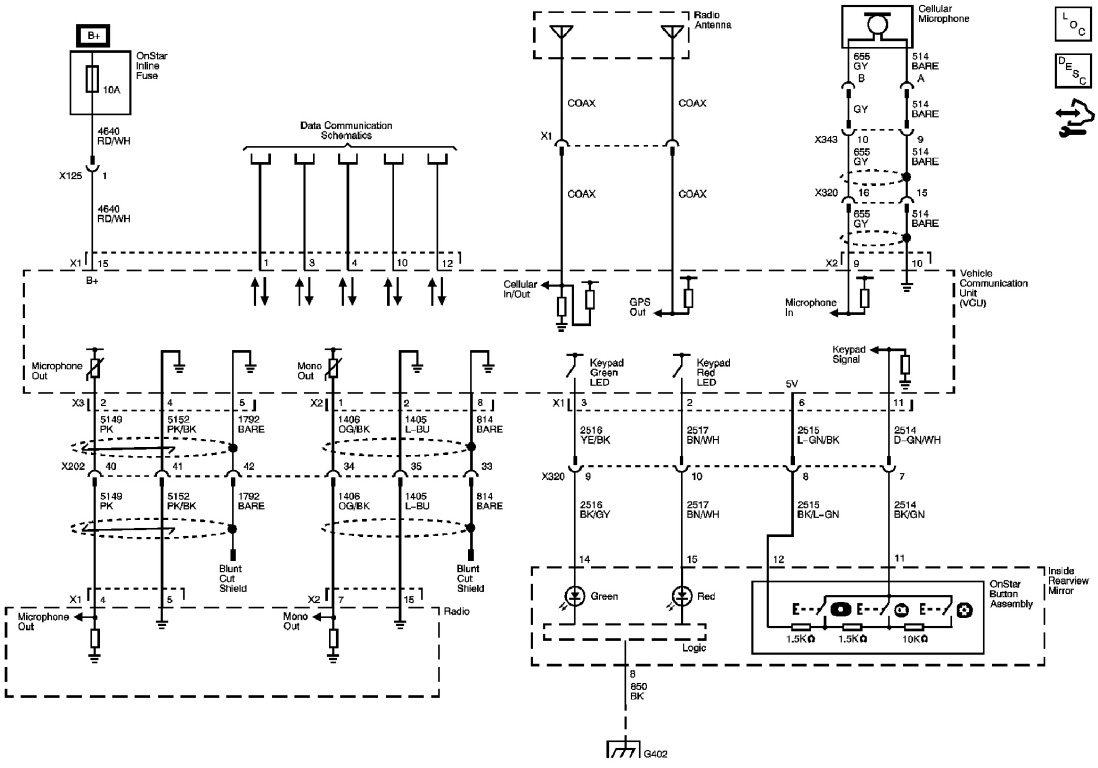


Fig. 13: UE1 Schematic
Courtesy of GENERAL MOTORS CORP.

VIDEO SYSTEM SCHEMATICS

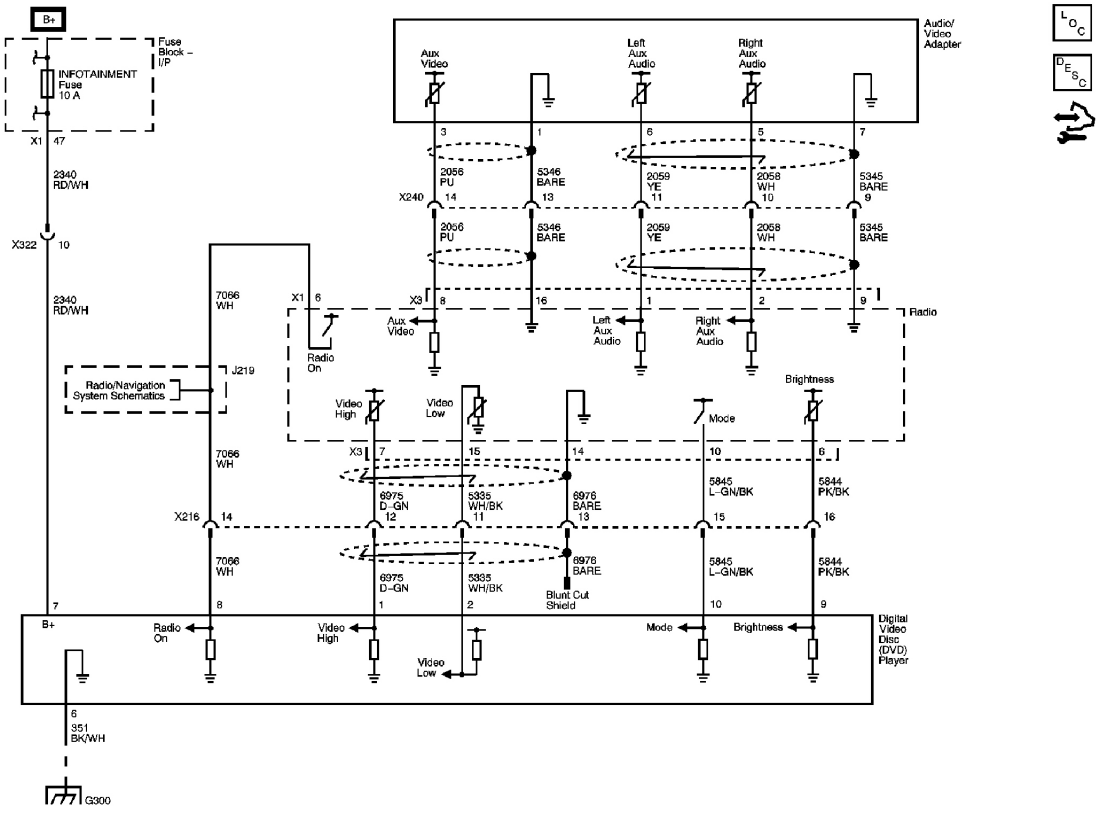


Fig. 14: U42 Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

ENTERTAINMENT/COMMUNICATION COMPONENT VIEWS

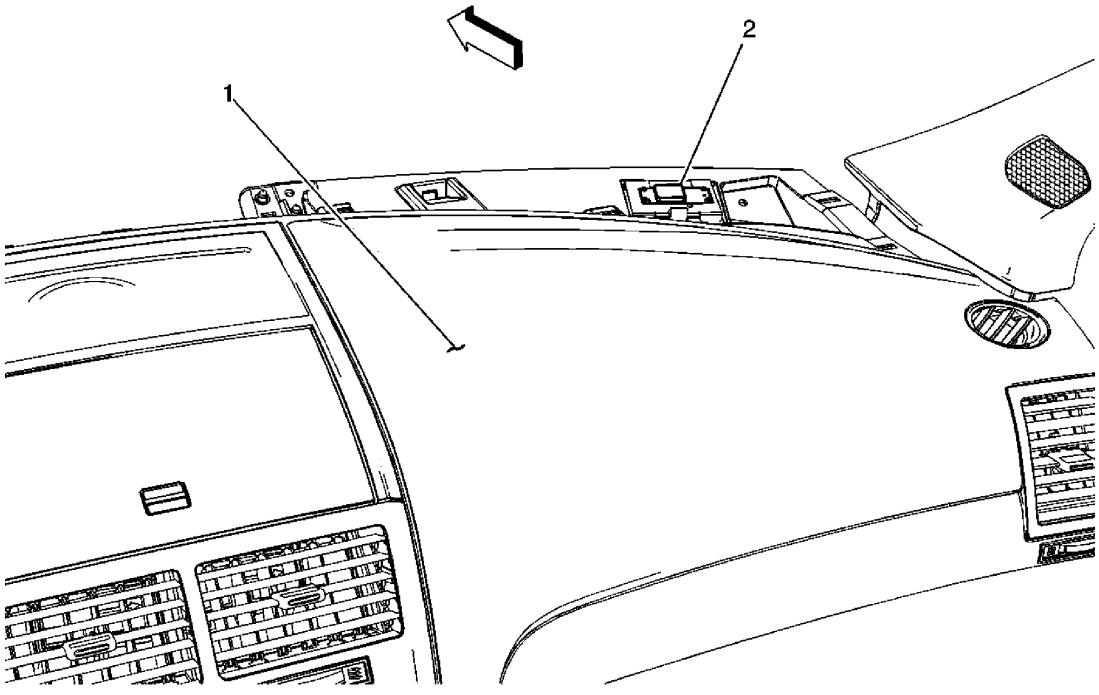


Fig. 15: Identifying Navigation Antenna
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 15

Callout	Component Name
1	I/P Trim
2	Navigation Radio Antenna

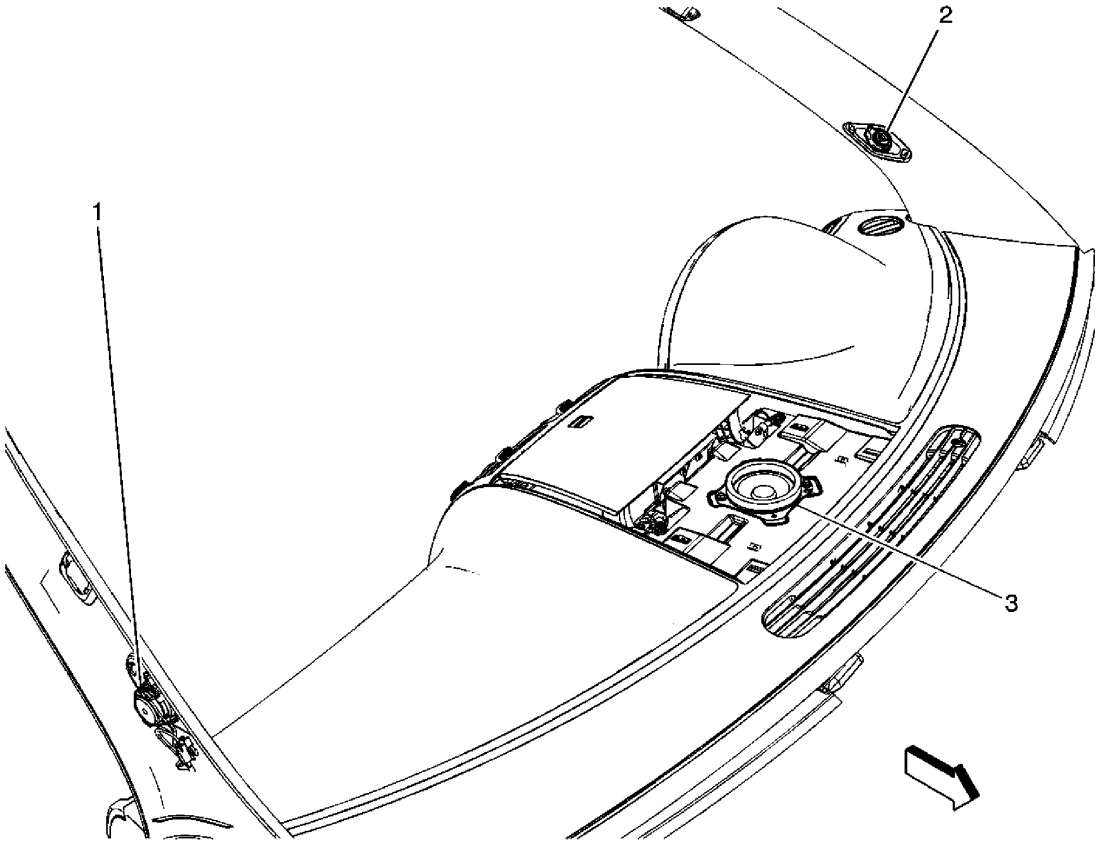


Fig. 16: Identifying I/P Speakers
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 16

Callout	Component Name
1	Speaker - RF Tweeter
2	Speaker - LF Tweeter
3	Speaker - Center (UQA/UQG/UQS)

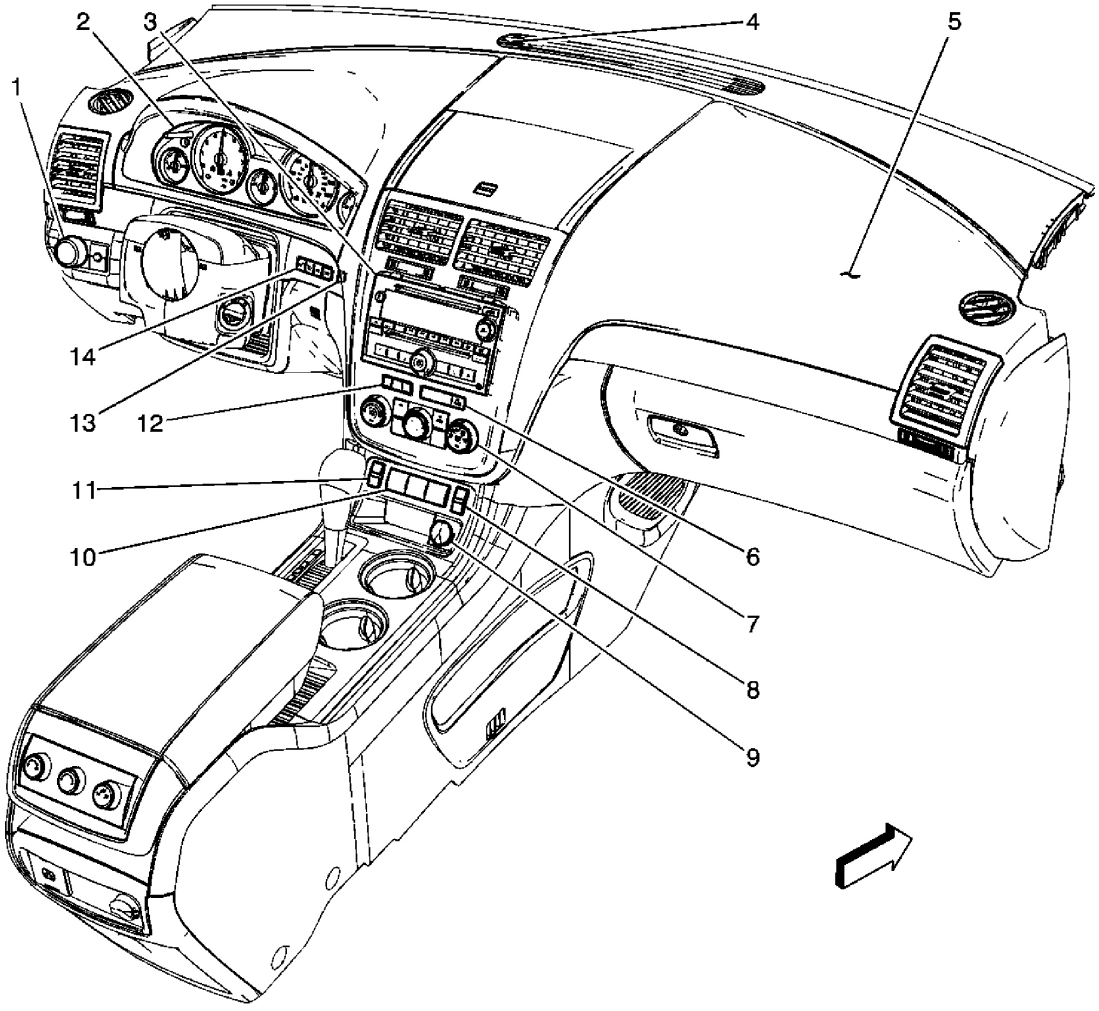


Fig. 17: Identifying I/P Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 17

Callout	Component Name
1	Headlamp Switch
2	Instrument Panel Cluster (IPC)
3	Radio
4	Sunload Sensor (CJ2)/Ambient Light Sensor (C67)
5	I/P Trim
6	Inflatable Restraint Passenger Air Bag ON/OFF Indicator
7	HVAC Control Module
8	Heated Seat Switch - Passenger (KA1)

9	Auxiliary Power Outlet - I/P
10	I/P Switch Assembly
11	Heated Seat Switch - Driver (KA1)
12	Hazard Switch
13	Driver Information Center (DIC) Switch (UH9)

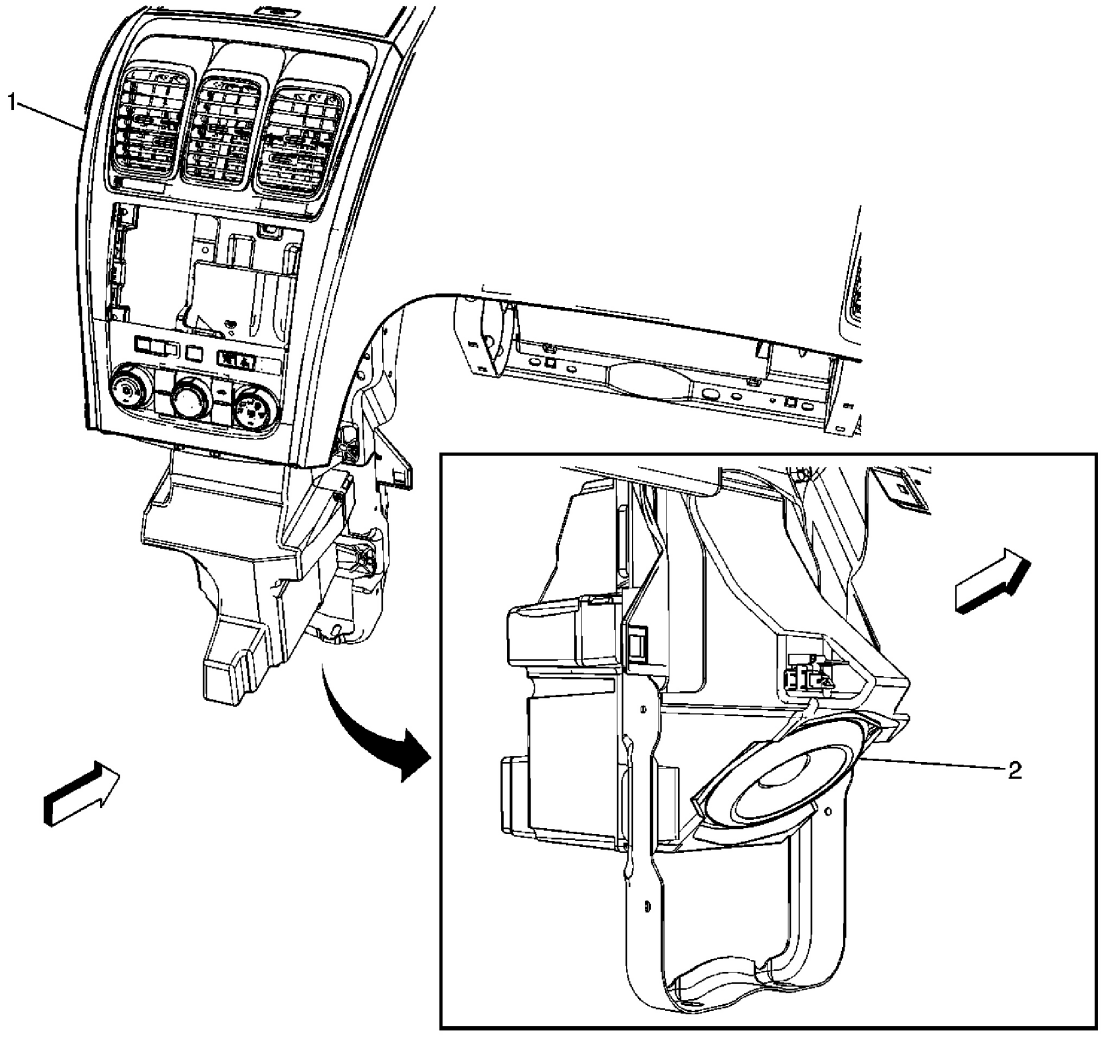


Fig. 18: Identifying Components Below Center I/P Trim
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 18

Callout	Component Name
1	I/P Trim

2	Speaker - Subwoofer (UQA/UQ6/UQS)

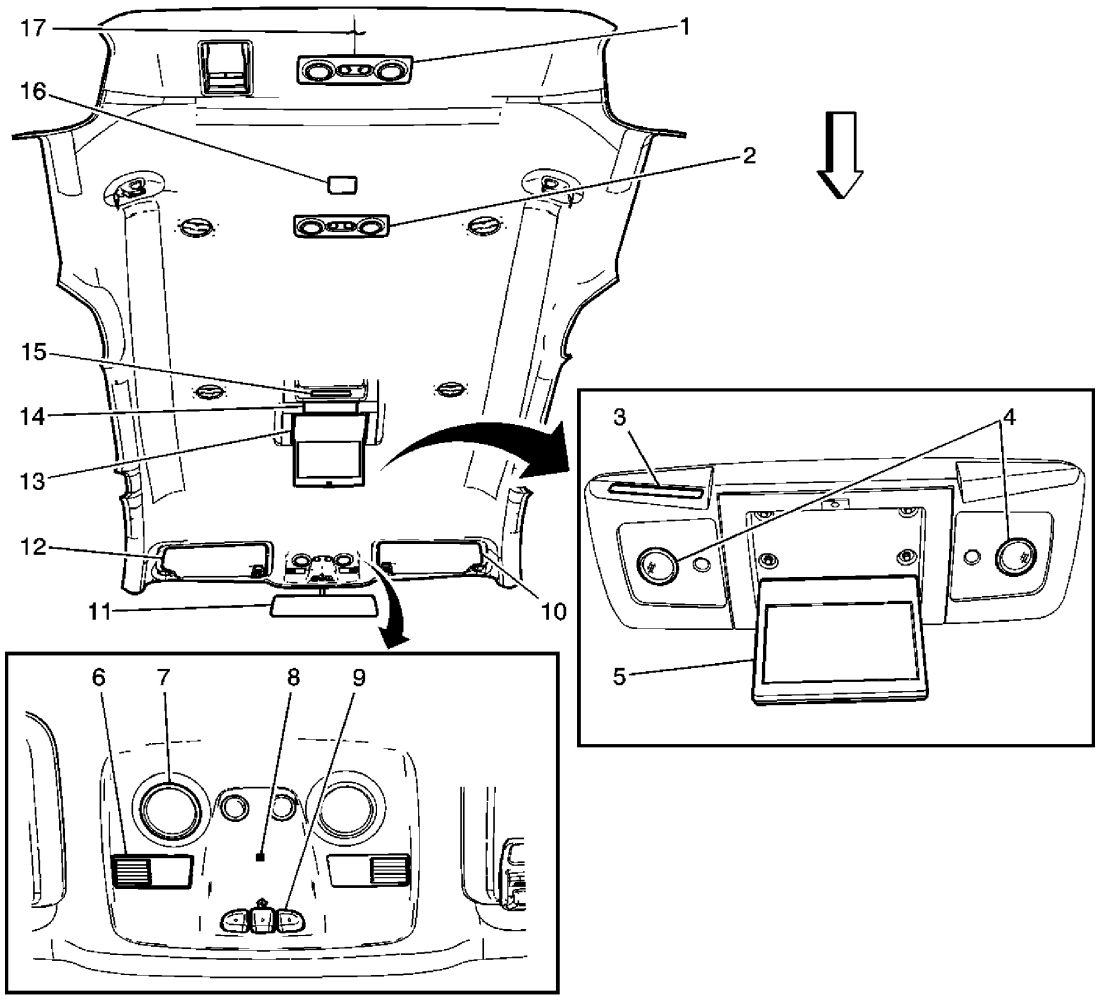


Fig. 19: Identifying Headliner Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 19

Callout	Component Name
1	Courtesy/Reading Lamp - Rear
2	Courtesy/Reading Lamp Center
3	Courtesy/Reading Lamp - Front
4	Front Overhead Console Assembly
5	Garage Door Opener (UG1)
6	Cellular Microphone (UE1)

7	Digital Video Disc (DVD) Player (U42)

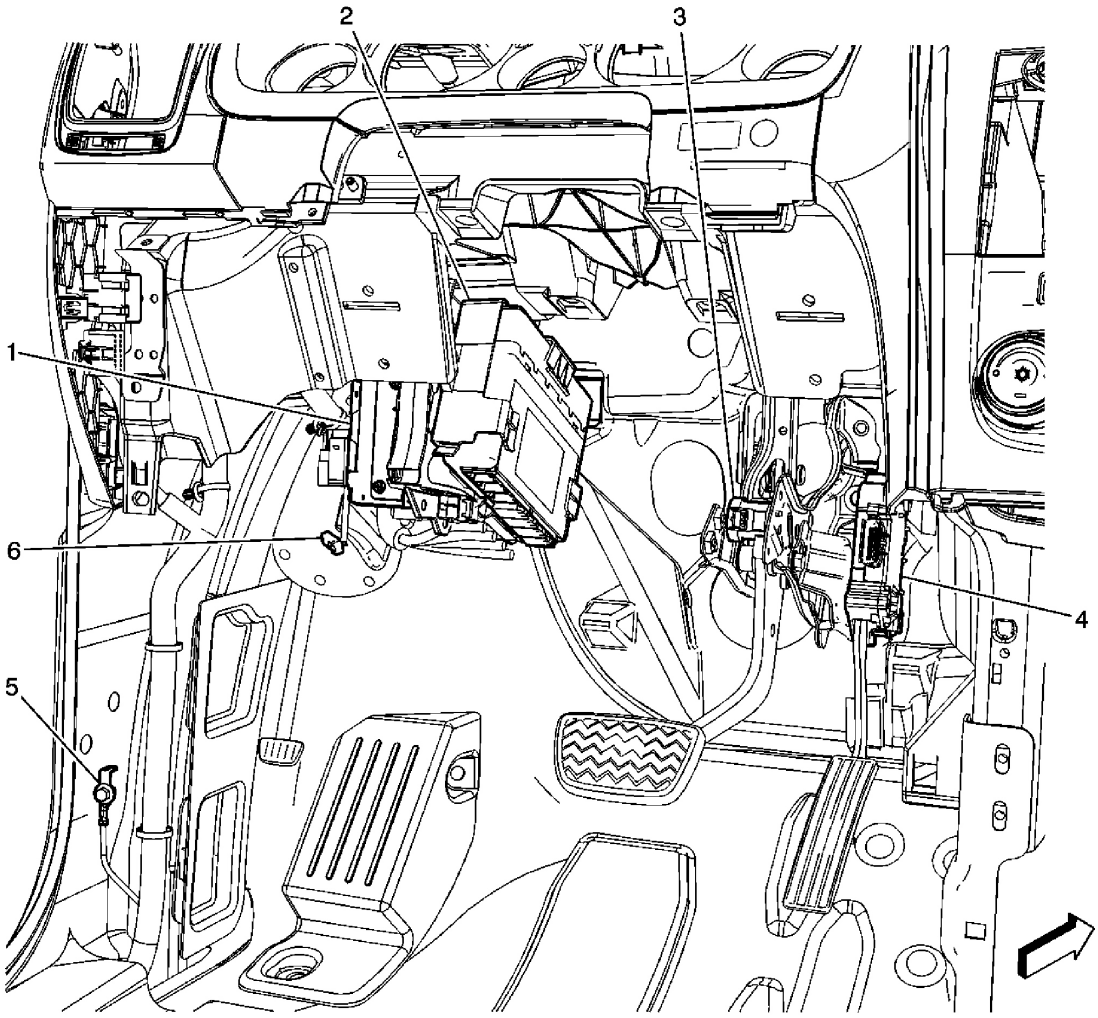


Fig. 20: View Below Drivers Side I/P
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 20

Callout	Component Name
1	Audio Amplifier (UQA/UQG/UQS)
2	Body Control Module (BCM)
3	Brake Pedal Position Sensor
4	Accelerator Pedal Position (APP) Sensor
5	G301

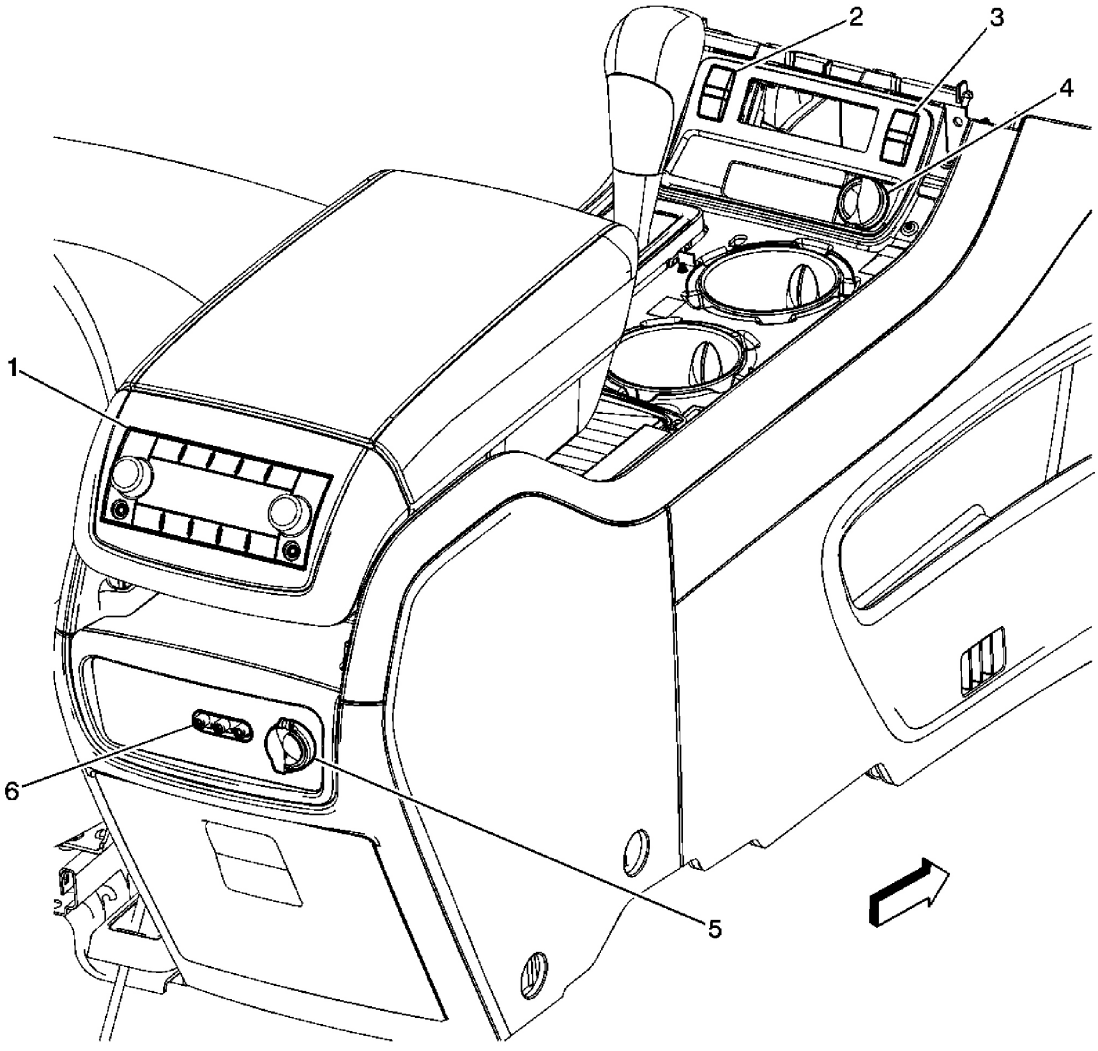


Fig. 21: Identifying Console Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 21

Callout	Component Name
1	Rear Video/Audio/HVAC Module (UK6)
2	Heated Seat Switch - Driver (KA1)
3	Heated Seat Switch - Passenger (KA1)
4	Cigar Lighter
5	Auxiliary Power Outlet - Console Rear (DK1)
6	Audio/Video Adapter (U42)

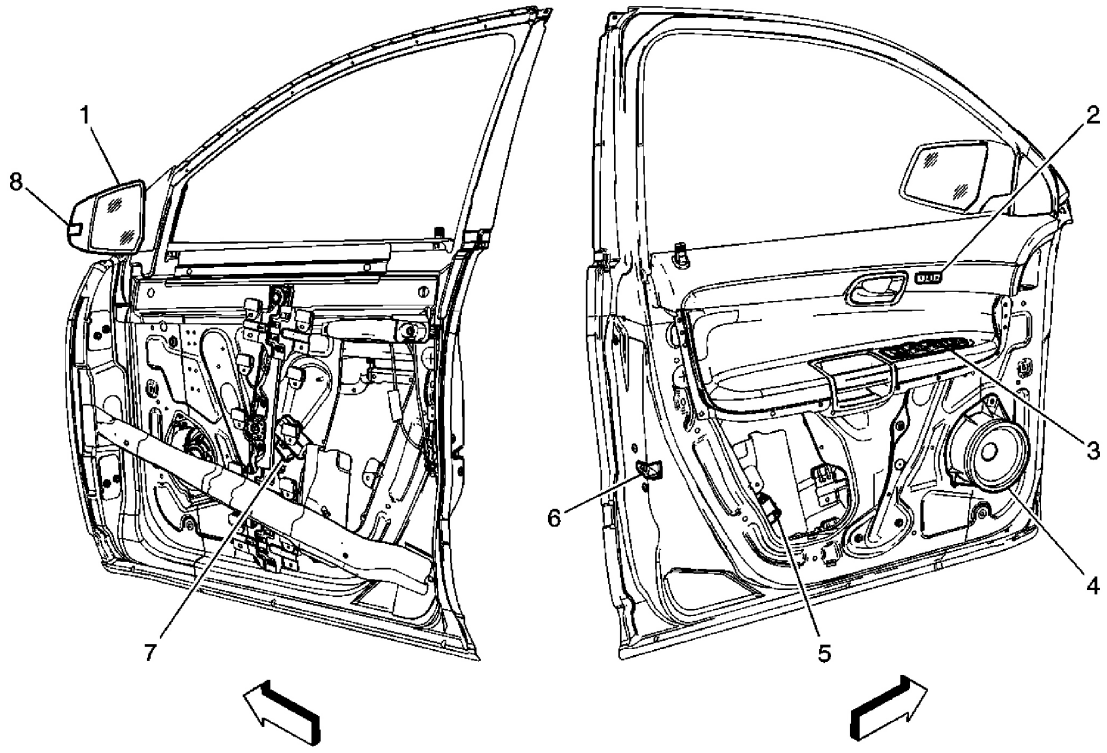


Fig. 22: Identifying Driver Door Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 22

Callout	Component Name
1	Outside Rearview Mirror - Driver
2	Memory Seat Switch (AG3)
3	Driver Door Module (DDM) (AXC/AXE)
4	Speaker - LF Door
5	Inflatable Restraint Side Impact Sensing Module (SISM) - Left
6	Door Latch Assembly - Driver
7	Window Motor - Driver
8	Turn Signal Lamp (Part of Outside Rearview)

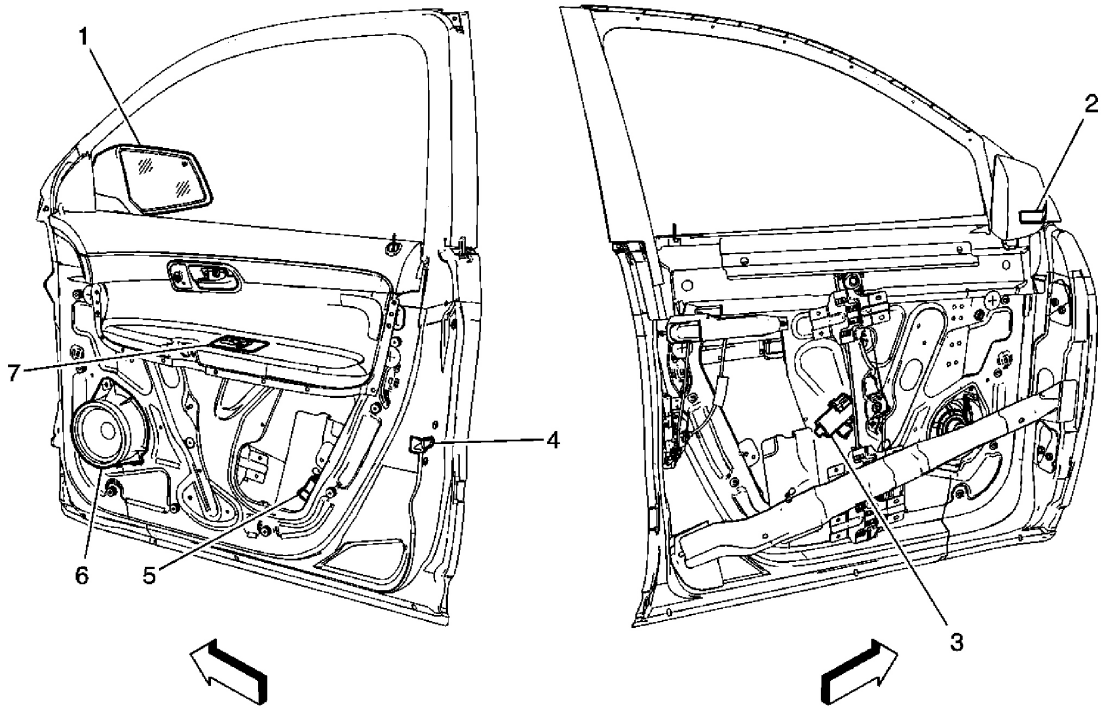


Fig. 23: Identifying Passenger Door Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 23

Callout	Component Name
1	Outside Rearview Mirror - Passenger
2	Turn Signal Lamp (Part of Outside Rearview Mirror)
3	Window Motor - Passenger
4	Door Latch Assembly - Passenger
5	Inflatable Restraint Side Impact Sensing Module (SISM) - Right
6	Speaker - RF Door
7	Window Switch - Passenger (AXA)

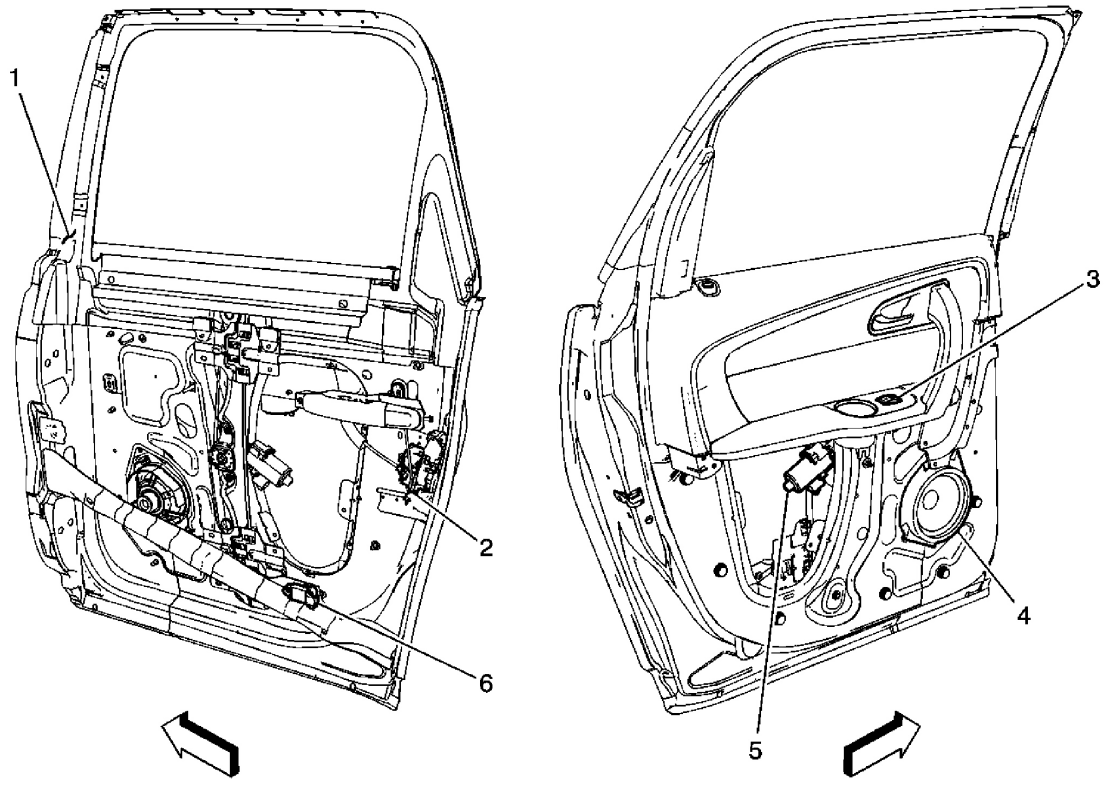


Fig. 24: Locating LR Door Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 24

Callout	Component Name
1	Door Frame
2	Door Latch Assembly - LR
3	Window Switch - LR
4	Speaker - LR Door
5	Window Motor - LR
6	Inflatable Restraint Side Impact Sensing Module (SISM) - LR

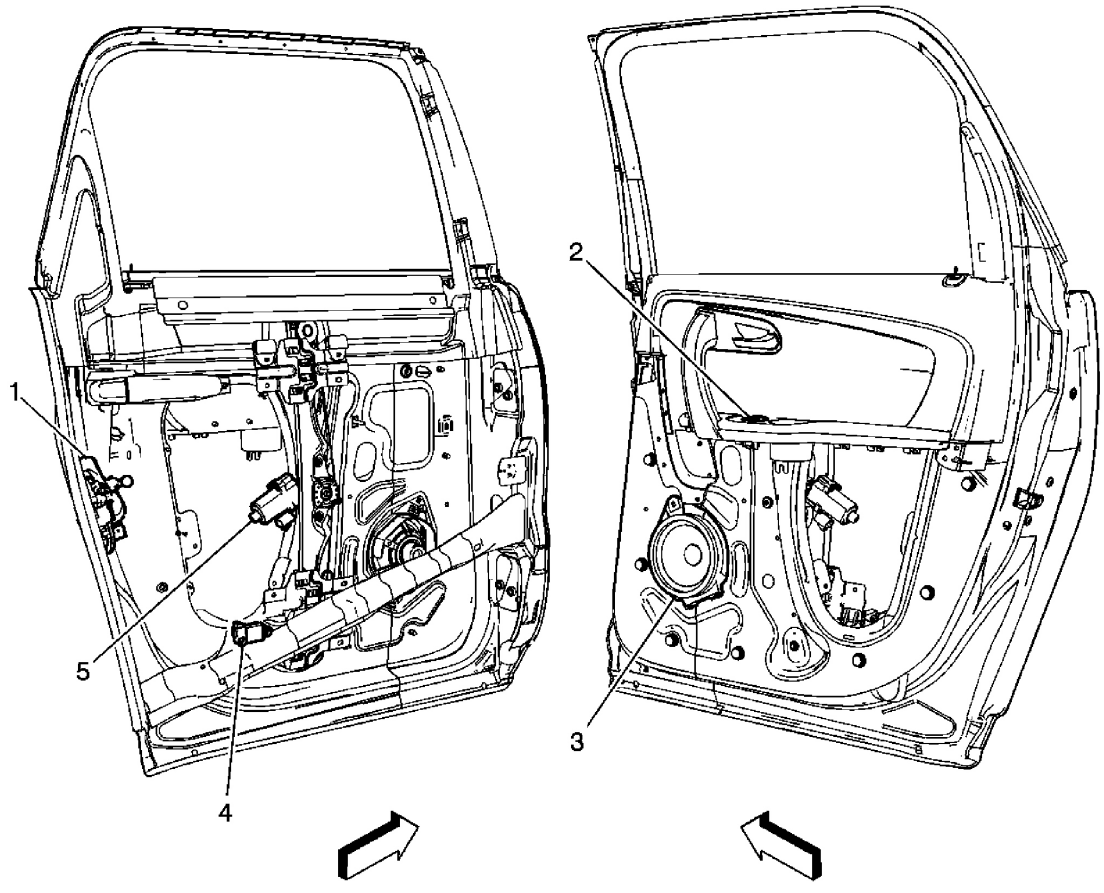


Fig. 25: Locating RR Door Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 25

Callout	Component Name
1	Door Latch Assembly - RR
2	Window Switch - RR
3	Speaker - RR Door
4	Inflatable Restraint Side Impact Sensing Module (SISM) - RR
5	Window Motor - RR

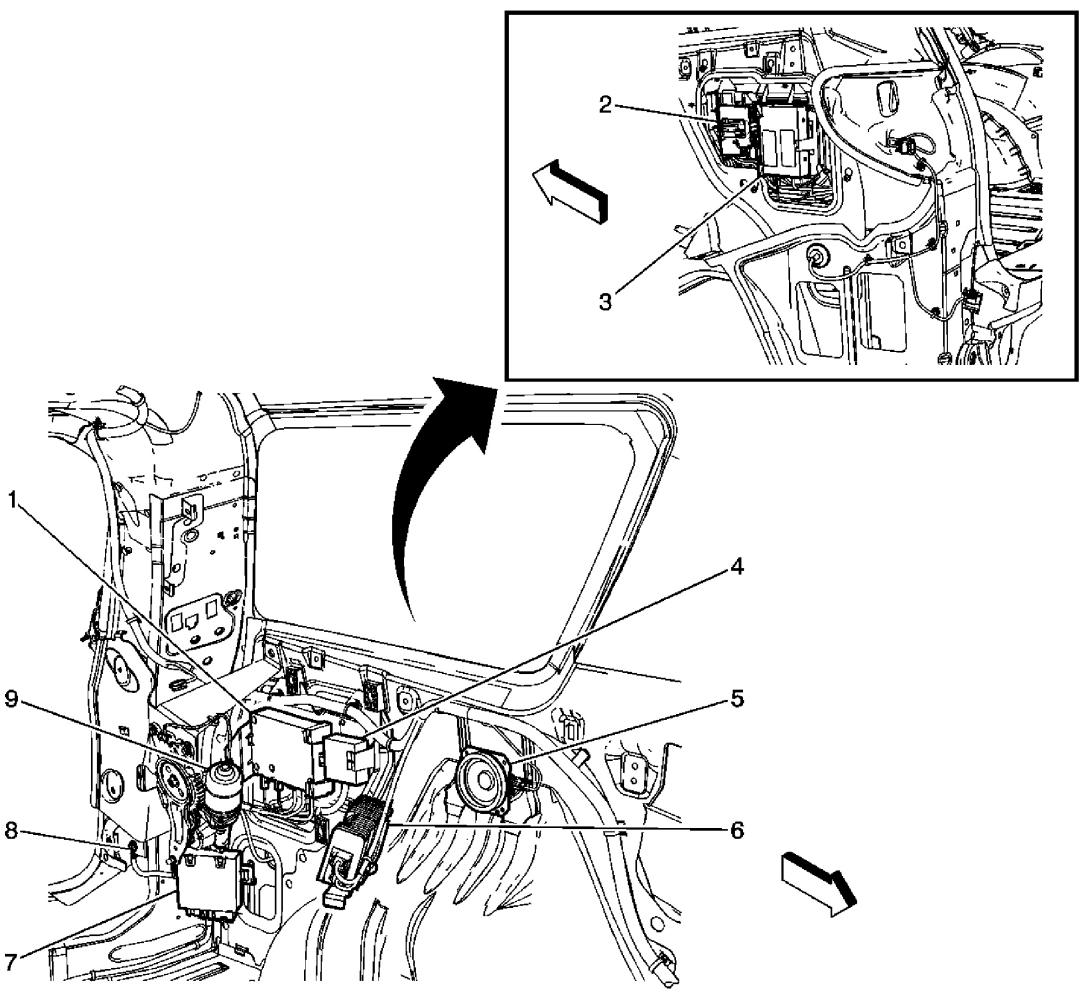


Fig. 26: Identifying Left Rear Passenger Compartment Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 26

Callout	Component Name
1	Vehicle Communication Unit (VCU) (UE1)
2	Rear Parking Assist (RPA) Module (UD7)
3	Digital Radio Receiver (U2K)
4	Speaker - LR (UQA/UQ6/UQS)
5	Accessory AC/DC Power Control Module (KV1)
6	Liftgate Module (LGM) (E61)
7	G401
8	Liftgate Motor Assembly (E61)

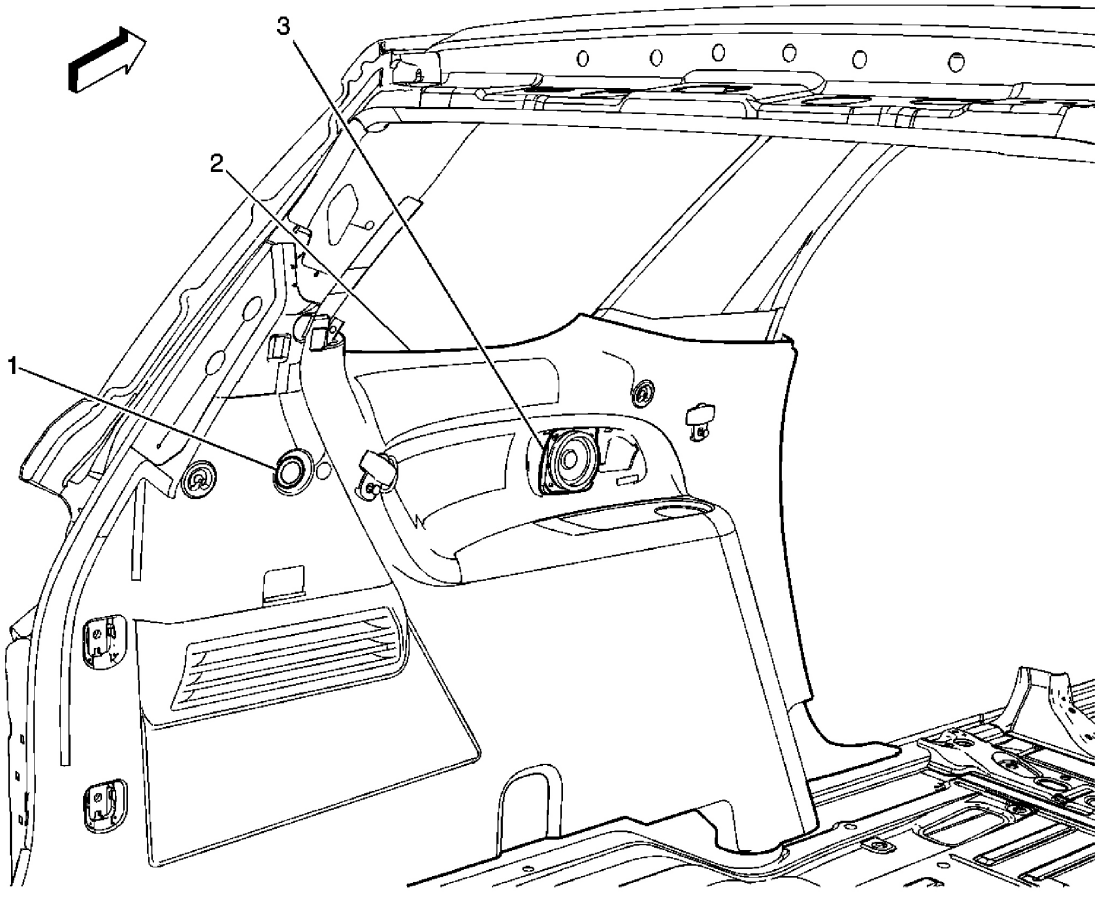


Fig. 27: Identifying Left Rear Panel Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 27

Callout	Component Name
1	Auxiliary Power Outlet - Rear
2	LR Trim Panel
3	Speaker - LR

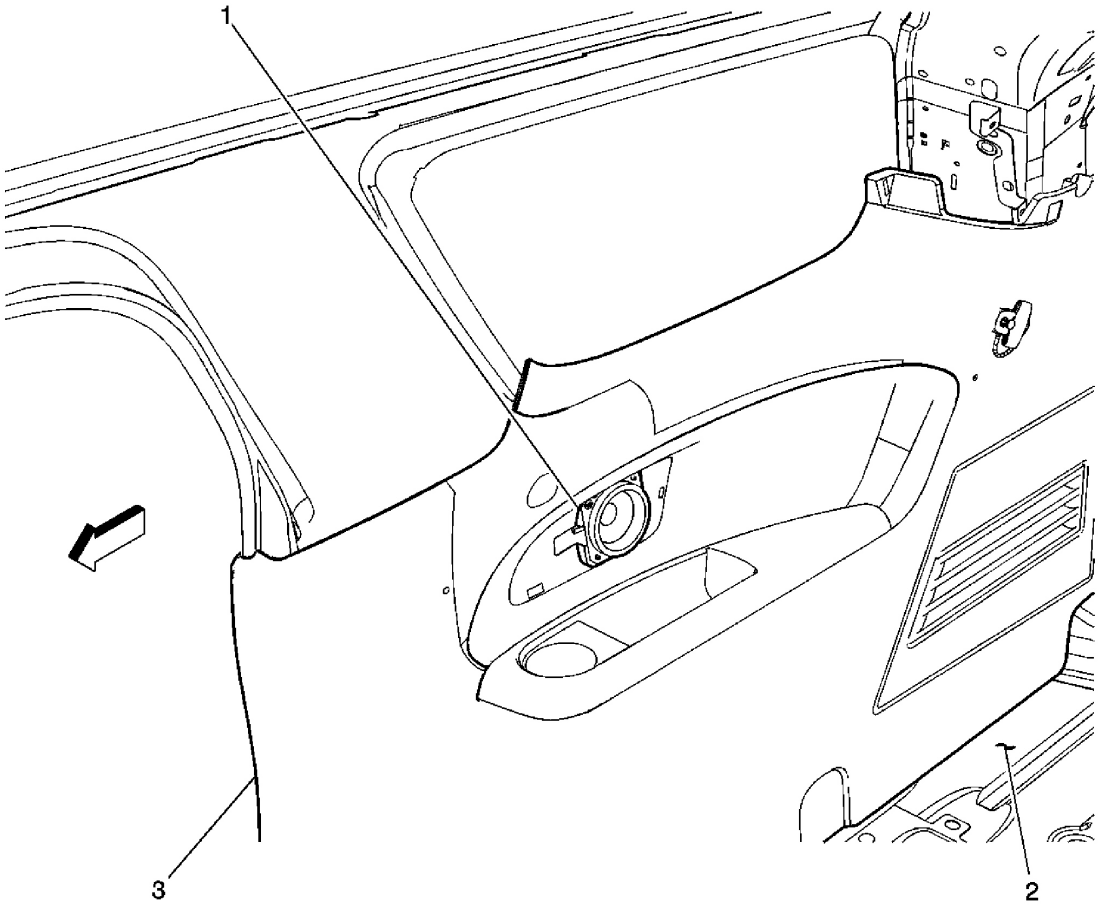


Fig. 28: Identifying Right Rear Panel Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 28

Callout	Component Name
1	Speaker - RR (UQA/UQ6/UQ8)
2	Rear Floor Panel
3	Trim Panel - RR

ENTERTAINMENT/COMMUNICATION CONNECTOR END VIEWS

Audio Amplifier X1 (Z88+UQA/UQS)

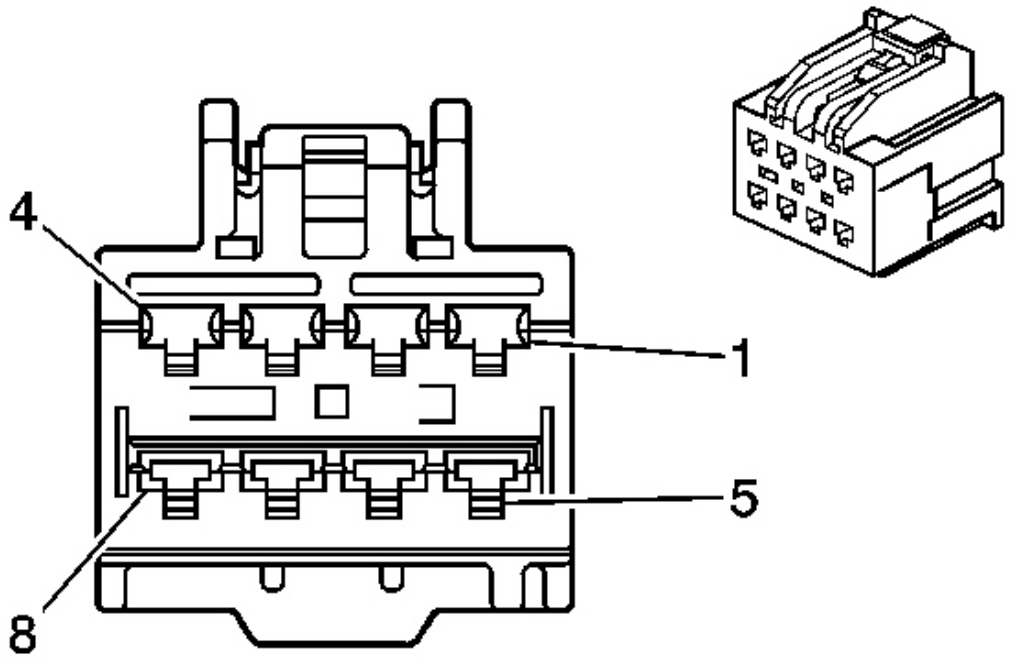


Fig. 29: Audio Amplifier X1 (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X1 (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 89047379
- Service: 19115652
- Description: 8-Way F Unsealed

Terminal Part Information

- Pins: 1, 3, 5, 7
- Terminal/Tray: 8100-4444/22
- Core/Insulation Crimp: 2/A
- Release Tool/Test Probe: 15315247/J-35616-35 (VT)

- Pins: 4, 8

- Terminal/Tray: 8100-4445/22
- Core/Insulation Crimp: Pins 4 - 4/4
- Core/Insulation Crimp: Pins 8 - F/D
- Release Tool/Test Probe: 15315247/J-35616-35 (VT)

Audio Amplifier X1 (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	1 GY	118	Left Front Speaker Output (-)
3	1 L-GN/BK	1794	Subwoofer Speaker Output (-)
4	2 RD/WH	2040	Battery Positive Voltage
5	1 TN	201	Left Front Speaker Output (+)
6	-	-	Not Used
7	1 D-BU/WH	346	Subwoofer Speaker Output (+)
8	3 BK/WH	351	Ground

Audio Amplifier X1 (WDA+UQG)

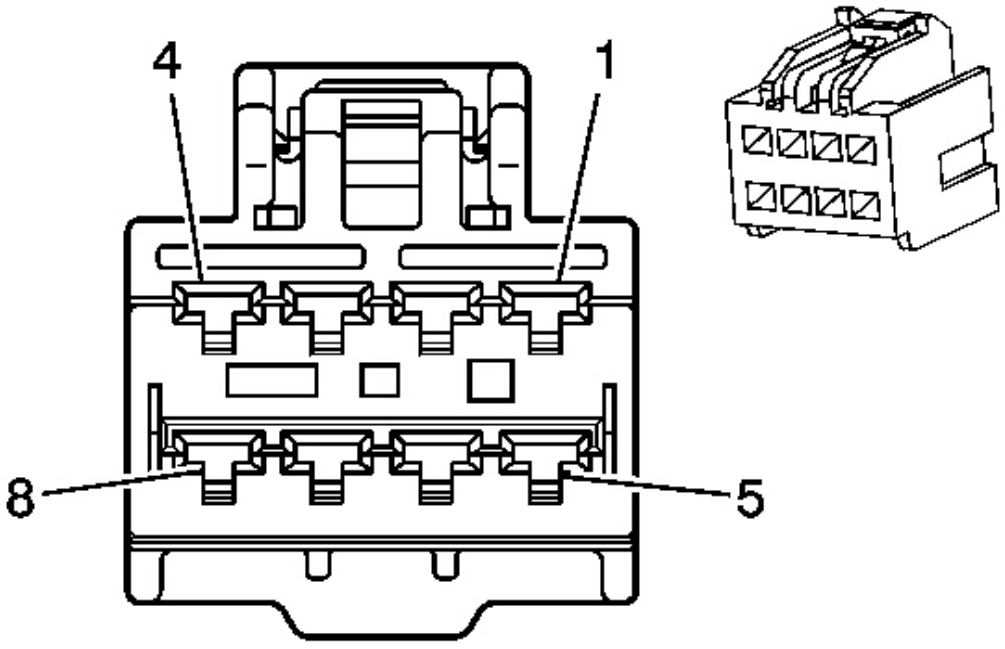


Fig. 30: Audio Amplifier X1 (WDA+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X1 (WDA+UQG) Connector Parts Information

Connector Part Information

- OEM: 15134093
- Service: 88988652
- Description: 8-Way F 2.8 Series (BK)

Terminal Part Information

- Pins: 1, 5
- Terminal/Tray: 8100-4445/22
- Core/Insulation Crimp: 4/4
- Release Tool/Test Probe: 15315247/J-35616-35 (VT)

- Pins: 3, 4, 7, 8

- Terminal/Tray: 8100-4443/22
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 15315247/J-35616-35 (VT)

Audio Amplifier X1 (WDA+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	2 RD/WH	2040	Battery Positive Voltage
3	0.5 D-BU/WH	346	Subwoofer Speaker Output (+)
4	0.5 D-GN	1795	Right Subwoofer Speaker Output (+)
5	2 BK/WH	351	Ground
6	-	-	Not Used
7	0.5 L-GN/BK	1794	Subwoofer Speaker Output (-)
8	0.5 L-BU/BK	315	Right Subwoofer Speaker Output (-)

Audio Amplifier X1 (Z88+UQG)

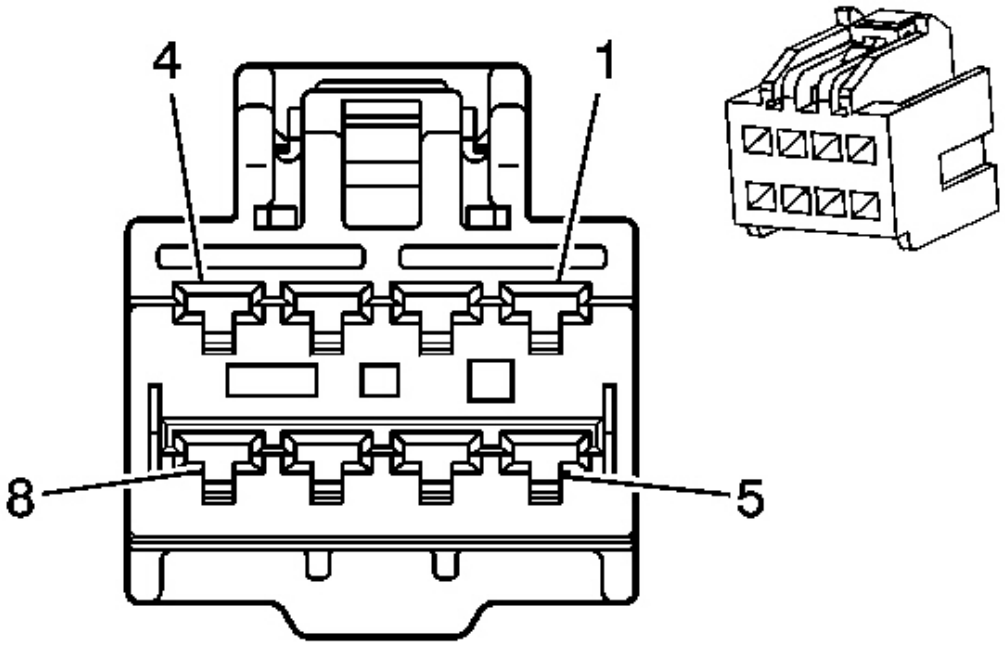


Fig. 31: Audio Amplifier X1 (Z88+UQG) Connector End View

Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X1 (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 15134093
- Service: 88988652
- Description: 8-Way F 2.8 Series (BK)

Terminal Part Information

- Pins: 1, 5
- Terminal/Tray: 8100-4445/22
- Core/Insulation Crimp: 4/4
- Release Tool/Test Probe: 15315247/J-35616-35 (VT)

- Pins: 3, 4, 7, 8
- Terminal/Tray: 8100-4443/22
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 15315247/J-35616-35 (VT)

Audio Amplifier X1 (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	2 RD/WH	2040	Battery Positive Voltage
2	-	-	Not Used
3	0.5 D-BU/WH	346	Subwoofer Speaker Output (+)
4	0.5 D-GN	1795	Right Subwoofer Speaker Output (+)
5	2 BK/WH	351	Ground
6	-	-	Not Used
7	0.5 L-GN/BK	1794	Subwoofer Speaker Output (-)
8	0.5 L-BU/BK	315	Right Subwoofer Speaker Output (-)

Audio Amplifier X2 (UQA/UQG/UQS)

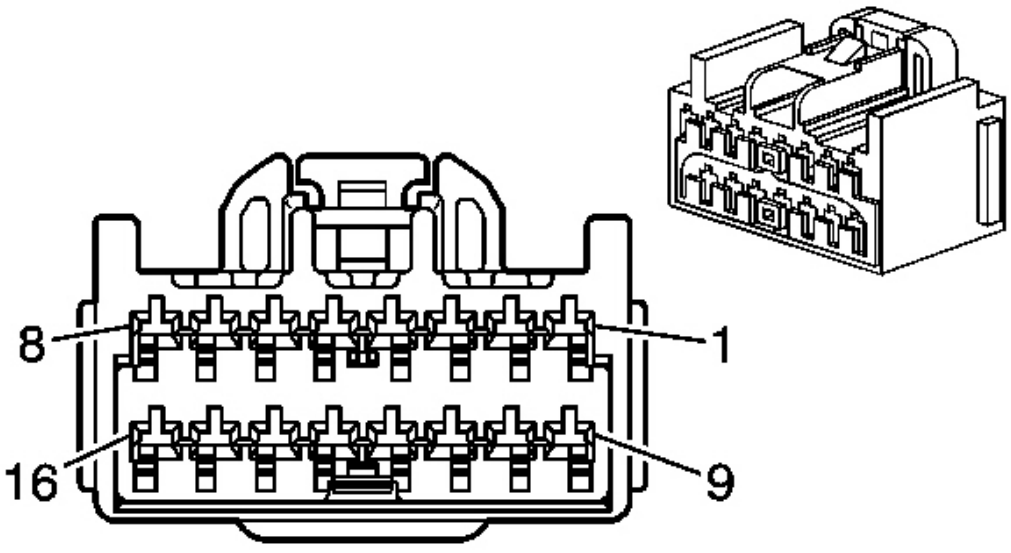


Fig. 32: Audio Amplifier X2 (UQA/UQG/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X2 (UQA/UQG/UQS) Connector Parts Information

Connector Part Information

- OEM: 15134091
- Service: See Catalog
- Description: 16-Way F 1.5 Series (BK)

Terminal Part Information

- Pins: 1- 4, 9- 12
- Terminal/Tray: 8240-0128/22
- Core/Insulation Crimp: C/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

- Pins: 5, 6, 13, 14
- Terminal/Tray: 8240-0127/22
- Core/Insulation Crimp: E/C

- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Audio Amplifier X2 (UQA/UQG/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	1 TN	201	Left Front Speaker Output (+)
2	1 L-GN	200	Right Front Speaker Output (+)
3	1 BN	199	Left Rear Speaker Output (+)
4	1 D-BU	46	Right Rear Speaker Output (+)
5	0.35 YE	1860	Front Center Speaker Output (+)
6	0.35 TN	1859	Left Rear Midrange Speaker Output (+)
7-8	-	-	Not Used
9	1 GY	118	Left Front Speaker Output (-)
10	1 D-GN	117	Right Front Speaker Output (-)
11	1 YE	116	Left Rear Speaker Output (-)
12	1 L-BU	115	Right Rear Speaker Output (-)
13	0.35 L-BU	1960	Front Center Speaker Output (-)
14	0.35 WH	1959	Left Rear Midrange Speaker Output (-)
15-16	-	-	Not Used

Audio Amplifier X2 (Z88+UQA/UQS)

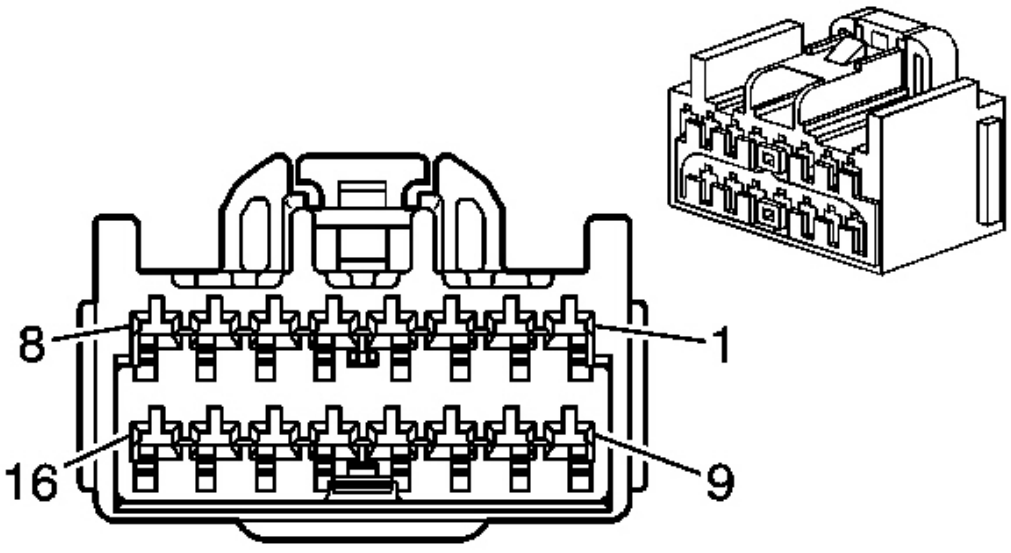


Fig. 33: Audio Amplifier X2 (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X2 (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 15134091
- Service: See Catalog
- Description: 16-Way F 1.5 Series (BK)

Terminal Part Information

- Pins: 1, 2, 7, 8, 15, 16
- Terminal/Tray: 8240-0128/22
- Core/Insulation Crimp: C/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

- Pins: 3- 6
- Terminal/Tray: 8240-0127/22
- Core/Insulation Crimp: E/C

- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Audio Amplifier X2 (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.8 L-BU	115	Right Rear Speaker Output (-)
2	0.8 D-BU	46	Right Rear Speaker Output (+)
3	0.35 L-BU	1960	Front Center Speaker Output (-)
4	0.35 YE	1860	Front Center Speaker Output (+)
5	0.5 WH	1959	Left Rear Midrange Speaker Output (-)
6	0.5 TN	1859	Left Rear Midrange Speaker Output (+)
7	1 D-GN	117	Right Front Speaker Output (-)
8	1 L-GN	200	Right Front Speaker Output (+)
9-14	-	-	Not Used
15	0.8 BN	199	Left Rear Speaker Output (+)
16	0.8 YE	116	Left Rear Speaker Output (-)

Audio Amplifier X2 (Z88+UQG)

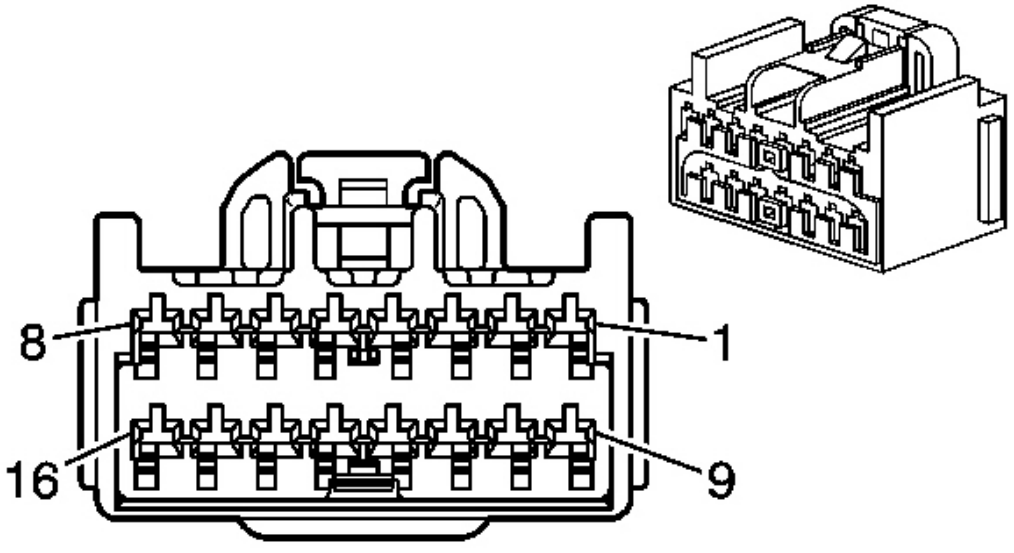


Fig. 34: Audio Amplifier X2 (Z88+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X2 (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 15134091
- Service: See Catalog
- Description: 16-Way F 1.5 Series (BK)

Terminal Part Information

- Pins: 1- 4, 9- 12
- Terminal/Tray: 8240-0128/22
- Core/Insulation Crimp: C/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

- Pins: 5, 6, 13, 14
- Terminal/Tray: 8240-0127/22
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Audio Amplifier X2 (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	1 TN	201	Left Front Speaker Output (+)
2	1 L-GN	200	Right Front Speaker Output (+)
3	1 BN	199	Left Rear Speaker Output (+)
4	1 D-BU	46	Right Rear Speaker Output (+)
5	0.35 YE	1860	Front Center Speaker Output (+)
6	0.35 TN	1859	Left Rear Midrange Speaker Output (+) (UQG)
9	1 GY	118	Left Front Speaker Output (-)
10	1 D-GN	117	Right Front Speaker Output (-)
11	1 YE	116	Left Rear Speaker Output (-)
12	1 L-BU	115	Right Rear Speaker Output (-)
13	0.35 L-BU	1960	Front Center Speaker Output (-)
14	0.35 WH	1959	Left Rear Midrange Speaker Output (-)

Audio Amplifier X3 (UQA/UQG/UQS)

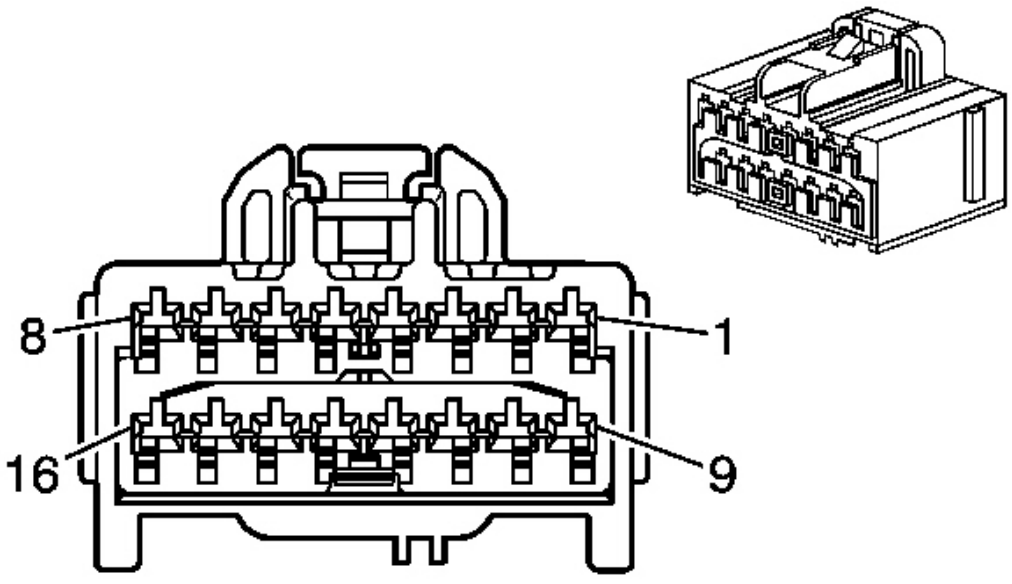


Fig. 35: Audio Amplifier X3 (UQA/UQG/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X3 (UQA/UQG/UQS) Connector Parts Information

Connector Part Information

- OEM: 15136073
- Service: See Catalog
- Description: 16-Way F Kaizen 0.64 (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Audio Amplifier X3 (UQA/UQG/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1-3	-	-	Not Used
4	0.35 OG	5748	Radio Audio Mute Signal (UQG)
5	0.5 TN	511	Left Front Low Level Audio Signal (+) (UQG)
6	0.5 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQG)
7	0.5 L-BU	5312	RSA Left Audio Signal (UQG+UK6)
7	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQG-UK6)
8	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQG-UK6)
8	0.5 L-GN	5313	RSA Right Audio Signal (UQG+UK6)
12	0.35 WH	7066	Entertainment Remote Enable Signal (UQG)
13	0.5 D-GN	1947	Left Front Low Level Audio Signal (-) (UQG)
14	0.5 L-GN	1948	Right Front Low Level Audio Signal (-) (UQG)
15	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQG-UK6)
15	0.5 BN	5314	RSA Audio Common Signal (UQG+UK6)
16	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQG-UK6)
16	0.5 TN/WH	5830	Remote Infra Red Signal (-) (UQG+UK6)

Audio Amplifier X3 (Z88+UQA/UQS)

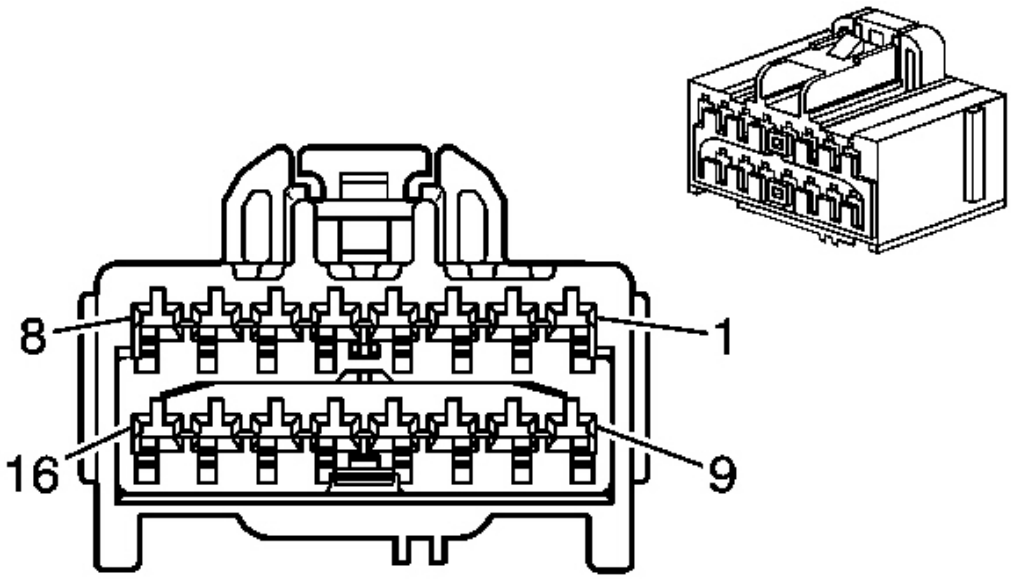


Fig. 36: Audio Amplifier X3 (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X3 (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 15136073
- Service: See Catalog
- Description: 16-Way F Kaizen 0.64 (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Audio Amplifier X3 (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.5 WH	6763	Subwoofer Low Level Audio Signal (UQS)

2	0.5 OG	6761	Center Channel Low Level Audio Signal (-) (UQS)
3	0.5 D-BU	6760	Center Channel Low Level Audio Signal (UQS)
4	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQA/UQS-UK6)
4	0.5 TN/WH	5830	Remote Infra Red Signal (-) (UQA/UQS+UK6)
5	0.5 BN	5314	RSA Audio Common Signal (UQA/UQS+UK6)
5	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQA/UQS-UK6)
6	0.5 L-GN	1948	Right Front Low Level Audio Signal (-) (UQA/UQS)
7	0.5 D-GN	1947	Left Front Low Level Audio Signal (-) (UQA/UQS)
8	0.35 WH	7066	Entertainment Remote Enable Signal (UQA/UQS)
9	0.5 PK	6762	Subwoofer Low Level Audio (-) (UQS)
10	-	-	Not Used
11	0.35 OG	5748	Radio Audio Mute Signal (UQA/UQS)
12	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQA/UQS-UK6)
12	0.5 L-GN	5313	RSA Right Audio Signal (UQA/UQS+UK6)
13	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQA/UQS-UK6)
13	0.5 L-BU	5312	RSA Left Audio Signal (UQA/UQS+UK6)
14	0.5 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQA/UQS)
15	0.5 TN	511	Left Front Low Level Audio Signal (+) (UQA/UQS)
16	-	-	Not Used

Audio Amplifier X3 (Z88+UQG)

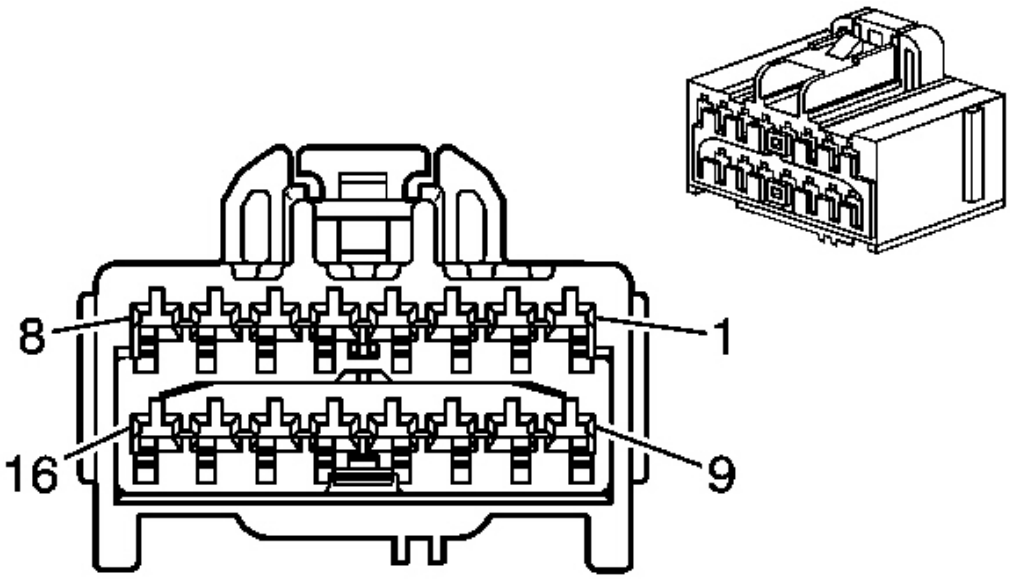


Fig. 37: Audio Amplifier X3 (Z88+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio Amplifier X3 (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 15136073
- Service: See Catalog
- Description: 16-Way F Kaizen 0.64 (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Audio Amplifier X3 (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1-3	-	-	Not Used
4	0.35 OG	5748	Radio Audio Mute Signal (UQG)

5	0.5 TN	511	Left Front Low Level Audio Signal (+) (UQG)
6	0.5 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQG)
7	0.5 L-BU	5312	RSA Left Audio Signal (UQG+UK6)
7	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQG-UK6)
8	0.5 L-GN	5313	RSA Right Audio Signal (UQG+UK6)
8	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQG-UK6)
9-11	-	-	Not Used
12	0.35 WH	7066	Entertainment Remote Enable Signal (UQG)
13	0.5 D-GN	1947	Left Front Low Level Audio Signal (-) (UQG)
14	0.5 L-GN	1948	Right Front Low Level Audio Signal (-) (UQG)
15	0.5 BN	5314	RSA Audio Common Signal (UQG+UK6)
15	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQG-UK6)
16	0.5 TN/WH	5830	Remote Infra Red Signal (-) (UQG+UK6)
16	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQG-UK6)

Audio/Video Adapter (U42)

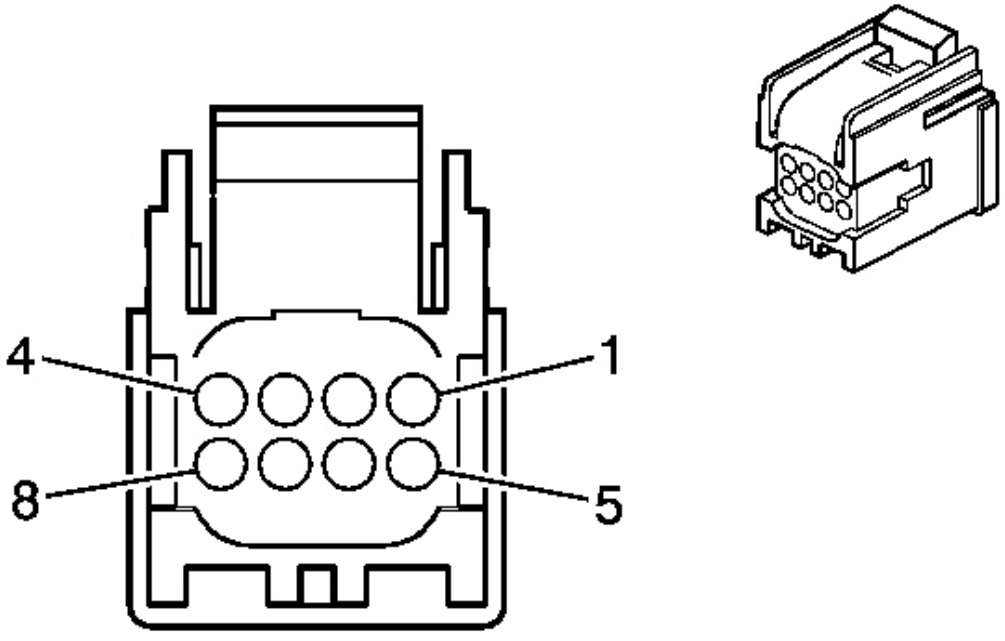


Fig. 38: Audio/Video Adapter (U42) Connector End View
Courtesy of GENERAL MOTORS CORP.

Audio/Video Adapter (U42) Connector Parts Information

Connector Part Information

- OEM: 15480082
- Service: 19149303
- Description: 8-Way F Micro 64 Series (GY)

Terminal Part Information

- Terminal/Tray: 15359541/4
- Core/Insulation Crimp: M/M
- Release Tool/Test Probe: 15381651-2/J-35616-64B (L-BU)

Audio/Video Adapter (U42) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.35 BARE	5346	Drain Wire
2	-	-	Not Used
3	0.35 PU	2056	Auxiliary Video High Signal
4	-	-	Not Used
5	0.35 WH	2058	Auxiliary Audio Right Signal
6	0.35 YE	2059	Auxiliary Audio Left Signal
7	0.35 BARE	5345	Drain Wire
8	-	-	Not Used

Cellular Microphone (UE1)

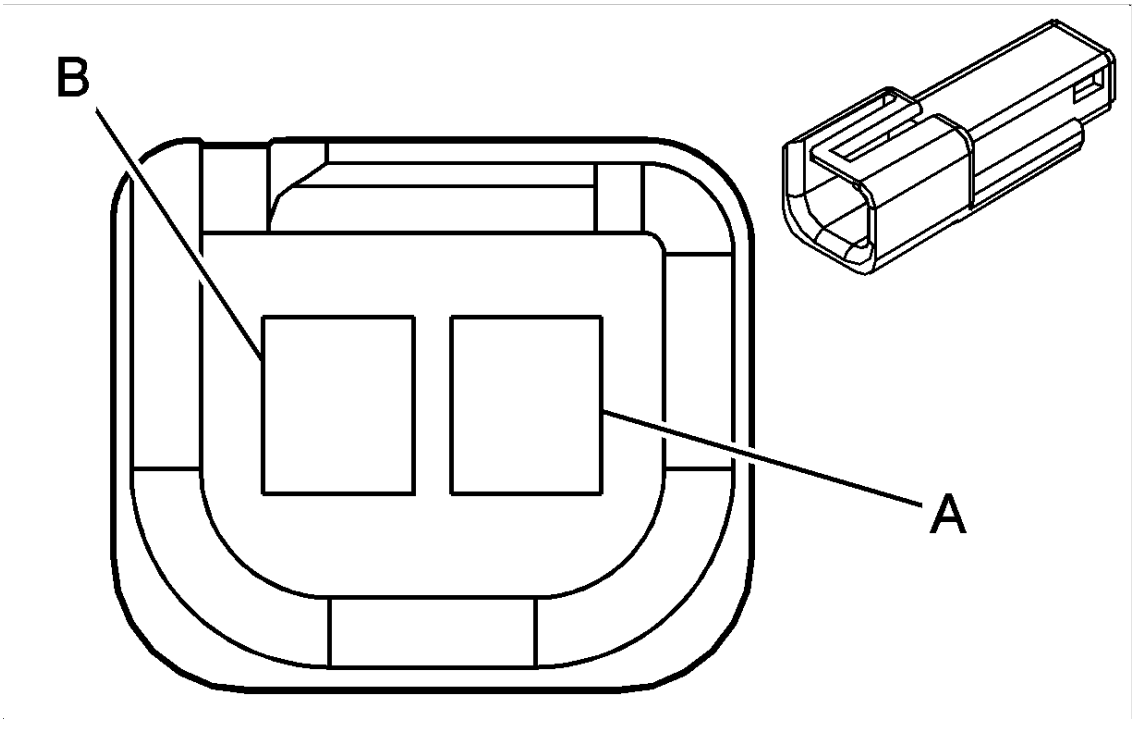


Fig. 39: Cellular Microphone (UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Cellular Microphone (UE1) Connector Parts Information

Connector Part Information

- OEM: 12047663
- Service: 12085481
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Cellular Microphone (UE1) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.35 BARE	514	Ground
B	0.35 GY	655	Cellular Microphone Signal

Digital Radio Receiver (WDA+U2K)

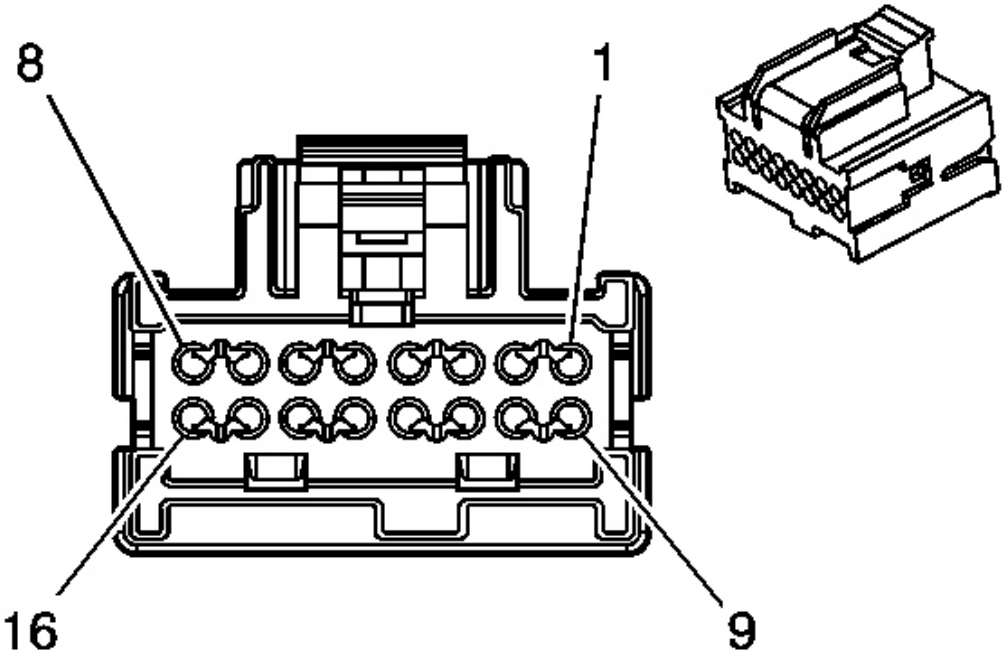


Fig. 40: Digital Radio Receiver (WDA+U2K) Connector End View
Courtesy of GENERAL MOTORS CORP.

Digital Radio Receiver (WDA+U2K) Connector Parts Information

Connector Part Information

- OEM: 15394150
- Service: See Catalog
- Description: 16-Way F Micro-Pack 064 Series (BK)

Terminal Part Information

- Terminal/Tray: 15359541/4
- Core/Insulation Crimp: M/M
- Release Tool/Test Probe: 15381651-2/J-35616-64B (L-BU)

Digital Radio Receiver (WDA+U2K) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.5 TN/WH	372	Remote Radio Audio Output (-)
2	0.5 BN/WH	367	Left Audio Signal (+)
3	0.5 D-GN/WH	368	Right Audio Signal (+)
4	0.5 GY	388	Remote Radio Right Audio Signal
5	0.35 D-GN	5060	Low Speed GMLAN Serial Data
6-8	-	-	Not Used
9	0.5 BK/WH	351	Ground
10-15	-	-	Not Used
16	0.5 RD/WH	2340	Battery Positive Voltage

Digital Radio Receiver (Z88+U2K)

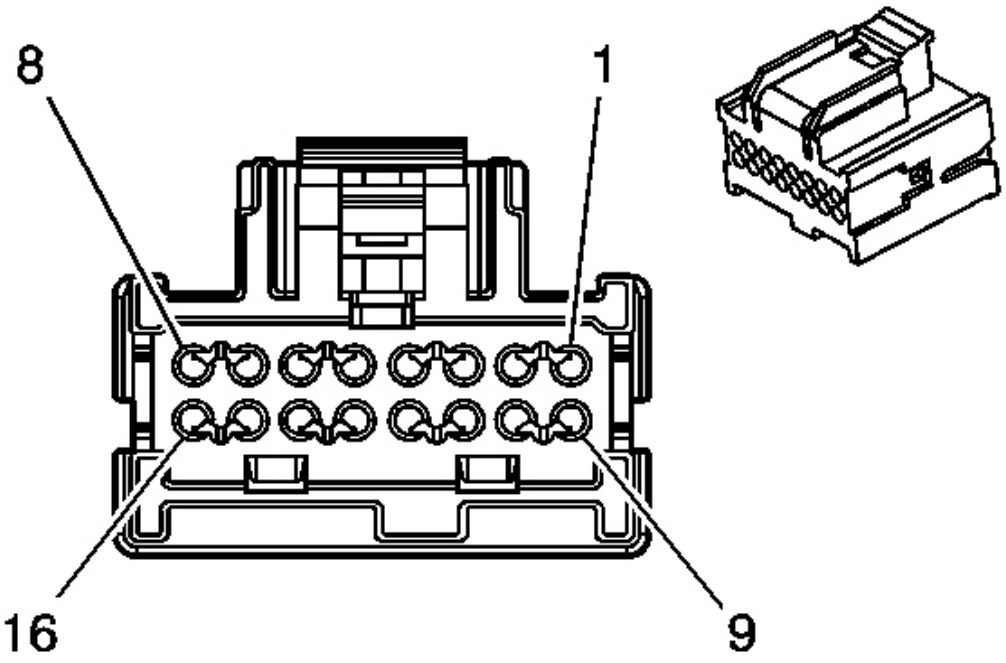


Fig. 41: Digital Radio Receiver (Z88+U2K) Connector End View
Courtesy of GENERAL MOTORS CORP.

Digital Radio Receiver (Z88+U2K) Connector Parts Information

Connector Part Information

- OEM: 15394150
- Service: See Catalog
- Description: 16-Way F Micro-Pack 064 Series (BK)

Terminal Part Information

- Terminal/Tray: 15359541/4
- Core/Insulation Crimp: M/M
- Release Tool/Test Probe: 15381651-2/J-35616-64B (L-BU)

Digital Radio Receiver (Z88+U2K) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.5 TN/WH	372	Remote Radio Audio Output (-)
2	0.5 BN/WH	367	Left Audio Signal (+)
3	0.5 D-GN/WH	368	Right Audio Signal (+)
4	0.5 GY	388	Remote Radio Right Audio Signal
5	0.35 D-GN	5060	Low Speed GMLAN Serial Data
6-8	-	-	Not Used
9	0.5 BK/WH	351	Ground
10-15	-	-	Not Used
16	0.5 RD/WH	2340	Battery Positive Voltage

Digital Video Disc (DVD) Player (WDA+U42)

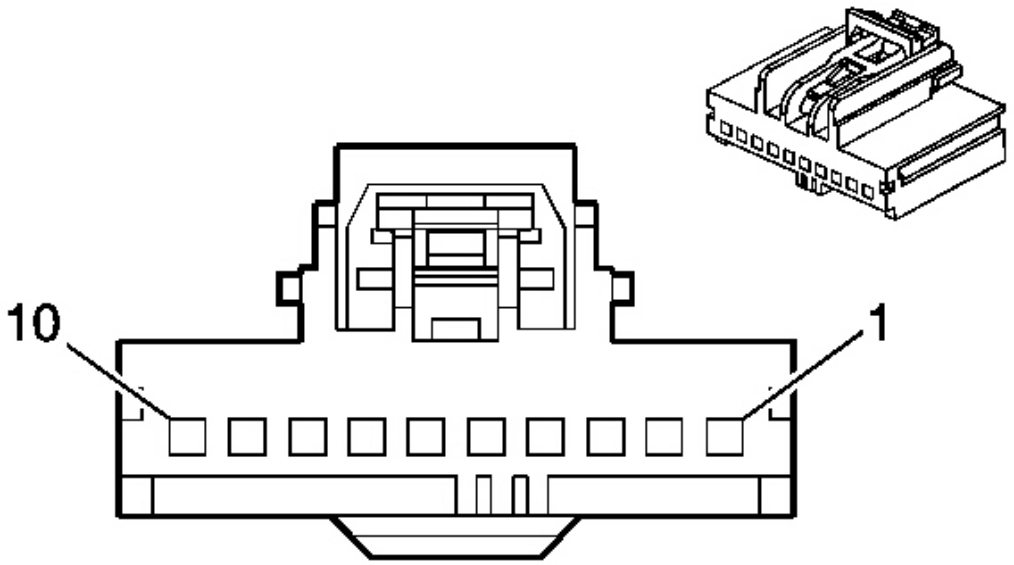


Fig. 42: Digital Video Disc (DVD) Player (WDA+U42) Connector End View
Courtesy of GENERAL MOTORS CORP.

Digital Video Disc (DVD) Player (WDA+U42) Connector Parts Information

Connector Part Information

- OEM: 15490628

- Service: See Catalog
- Description: 10-Way F Kaizen 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Digital Video Disc (DVD) Player (WDA+U42) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 D-GN	6975	DVD Video Signal (+)
2	0.35 WH/BK	5335	DVD Video Signal (-)
3-5	-	-	Not Used
6	0.5 BK/WH	351	Ground
7	0.5 RD/WH	2340	Battery Positive Voltage
8	0.35 WH	7066	Entertainment Remote Enable Signal
9	0.35 PK/BK	5844	Video Bright Control
10	0.35 L-GN/BK	5845	Video Module Signal

Digital Video Disc (DVD) Player (Z88+U42)

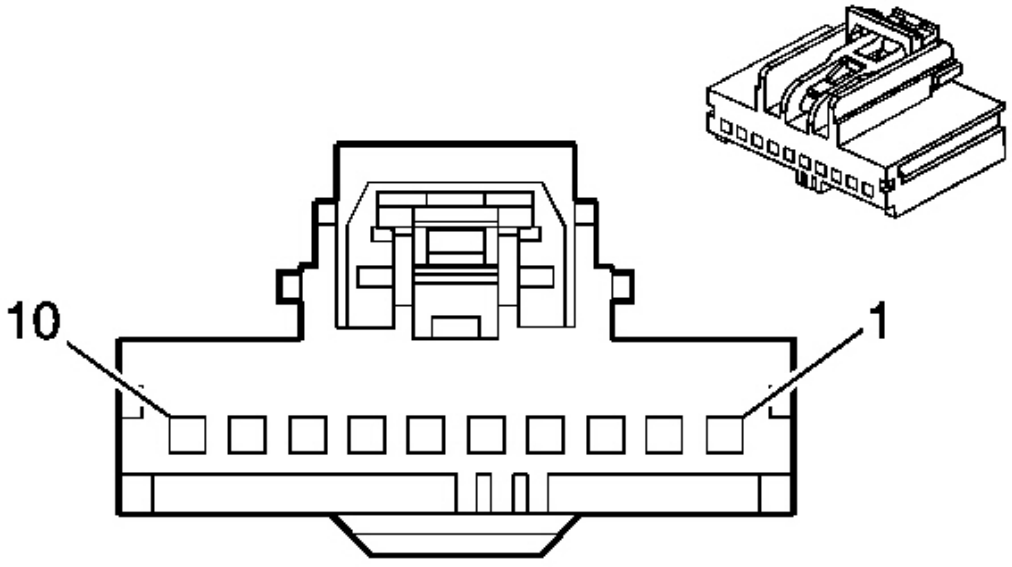


Fig. 43: Digital Video Disc (DVD) Player (Z88+U42) Connector End View
Courtesy of GENERAL MOTORS CORP.

Digital Video Disc (DVD) Player (Z88+U42) Connector Parts Information

Connector Part Information

- OEM: 7283-9088-30
- Service: See Catalog
- Description: 10-Way F Kaizen 0.64 Series (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Digital Video Disc (DVD) Player (Z88+U42) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 D-GN	6975	DVD Video Signal (+)
2	0.35 WH/BK	5335	DVD Video Signal (-)

6	0.5 BK/WH	351	Ground
7	0.5 RD/WH	2340	Battery Positive Voltage
8	0.35 WH	7066	Entertainment Remote Enable Signal
9	0.35 PK/BK	5844	Video Bright Control
10	0.35 L-GN/BK	5845	Video Module Signal

Infrared Module (WDA+U42)

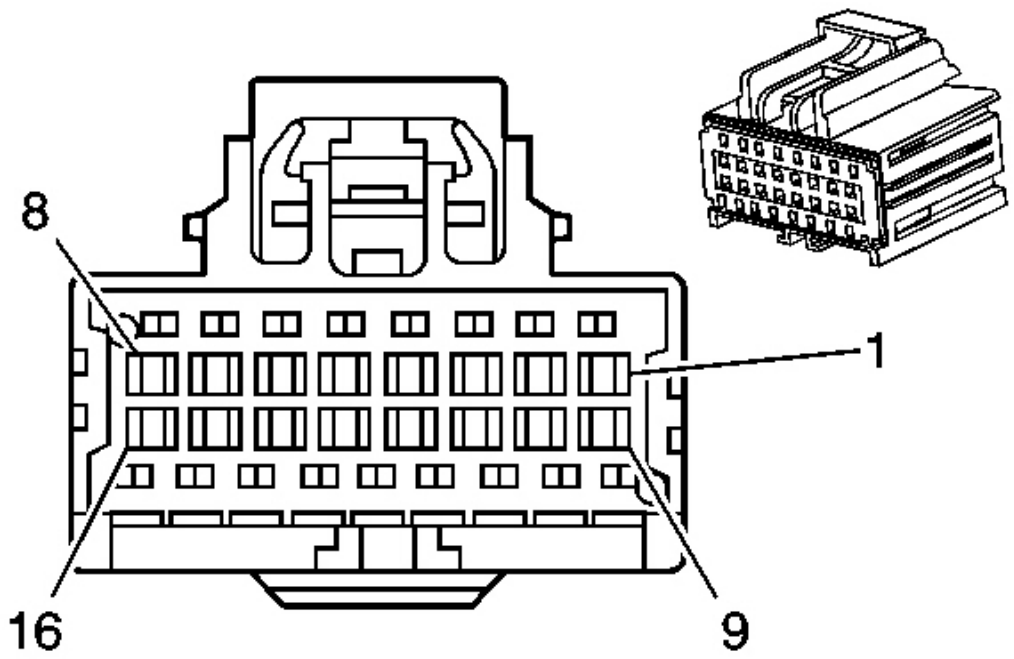


Fig. 44: Infrared Module (WDA+U42) Connector End View
Courtesy of GENERAL MOTORS CORP.

Infrared Module (WDA+U42) Connector Parts Information

Connector Part Information

- OEM: 7283-9078-80
- Service: See Catalog
- Description: 16-Way F Kaizen 0.64 Series (BN)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Infrared Module (WDA+U42) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 L-BU	5826	Left DVD Audio Signal (+)
2	0.35 PU	6979	DVD Audio Common
3	0.35 WH	5828	Right DVD Audio Signal (+)
4	0.5 PK	5829	Infra Red Module Supply Voltage
5-7	-	-	Not Used
8	0.35 OG/BK	5831	Remote Infra Red Signal (+)
9	0.35 OG/BK	5329	Left Rear Low Level Audio Signal (+)
10	0.35 BN/WH	5331	Infra Red Audio Low Reference
11	0.35 PU/WH	5330	Right Infra Red Audio Signal
12	0.5 BK/WH	351	Ground
13-15	-	-	Not Used
16	0.35 TN/WH	5830	Remote Infra Red Signal (-)

Infrared Module (Z88+U42)

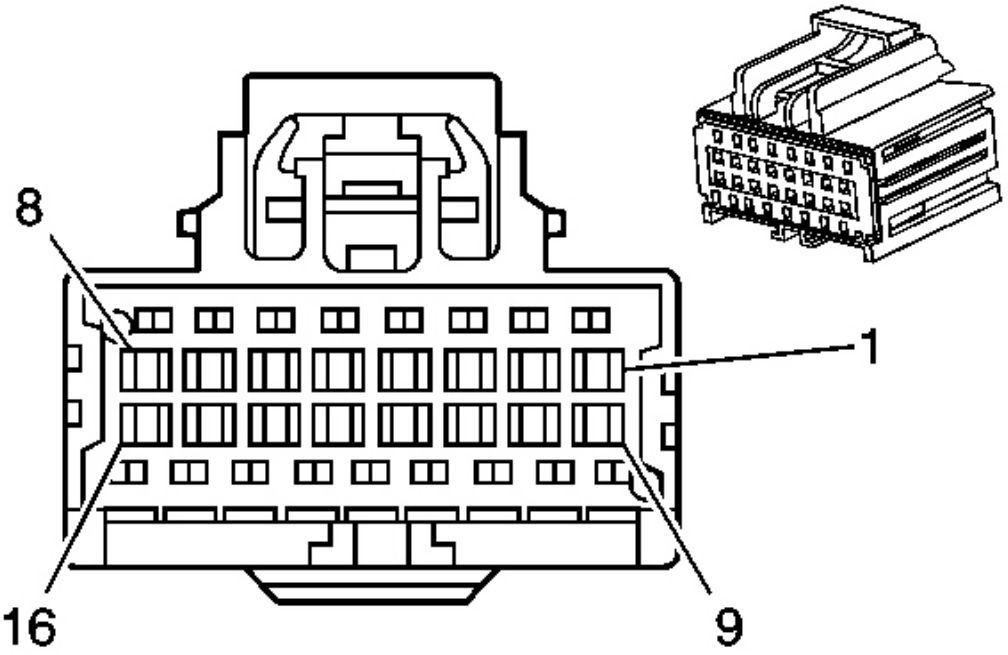


Fig. 45: Infrared Module (Z88+U42) Connector End View
Courtesy of GENERAL MOTORS CORP.

Infrared Module (Z88+U42) Connector Parts Information

Connector Part Information

- OEM: 7283-9078-80
- Service: See Catalog
- Description: 16-Way F Kaizen 0.64 Series (BN)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Infrared Module (Z88+U42) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.35 L-BU	5826	Left DVD Audio Signal (+)
2	0.35 PU	6979	DVD Audio Common
3	0.35 WH	5828	Right DVD Audio Signal (+)
4	0.5 PK	5829	Infra Red Module Supply Voltage
5-7	-	-	Not Used
8	0.35 OG/BK	5831	Remote Infra Red Signal (+)
9	0.35 OG/BK	5329	Left Rear Low Level Audio Signal (+)
10	0.35 BN/WH	5331	Infra Red Audio Low Reference
11	0.35 PU/WH	5330	Right Infra Red Audio Signal
12	0.5 BK/WH	351	Ground
13-15	-	-	Not Used
16	0.35 TN/WH	5830	Remote Infra Red Signal (-)

Radio X1 (WDA)

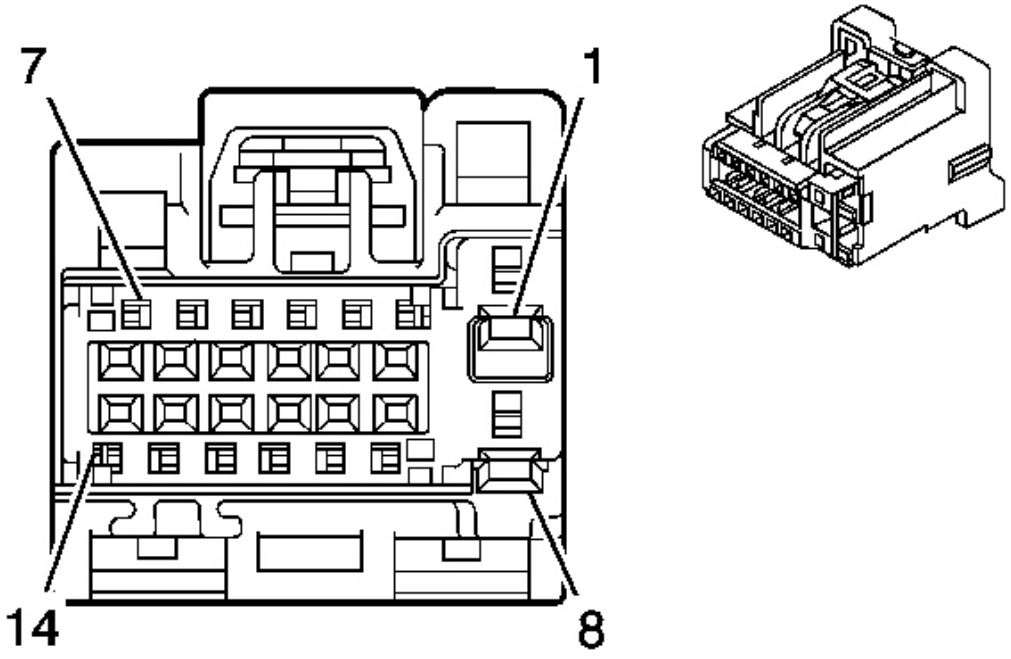


Fig. 46: Radio X1 (WDA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Radio X1 (WDA) Connector Parts Information

Connector Part Information

- OEM: 7283-9281-30
- Service: See Catalog
- Description: 14-Way F YESC Kaizen Series (BK)

Terminal Part Information

- Pins: 1, 8
- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

- Pins: 2-7, 9- 11, 13
- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X1 (WDA) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	1 RD/WH	4240	Battery Positive Voltage
2	0.5 TN	201	Left Front Speaker Output (+) (UQF)
	0.5 TN	511	Left Front Low Level Audio Signal (+) (UQG)
3	0.5 L-GN	200	Right Front Speaker Output (+) (UQF)
	0.5 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQG)
4	0.35 PK	5149	Voice Recognition Audio Signal (UE1+UZR/U3R)
5	0.35 PK/BK	5152	Voice Recognition Audio Low Reference (UE1+UZR/U3R)
6	0.35 WH	7066	Entertainment Remote Enable Signal (UQF+U42)
	0.35 WH	7066	Entertainment Remote Enable Signal (UQG)
	0.35 WH	7066	Entertainment Remote Enable Signal

			(UQF-U42)
7	0.35 PU/WH	1382	LED Dimming Signal
8	1 BK/WH	351	Ground
9	0.5 GY	118	Left Front Speaker Output (-) (UQF)
	0.5 D-GN	1947	Left Front Low Level Audio Signal (-) (UQG)
10	0.5 D-GN	117	Right Front Speaker Output (-) (UQF)
	0.5 L-GN	1948	Right Front Low Level Audio Signal (-) (UQG)
11	0.35 BARE	1573	Drain Wire (UQG)
12	-	-	Not Used
13	0.35 D-GN	5060	Low Speed GMLAN Serial Data
14	-	-	Not Used

Radio X1 (Z88)

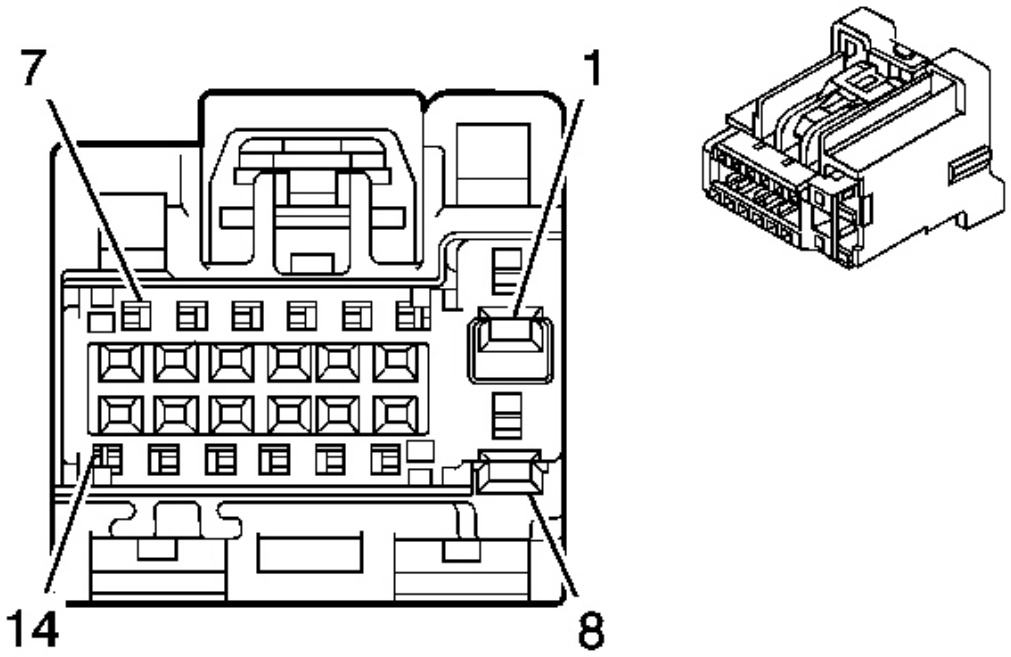


Fig. 47: Radio X1 (Z88) Connector End View

Courtesy of GENERAL MOTORS CORP.

Radio X1 (Z88) Connector Parts Information

Connector Part Information

- OEM: 7283-9281-30
- Service: See Catalog
- Description: 14-Way F YESC Kaizen Series (BK)

Terminal Part Information

- Pins: 1, 8
- Terminal/Tray: 12191812/19
- Core/Insulation Crimp: C/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

- Pins: 2-7, 9-11, 13
- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X1 (Z88) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	1 RD/WH	4240	Battery Positive Voltage
2	0.5 TN	511	Left Front Low Level Audio Signal (+) (UQG)
	0.5 TN	201	Left Front Speaker Output (+) (UQF)
	0.5 TN	511	Left Front Low Level Audio Signal (+) (UQA/UQS)
3	0.5 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQA/UQS)
	0.5 L-GN/WH	512	Right Front Low Level Audio Signal (+) (UQG)
	0.5 L-GN	200	Right Front Speaker Output (+) (UQF)
4	0.35 PK	5149	Voice Recognition Audio Signal (UE1+UZR/U3R)
5	0.35 PK/BK	5152	Voice Recognition Audio Low Reference (UE1+UZR/U3R)

6	0.35 WH	7066	Entertainment Remote Enable Signal (UQF-U42)
	0.35 WH	7066	Entertainment Remote Enable Signal (UQA/UQS)
	0.35 WH	7066	Entertainment Remote Enable Signal (UQG)
	0.35 WH	7066	Entertainment Remote Enable Signal (UQF+U42)
7	0.35 PU/WH	1382	LED Dimming Signal
8	1 BK/WH	351	Ground
9	0.5 D-GN	1947	Left Front Low Level Audio Signal (-) (UQA/UQS)
	0.5 GY	118	Left Front Speaker Output (-) (UQF)
	0.5 D-GN	1947	Left Front Low Level Audio Signal (-) (UQG)
10	0.5 L-GN	1948	Right Front Low Level Audio Signal (-) (UQA/UQS)
	0.5 D-GN	117	Right Front Speaker Output (-) (UQF)
	0.5 L-GN	1948	Right Front Low Level Audio Signal (-) (UQG)
11	0.35 BARE	1573	Drain Wire (UQG)
	0.35 BARE	1573	Drain Wire (UQA/UQS)
12	-	-	Not Used
13	0.35 D-GN	5060	Low Speed GMLAN Serial Data
14	-	-	Not Used

Radio X2 (WDA)

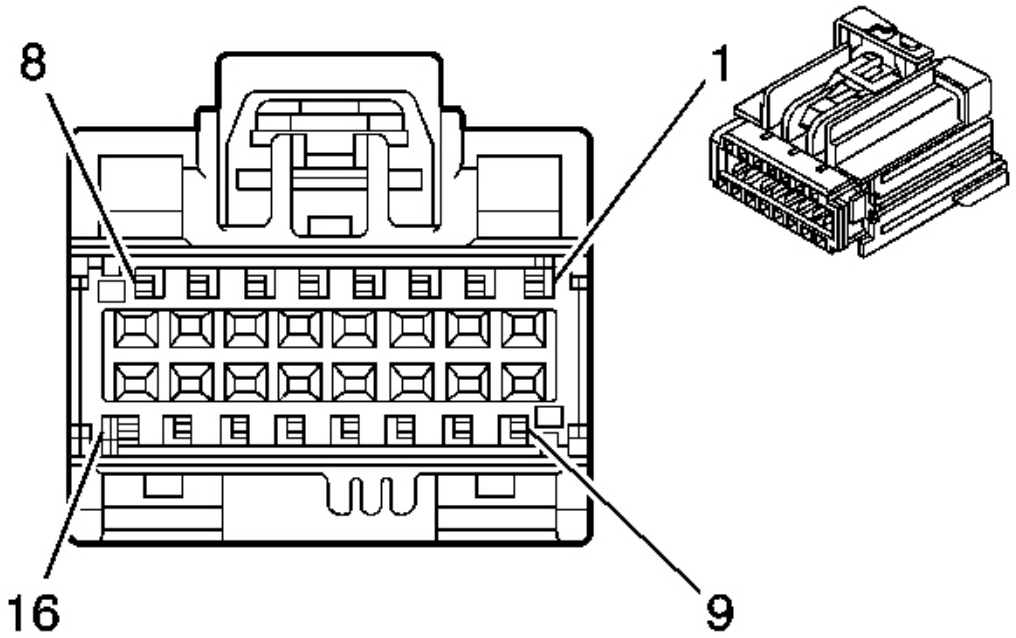


Fig. 48: Radio X2 (WDA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Radio X2 (WDA) Connector Parts Information

Connector Part Information

- OEM: 7283-9282-30
- Service: See Catalog
- Description: 16-Way F YESC Kaizen Series (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X2 (WDA) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.5 BN/WH	367	Left Audio Signal (+) (U2K)
2	0.5 D-GN/WH	368	Right Audio Signal (+) (U2K)
	0.35 BARE	1574	Drain Wire (UQG-UK6)
3	0.35 BARE	1574	Drain Wire (UQG+UK6)
4	-	-	Not Used
5	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQG+UK6)
	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQF+UK6)
	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQG-UK6)
	0.5 BN	199	Left Rear Speaker Output (+) (UQF-UK6)
6	0.5 D-BU	46	Right Rear Speaker Output (+) (UQF-UK6)
	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQG+UK6)
	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQF+UK6)
	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQG-UK6)
7	0.35 OG/BK	1406	Remote Playback Device Left Audio Signal (UE1)
8	0.35 OG	5748	Radio Audio Mute Signal (UQG)
9	0.5 TN/WH	372	Remote Radio Audio Output (-) (U2K)
10	0.5 GY	388	Remote Radio Right Audio Signal (U2K)
11	0.35 BARE	6131	Cellular Microphone Signal (U2K)
12	-	-	Not Used
13	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQG-UK6)
	0.5 YE	116	Left Rear Speaker Output (-) (UQF-UK6)
	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQF+UK6)
	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQG+UK6)

14	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQG+UK6)
	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQF+UK6)
	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQG-UK6)
	0.5 L-BU	115	Right Rear Speaker Output (-) (UQF-UK6)
15	0.35 L-BU	1405	Remote Playback Device Audio Common Signal (UE1)
16	-	-	Not Used

Radio X2 (Z88)

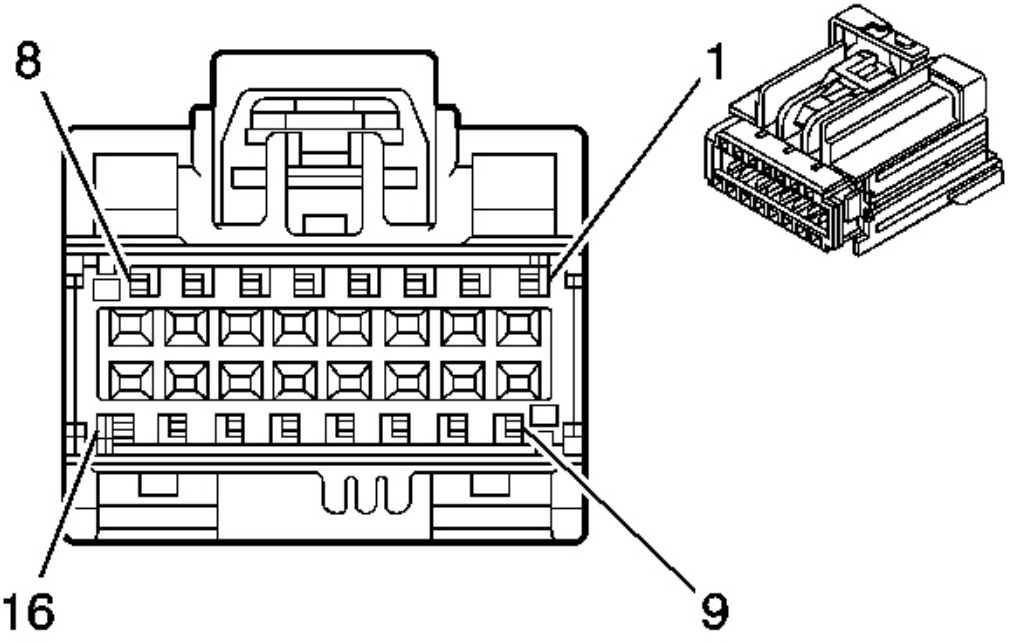


Fig. 49: Radio X2 (Z88) Connector End View
Courtesy of GENERAL MOTORS CORP.

Radio X2 (Z88) Connector Parts Information

Connector Part Information

- OEM: 7283-9282-30
- Service: See Catalog
- Description: 16-Way F YESC Kaizen Series (BK)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X2 (Z88) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.5 BN/WH	367	Left Audio Signal (+) (U2K)
2	0.5 D-GN/WH	368	Right Audio Signal (+) (U2K)
3	0.35 BARE	1574	Drain Wire (UQG-UK6)
	0.35 BARE	1574	Drain Wire (UQA/UQS+UK6)
	0.35 BARE	1574	Drain Wire (UQG+UK6)
	0.35 BARE	1574	Drain Wire (UQA/UQS-UK6)
4	-	-	Not Used
5	0.5 BN	199	Left Rear Speaker Output (+) (UQF-UK6)
	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQA/UQS+UK6)
	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQF+UK6)
	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQA/UQS-UK6)
	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQG+UK6)
	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+) (UQG-UK6)
	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQG-UK6)
	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQA/UQS+UK6)

6	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQF+UK6)
	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQA/UQS-UK6)
	0.5 D-BU	546	Right Rear Low Level Audio Signal (+) (UQG+UK6)
	0.5 D-BU	46	Right Rear Speaker Output (+) (UQF-UK6)
7	0.35 OG/BK	1406	Remote Playback Device Left Audio Signal (UE1)
8	0.35 OG	5748	Radio Audio Mute Signal (UQA/UQS)
	0.35 OG	5748	Radio Audio Mute Signal (UQG)
9	0.5 TN/WH	372	Remote Radio Audio Output (-) (U2K)
10	0.5 GY	388	Remote Radio Right Audio Signal (U2K)
11	0.35 BARE	6131	Cellular Microphone Signal (U2K)
12	-	-	Not Used
13	0.5 YE	116	Left Rear Speaker Output (-) (UQF-UK6)
	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQG-UK6)
	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQG+UK6)
	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQA/UQS-UK6)
	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQF+UK6)
	0.5 BN	1999	Left Rear Low Level Audio Signal (-) (UQA/UQS+UK6)
14	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQA/UQS+UK6)
	0.5 L-BU	115	Right Rear Speaker Output (-) (UQF-UK6)
	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQF+UK6)
	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQG+UK6)

	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQG-UK6)
	0.5 TN	1946	Right Rear Low Level Audio Signal (-) (UQA/UQS-UK6)
15	0.35 L-BU	1405	Remote Playback Device Audio Common Signal (UE1)
16	-	-	Not Used

Radio X3 (WDA+U42)

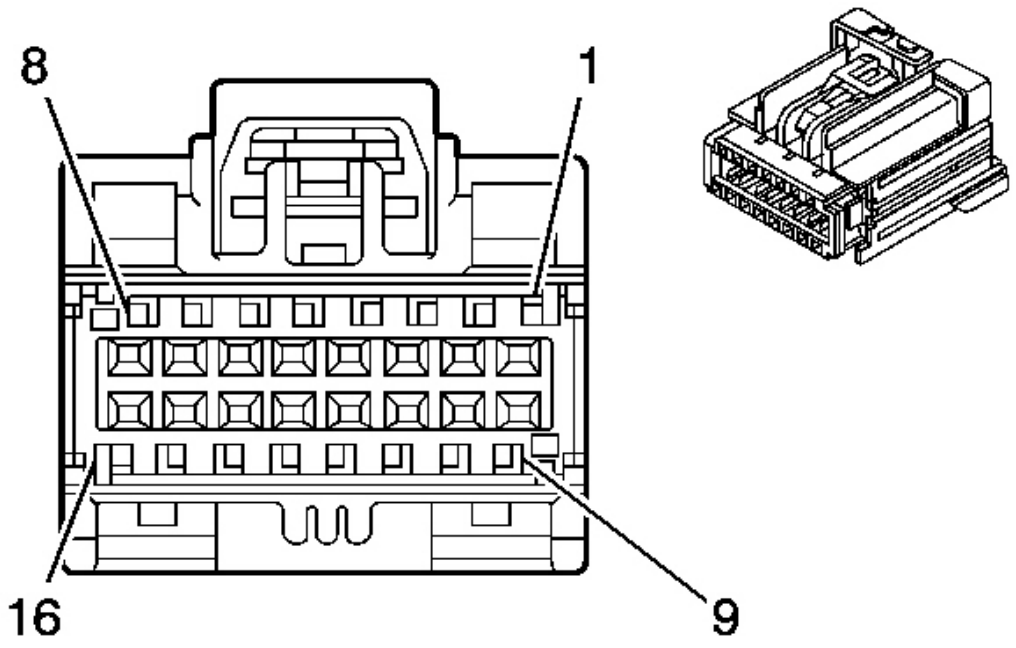


Fig. 50: Radio X3 (WDA+U42) Connector End View
Courtesy of GENERAL MOTORS CORP.

Radio X3 (WDA+U42) Connector Parts Information

Connector Part Information

- OEM: 7283-9283-40
- Service: See Catalog

- Description: 16-Way F YESC Kaizen Series (L-GY)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X3 (WDA+U42) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 YE	2059	Auxiliary Audio Left Signal
2	0.35 WH	2058	Auxiliary Audio Right Signal
3	0.35 L-BU	5826	Left DVD Audio Signal (+)
4	0.35 WH	5828	Right DVD Audio Signal (+)
5	0.35 OG/BK	5831	Remote Infra Red Signal (+)
6	0.35 PK/BK	5844	Video Bright Control
7	0.35 D-GN	6975	DVD Video Signal (+)
8	0.35 PU	2056	Auxiliary Video High Signal
9	0.35 BARE	5345	Drain Wire
10	0.35 L-GN/BK	5845	Video Module Signal
11	0.35 PU	6979	DVD Audio Common
12	0.35 BARE	6980	DVD Audio Shield
13	0.35 TN/WH	5830	Remote Infra Red Signal (-)
14	0.35 BARE	6976	DVD Video Drain Wire
15	0.35 WH/BK	5335	DVD Video Signal (-)
16	0.35 BARE	5346	Drain Wire

Radio X3 (Z88+U42)

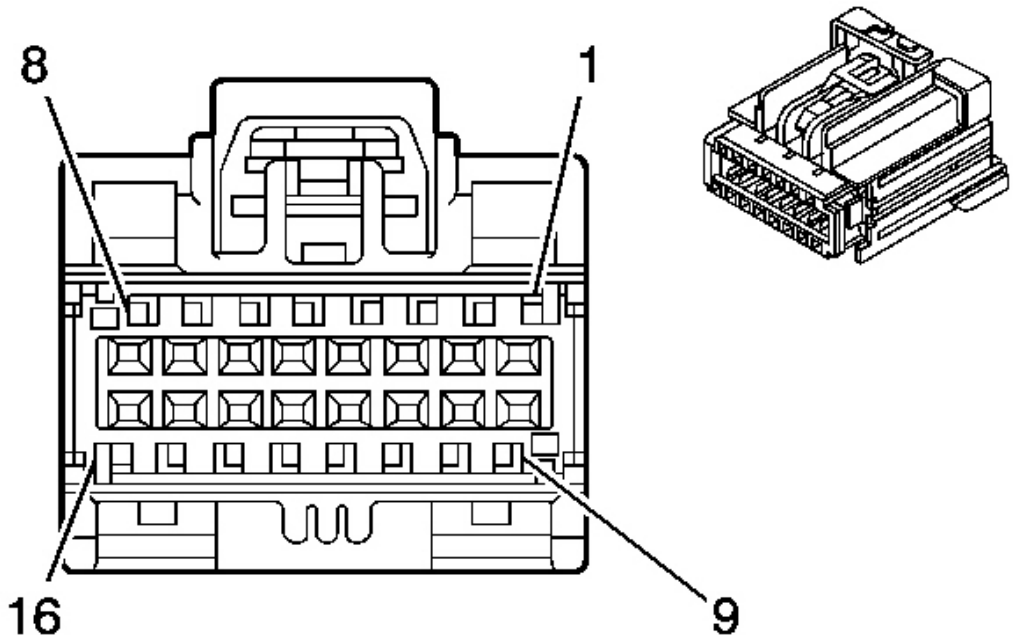


Fig. 51: Radio X3 (Z88+U42) Connector End View
Courtesy of GENERAL MOTORS CORP.

Radio X3 (Z88+U42) Connector Parts Information

Connector Part Information

- OEM: 7283-9283-40
- Service: See Catalog
- Description: 16-Way F YESC Kaizen Series (L-GY)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X3 (Z88+U42) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.35 YE	2059	Auxiliary Audio Left Signal
2	0.35 WH	2058	Auxiliary Audio Right Signal
3	0.35 L-BU	5826	Left DVD Audio Signal (+)
4	0.35 WH	5828	Right DVD Audio Signal (+)
5	0.35 OG/BK	5831	Remote Infra Red Signal (+)
6	0.35 PK/BK	5844	Video Bright Control
7	0.35 D-GN	6975	DVD Video Signal (+)
8	0.35 PU	2056	Auxiliary Video High Signal
9	0.35 BARE	5345	Drain Wire
10	0.35 L-GN/BK	5845	Video Module Signal
11	0.35 PU	6979	DVD Audio Common
12	0.35 BARE	6980	DVD Audio Shield
13	0.35 TN/WH	5830	Remote Infra Red Signal (-)
14	0.35 BARE	6976	DVD Video Drain Wire
15	0.35 WH/BK	5335	DVD Video Signal (-)
16	0.35 BARE	5346	Drain Wire

Radio X4 (WDA+U3R/UZR)

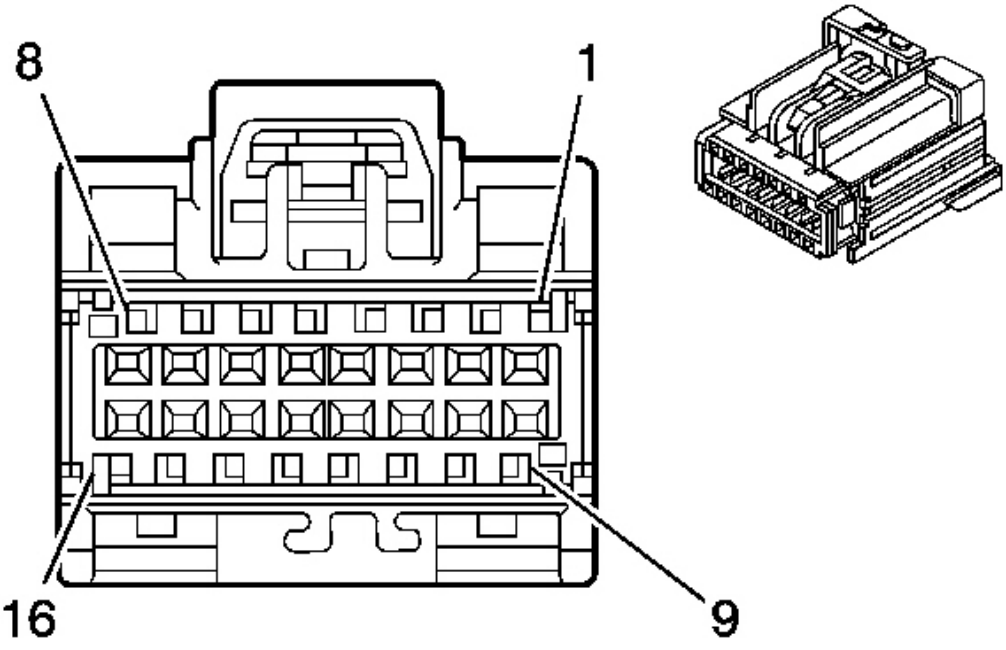


Fig. 52: Radio X4 (WDA+U3R/UZR) Connector End View
Courtesy of GENERAL MOTORS CORP.

Radio X4 (WDA+U3R/UZR) Connector Parts Information

Connector Part Information

- OEM: 7283-9284-80
- Service: See Catalog
- Description: 16-Way F YESC Kaizen Series (BN)

Terminal Part Information

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X4 (WDA+U3R/UZR) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1-4	-	-	Not Used
5	0.5 D-GN/WH	817	Vehicle Speed Signal
6-16	-	-	Not Used

Radio X4 (Z88+U3R/UZR)

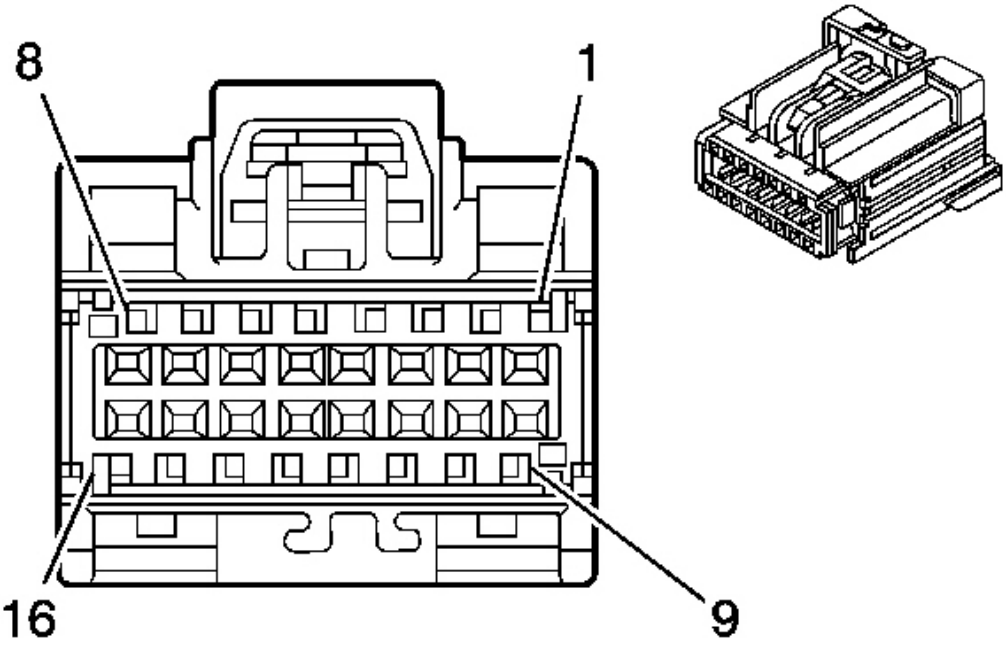


Fig. 53: Radio X4 (Z88+U3R/UZR) Connector End View
Courtesy of GENERAL MOTORS CORP.

Radio X4 (Z88+U3R/UZR) Connector Parts Information

Connector Part Information

- OEM: 7283-9284-80
- Service: See Catalog
- Description: 16-Way F YESC Kaizen Series (BN)

Terminal Part Information

- Pins: 3- 7, 11- 13

- Terminal/Tray: 7116-4618-02/14
- Core/Insulation Crimp: P/P
- Release Tool/Test Probe: J-38125-215/J-35616-64B (L-BU)

Radio X4 (Z88+U3R/UZR) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1-2	-	-	Not Used
3	0.5 D-BU	6760	Center Channel Low Level Audio Signal (UQS)
4	0.5 WH	6763	Subwoofer Low Level Audio Signal (UQS)
5	0.5 D-GN/WH	817	Vehicle Speed Signal (U3R/UZR)
6	0.35 PK	6972	Windshield Washer Switch Signal (UVC)
7	0.35 L-BU	6973	Windshield Washer Switch Signal (UVC)
8-10	-	-	Not Used
11	0.5 OG	6761	Center Channel Low Level Audio Signal (-) (UQS)
12	0.5 PK	6762	Subwoofer Low Level Audio (-) (UQS)
13	0.35 BARE	5838	Amplifier Audio Prompt Drain Wire (UQS)
14-16	-	-	Not Used

Rear Seat Audio (RSA) Control (WDA+RCA)

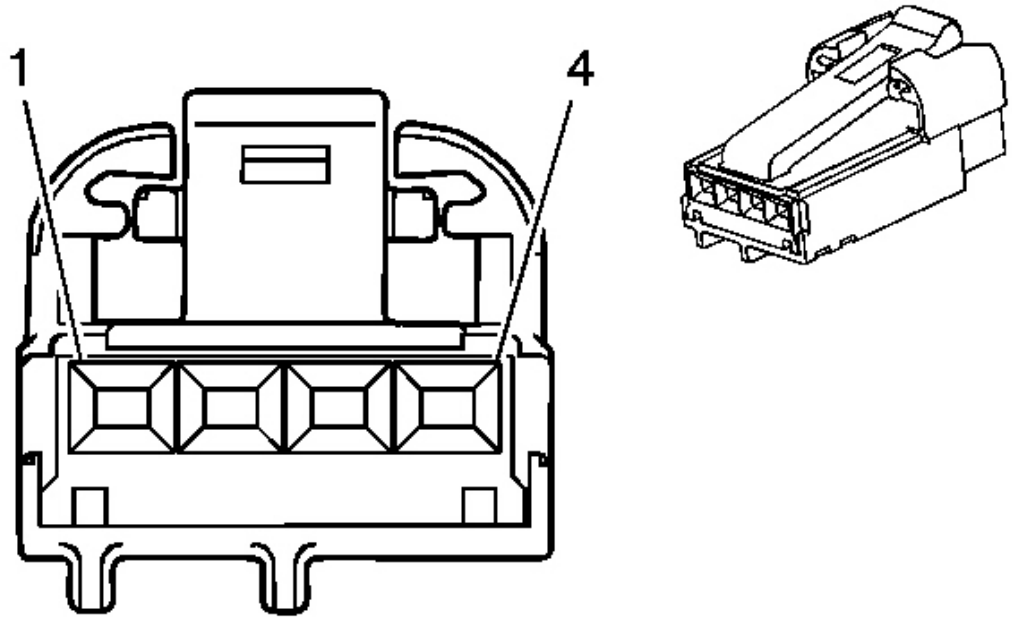


Fig. 54: Rear Seat Audio (RSA) Control (WDA+RCA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Rear Seat Audio (RSA) Control (WDA+RCA) Connector Parts Information

Connector Part Information

- OEM: 31068-1010
- Service: See Catalog
- Description: 4-Way F HDAC64 SR Housing (BK)

Terminal Part Information

- Terminal/Tray: 1393364-2/7
- Core/Insulation Crimp: K/K
- Release Tool/Test Probe: 15315247/J-35616-64B (L-BU)

Rear Seat Audio (RSA) Control (WDA+RCA) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 L-GN	1011	Remote Radio Control Signal

2	0.35 BK	850	Ground
3	0.35 PU/WH	1382	LED Dimming Signal
4	0.35 PU	1375	Remote Radio Control Supply Voltage

Rear Seat Audio (RSA) Control (Z88+RCA)

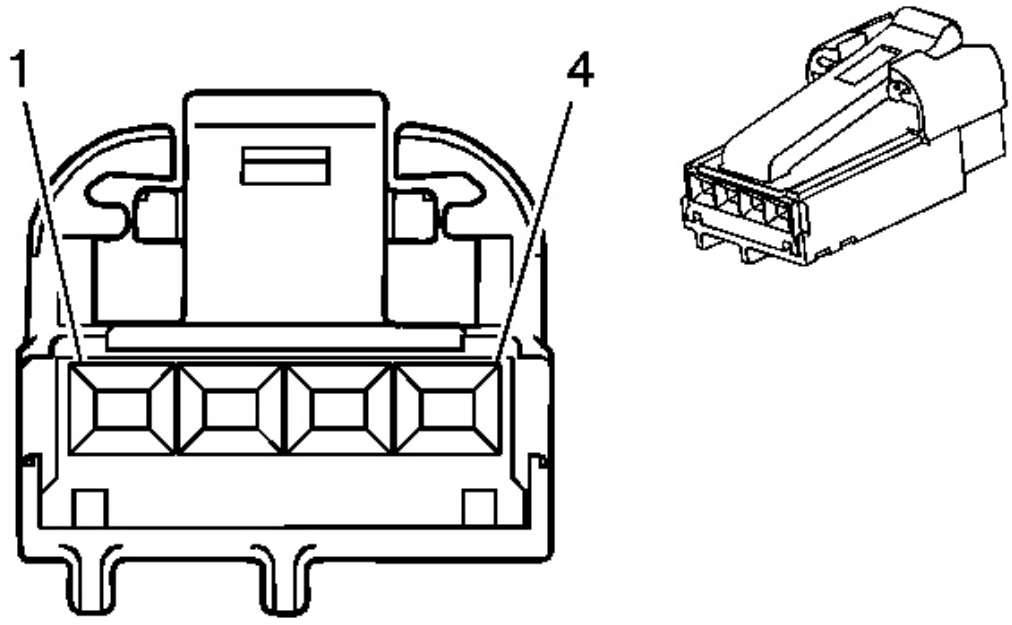


Fig. 55: Rear Seat Audio (RSA) Control (Z88+RCA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Rear Seat Audio (RSA) Control (Z88+RCA) Connector Parts Information

Connector Part Information

- OEM: 31068-1010
- Service: See Catalog
- Description: 4-Way F HDAC64 SR Housing (BK)

Terminal Part Information

- Terminal/Tray: 1393364-2/7

- Core/Insulation Crimp: K/K
- Release Tool/Test Probe: 15315247/J-35616-64B (L-BU)

Rear Seat Audio (RSA) Control (Z88+RCA) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 L-GN	1011	Remote Radio Control Signal
2	-	-	Not Used
3	0.35 PU/WH	1382	LED Dimming Signal
4	0.35 PU	1375	Remote Radio Control Supply Voltage

Rear Video/Audio/HVAC Module X1 (UK6)

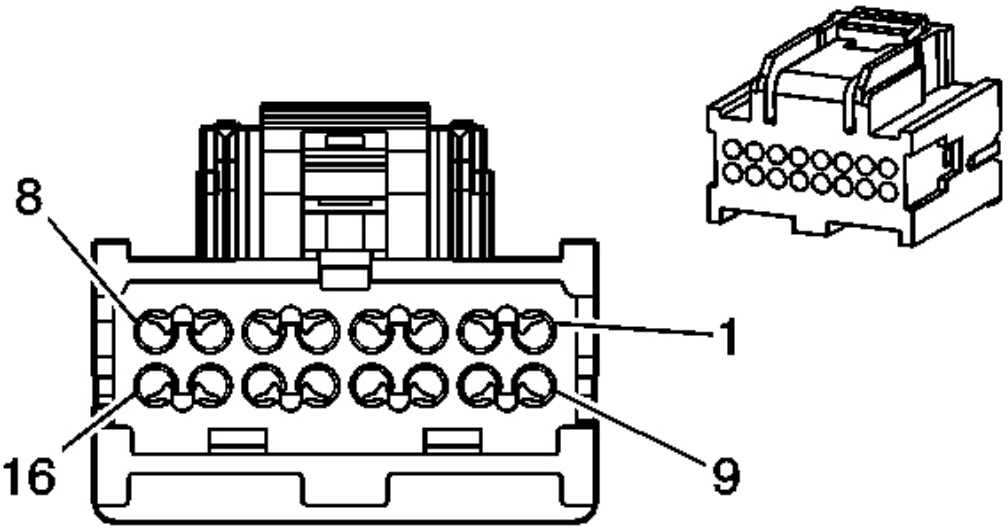


Fig. 56: Rear Video/Audio/HVAC Module X1 (UK6) Connector End View
Courtesy of GENERAL MOTORS CORP.

Rear Video/Audio/HVAC Module X1 (UK6) Connector Parts Information

Connector Part Information

- OEM: 15394149
- Service: See Catalog

- Description: 16-Way F Micro-Pack 064 Series (GY)

Terminal Part Information

- Terminal/Tray: 15359541/4
- Core/Insulation Crimp: M/M
- Release Tool/Test Probe: 15381651-2/J-35616-64B (L-BU)

Rear Video/Audio/HVAC Module X1 (UK6) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 OG/BK	5329	Left Rear Low Level Audio Signal (+) (U42)
2	0.35 BN/WH	5331	Infra Red Audio Low Reference (U42)
3	0.35 PU/WH	5330	Right Infra Red Audio Signal (U42)
4	0.35 BARE	5332	Infra Red Audio Drain Wire (U42)
5	0.5 RD/WH	2340	Battery Positive Voltage (UK6)
6	0.5 BK/WH	351	Ground (UK6)
7	0.35 PU/WH	1382	LED Dimming Signal (UK6)
8-13	-	-	Not Used
14	0.35 PK	5829	Infra Red Module Supply Voltage (U42)
15	0.35 D-GN	5060	Low Speed GMLAN Serial Data (UK6)
16	-	-	Not Used

Rear Video/Audio/HVAC Module X2 (UK6)

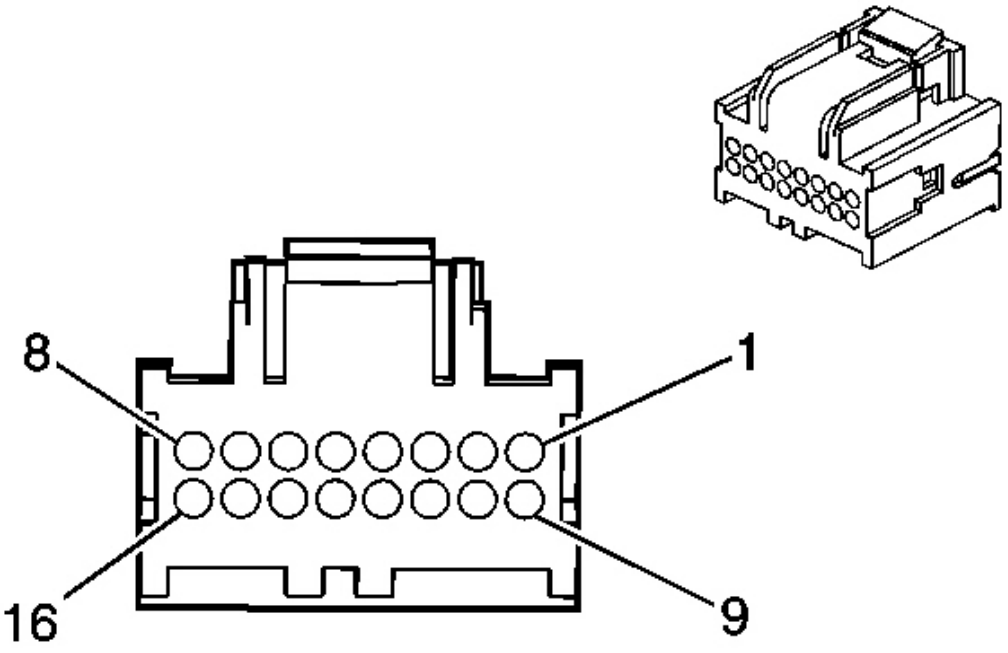


Fig. 57: Rear Video/Audio/HVAC Module X2 (UK6) Connector End View
Courtesy of GENERAL MOTORS CORP.

Rear Video/Audio/HVAC Module X2 (UK6) Connector Parts Information

Connector Part Information

- OEM: 15394152
- Service: 19115676
- Description: 16-Way F Micro-Pack 064 Series (BK)

Terminal Part Information

- Terminal/Tray: 15359541/4
- Core/Insulation Crimp: M/M
- Release Tool/Test Probe: 15381651-2/J-35616-64B (L-BU)

Rear Video/Audio/HVAC Module X2 (UK6) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.5 BN/WH	599	Left Rear Low Level Audio Signal (+)
2	0.5 BN	1999	Left Rear Low Level Audio Signal (-)
3	0.5 D-BU	546	Right Rear Low Level Audio Signal (+)
4	0.5 TN	1946	Right Rear Low Level Audio Signal (-)
5	0.35 BARE	1574	Drain Wire
6-8	-	-	Not Used
9	0.5 L-BU	5312	RSA Left Audio Signal
10	0.5 BN	5314	RSA Audio Common Signal
11	0.5 L-GN	5313	RSA Right Audio Signal
12	0.5 TN/WH	5830	Remote Infra Red Signal (-)
13	0.35 BARE	6759	Discrete Audio Drain Wire
14-16	-	-	Not Used

Speaker - Center (Z88+UQA/UQS)

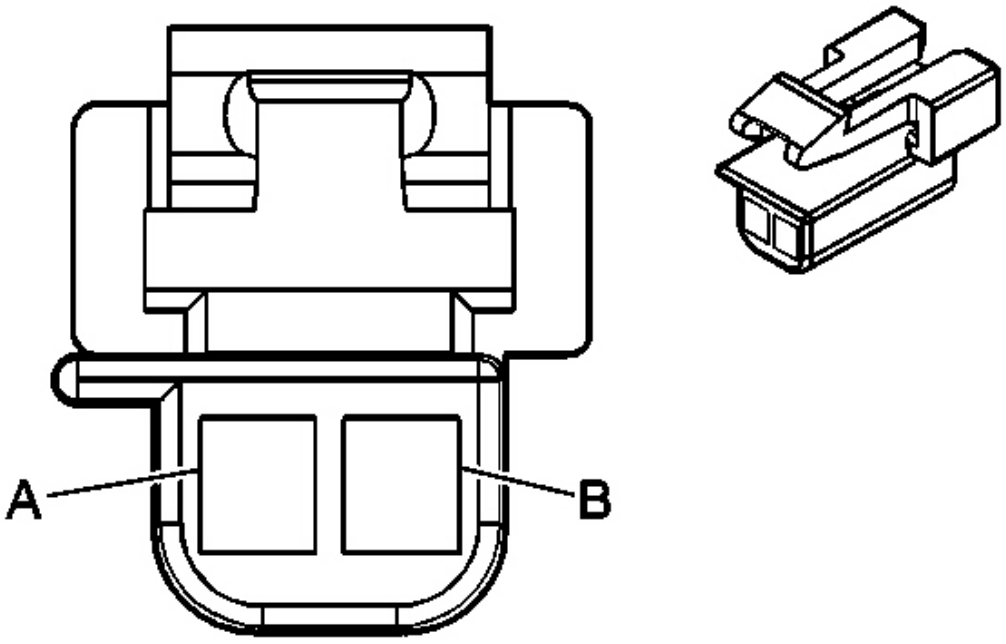


Fig. 58: Speaker - Center (Z88+UQA/UQS) Connector End View

Courtesy of GENERAL MOTORS CORP.

Speaker - Center (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - Center (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.35 L-BU	1960	Front Center Speaker Output (-)
B	0.35 YE	1860	Front Center Speaker Output (+)

Speaker - Center (WDA+UQG)

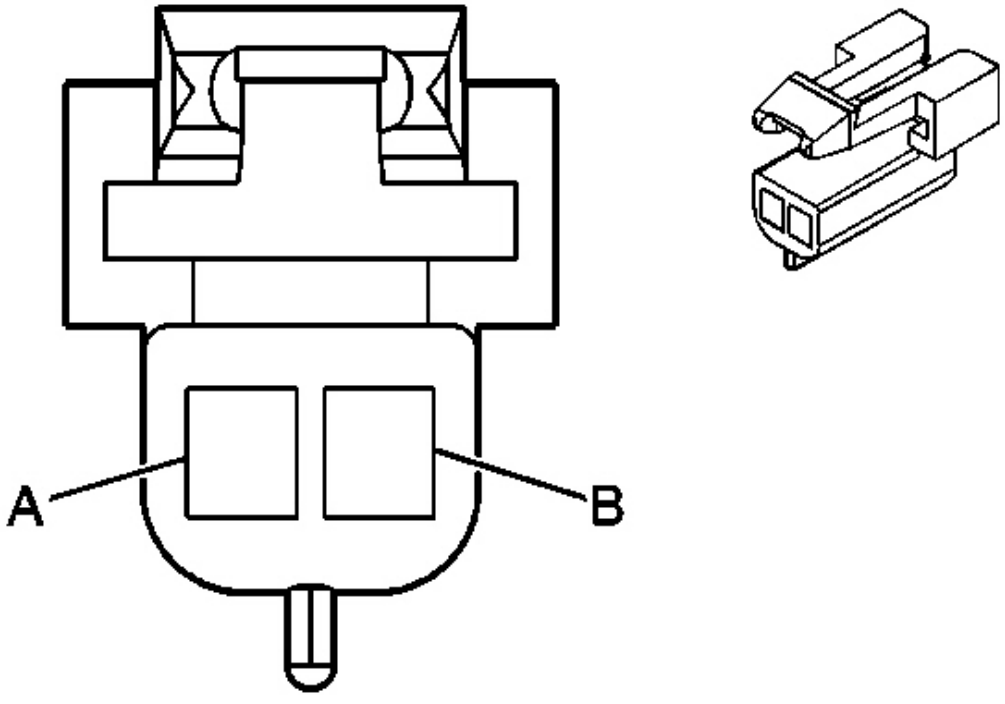


Fig. 59: Speaker - Center (WDA+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - Center (WDA+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - Center (WDA+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.35 L-BU	1960	Front Center Speaker Output (-)
B	0.35 YE	1860	Front Center Speaker Output (+)

Speaker - Center (Z88+UQG)

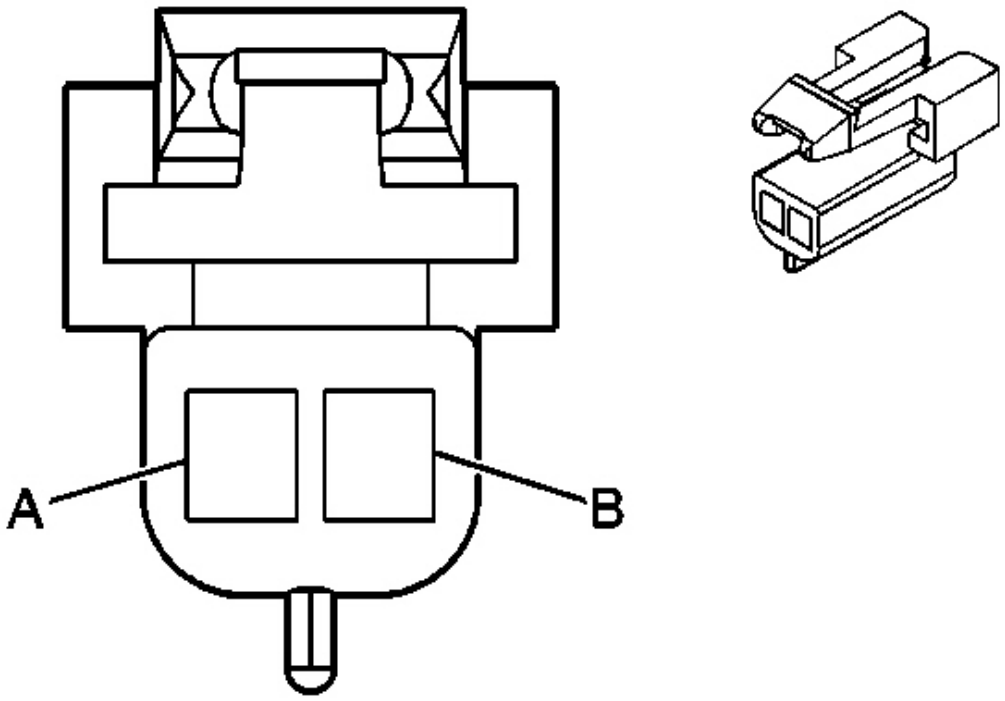


Fig. 60: Speaker - Center (Z88+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - Center (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - Center (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.35 L-BU	1960	Front Center Speaker Output (-)
B	0.35 YE	1860	Front Center Speaker Output (+)

Speaker - LF Door (WDA+UQA/UQS)

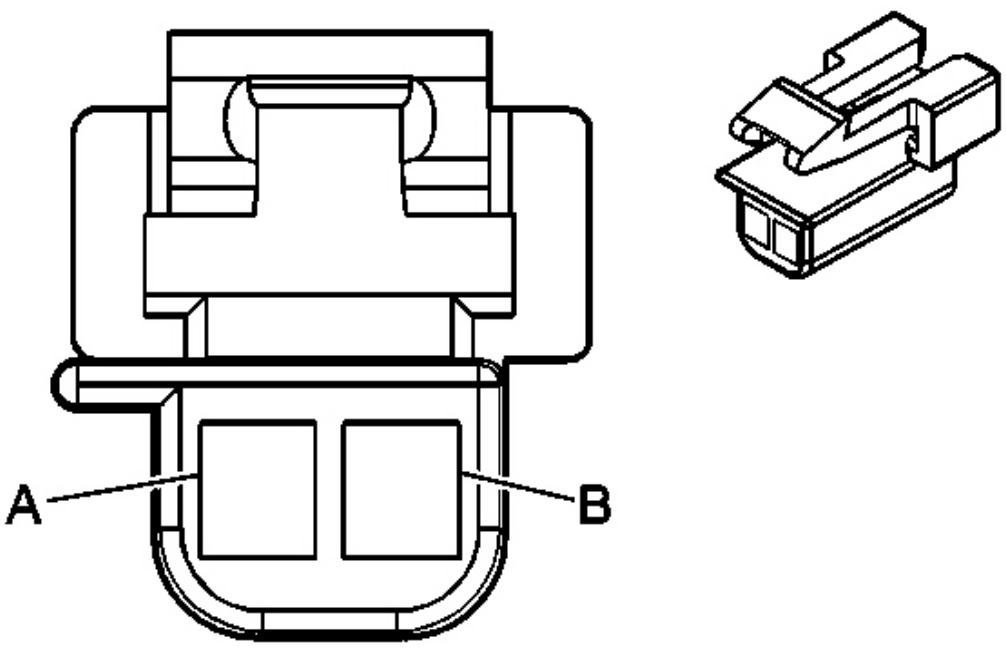


Fig. 61: Speaker - LF Door (WDA+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door (WDA+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LF Door (WDA+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 GY	118	Left Front Speaker Output (-)
B	0.8 TN	201	Left Front Speaker Output (+)

Speaker - LF Door (Z88+UQA/UQS)

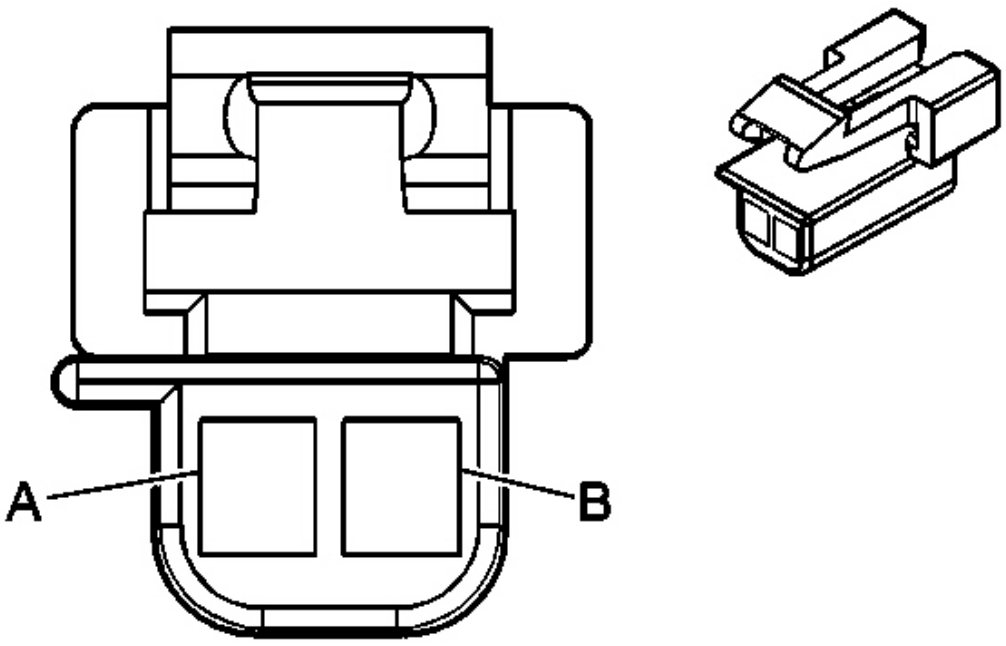


Fig. 62: Speaker - LF Door (Z88+UQA/UQS) Connector End View

Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LF Door (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 GY	118	Left Front Speaker Output (-)
B	0.8 TN	201	Left Front Speaker Output (+)

Speaker - LF Door (WDA+UQF)

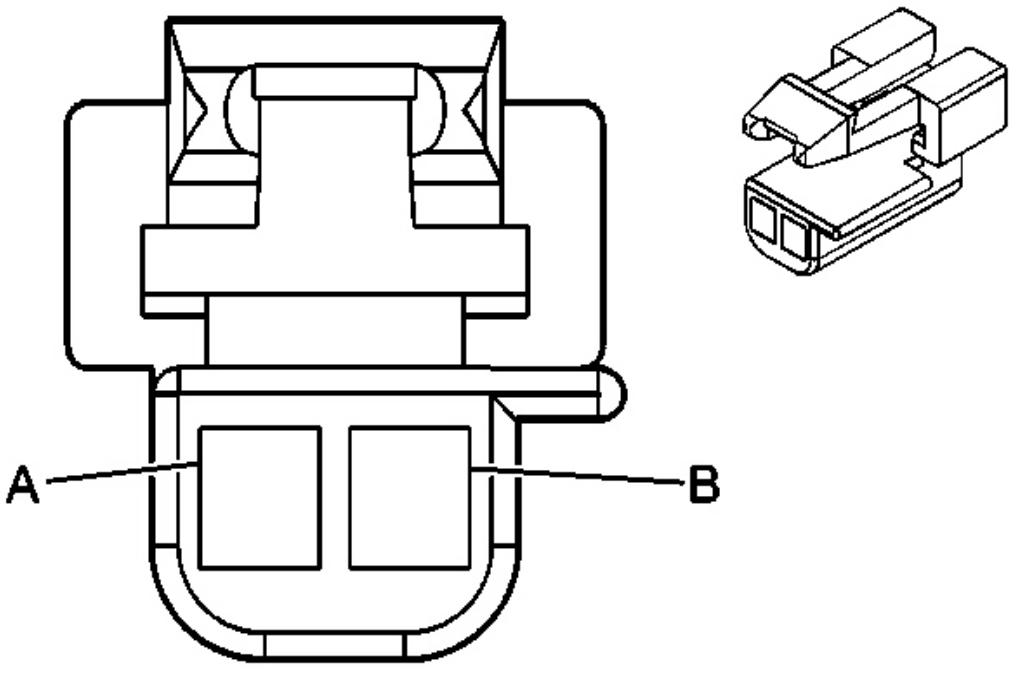


Fig. 63: Speaker - LF Door (WDA+UQF) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door (WDA+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867
- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LF Door (WDA+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

A	0.8 GY	118	Left Front Speaker Output (-)
B	0.8 TN	201	Left Front Speaker Output (+)

Speaker - LF Door (Z88+UQF)

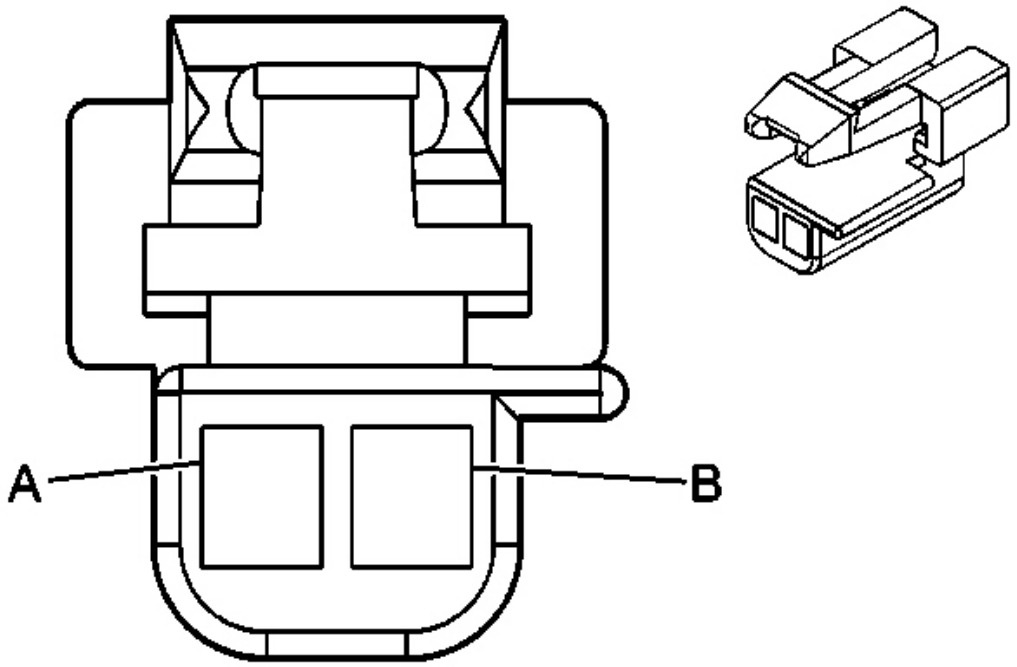


Fig. 64: Speaker - LF Door (Z88+UQF) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door (Z88+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867
- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2

- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LF Door (Z88+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 GY	118	Left Front Speaker Output (-)
B	0.8 TN	201	Left Front Speaker Output (+)

Speaker - LF Door (WDA+UQG)

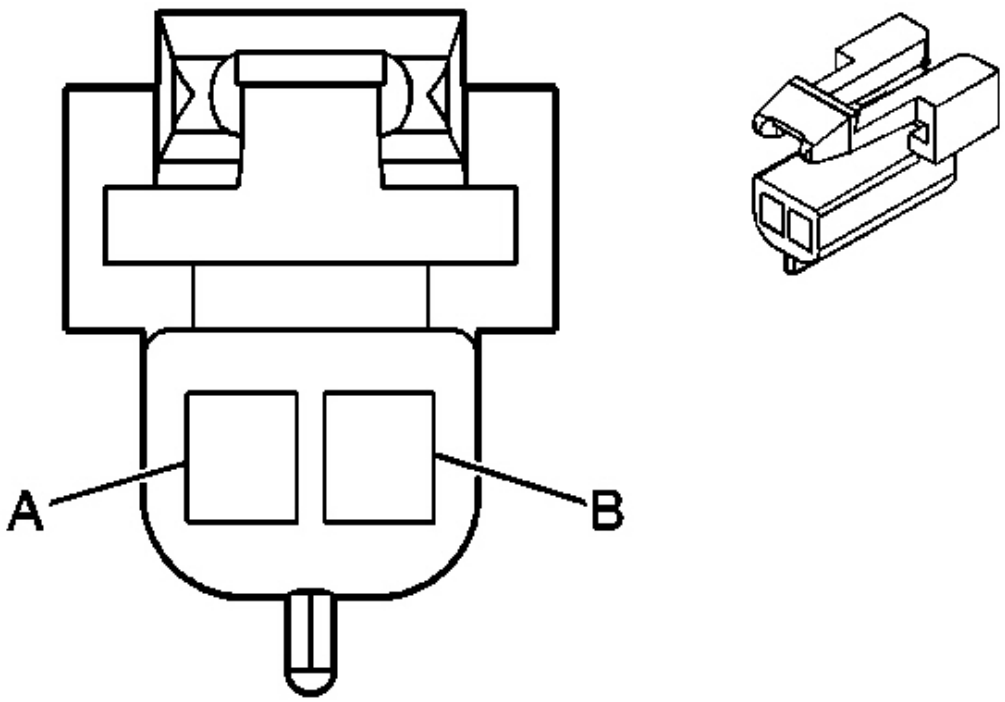


Fig. 65: Speaker - LF Door (WDA+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door (WDA+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LF Door (WDA+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 GY	118	Left Front Speaker Output (-)
B	0.8 TN	201	Left Front Speaker Output (+)

Speaker - LF Door (Z88+UQG)

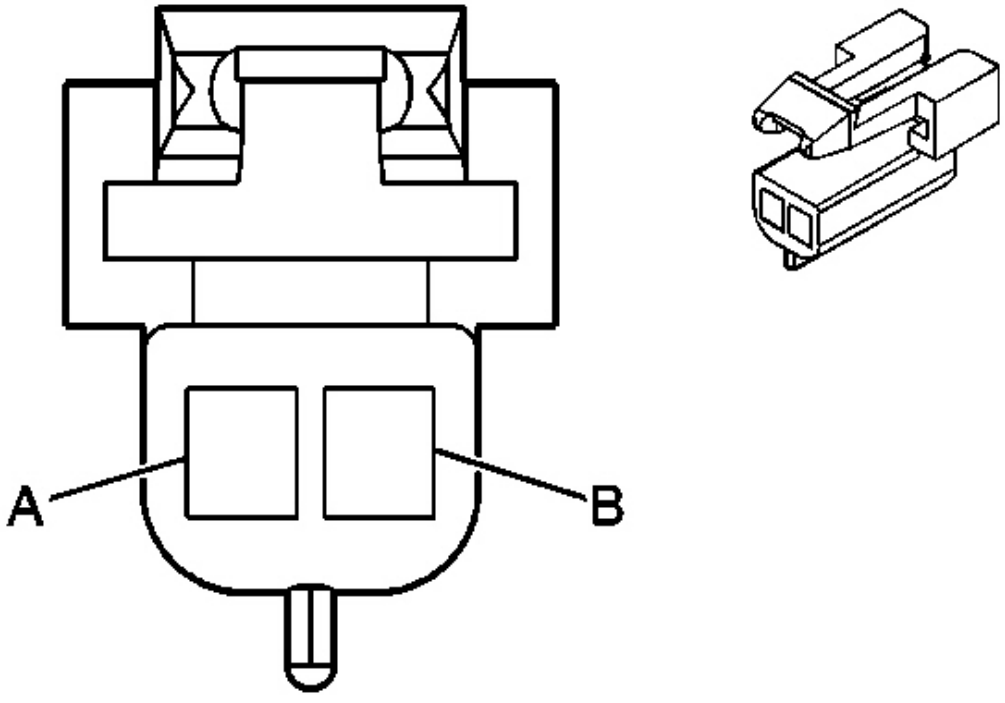


Fig. 66: Speaker - LF Door (Z88+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LF Door (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 GY	118	Left Front Speaker Output (-)
B	0.8 TN	201	Left Front Speaker Output (+)

Speaker - LF Door Tweeter (WDA)

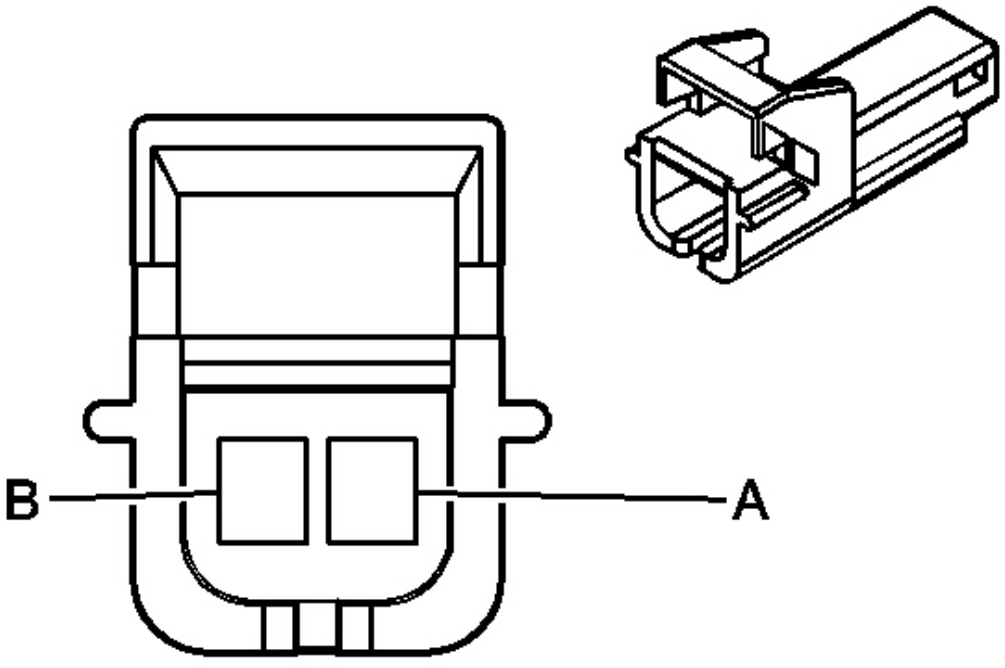


Fig. 67: Speaker - LF Door Tweeter (WDA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door Tweeter (WDA) Connector Parts Information

Connector Part Information

- OEM: 12052833
- Service: 12117275
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Speaker - LF Door Tweeter (WDA) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

A	0.8 GY	118	Left Front Speaker Output (-) (UQA/UQS)
	0.8 GY	118	Left Front Speaker Output (-) (UQG)
	0.8 GY	118	Left Front Speaker Output (-) (UQF)
B	0.8 TN	201	Left Front Speaker Output (+) (UQA/UQS)
	0.8 TN	201	Left Front Speaker Output (+) (UQG)
	0.8 TN	201	Left Front Speaker Output (+) (UQF)

Speaker - LF Door Tweeter (Z88)

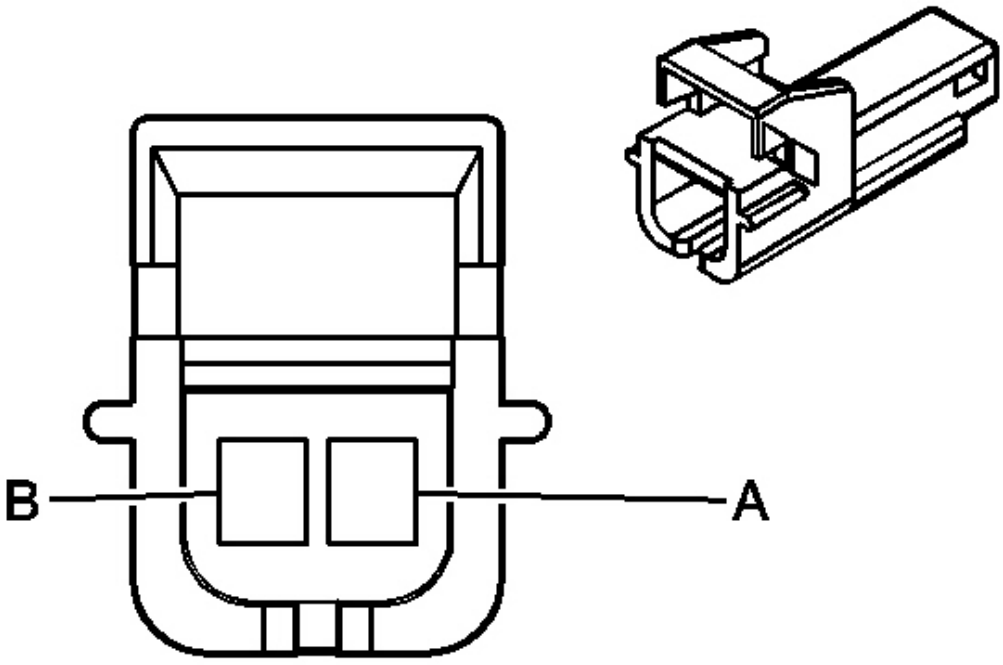


Fig. 68: Speaker - LF Door Tweeter (Z88) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LF Door Tweeter (Z88) Connector Parts Information

Connector Part Information

- OEM: 12052833
- Service: 12117275
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Speaker - LF Door Tweeter (Z88) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 GY	118	Left Front Speaker Output (-) (UQA/UQS)
	0.8 GY	118	Left Front Speaker Output (-) (UQF)
B	0.8 TN	201	Left Front Speaker Output (+) (UQA/UQS)
	0.8 TN	201	Left Front Speaker Output (+) (UQF)

Speaker - LR (WDA+UQA/UQS)

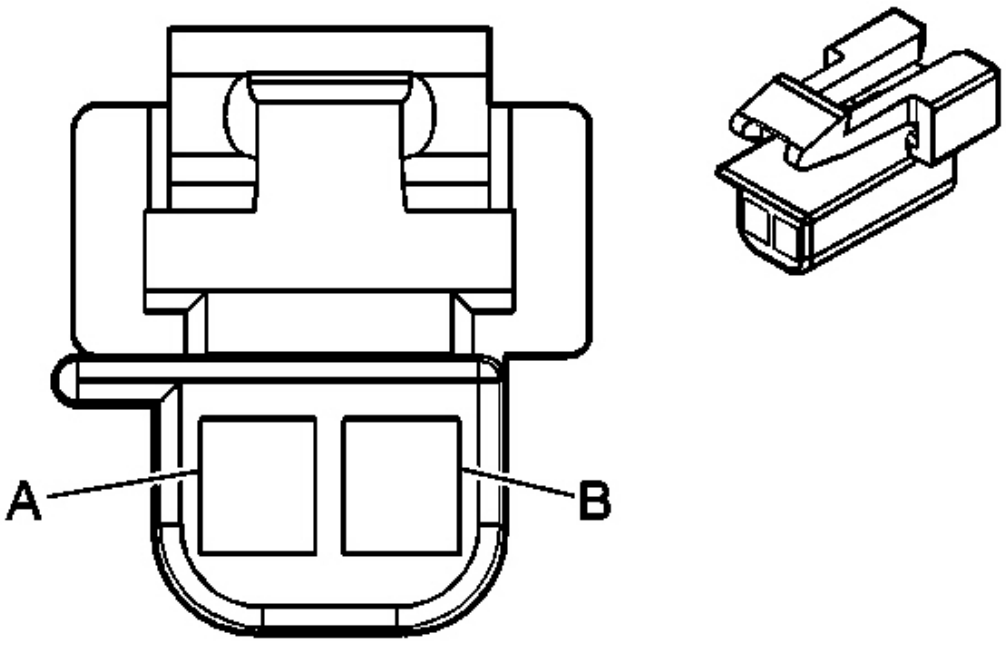


Fig. 69: Speaker - LR (WDA+UQA/UQS Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR (WDA+UQA/UQS Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR (WDA+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

A	0.5 WH	1959	Left Rear Midrange Speaker Output (-)
B	0.5 TN	1859	Left Rear Midrange Speaker Output (+)

Speaker - LR (Z88+UQA/UQS)

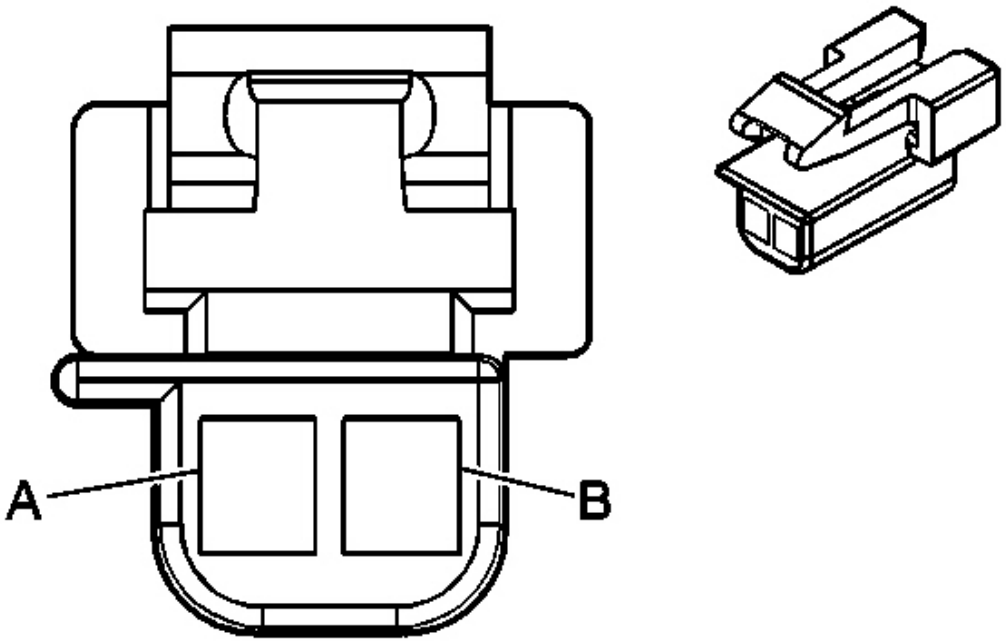


Fig. 70: Speaker - LR (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12064971/5

- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.5 WH	1959	Left Rear Midrange Speaker Output (-)
B	0.5 TN	1859	Left Rear Midrange Speaker Output (+)

Speaker - LR (UQG)

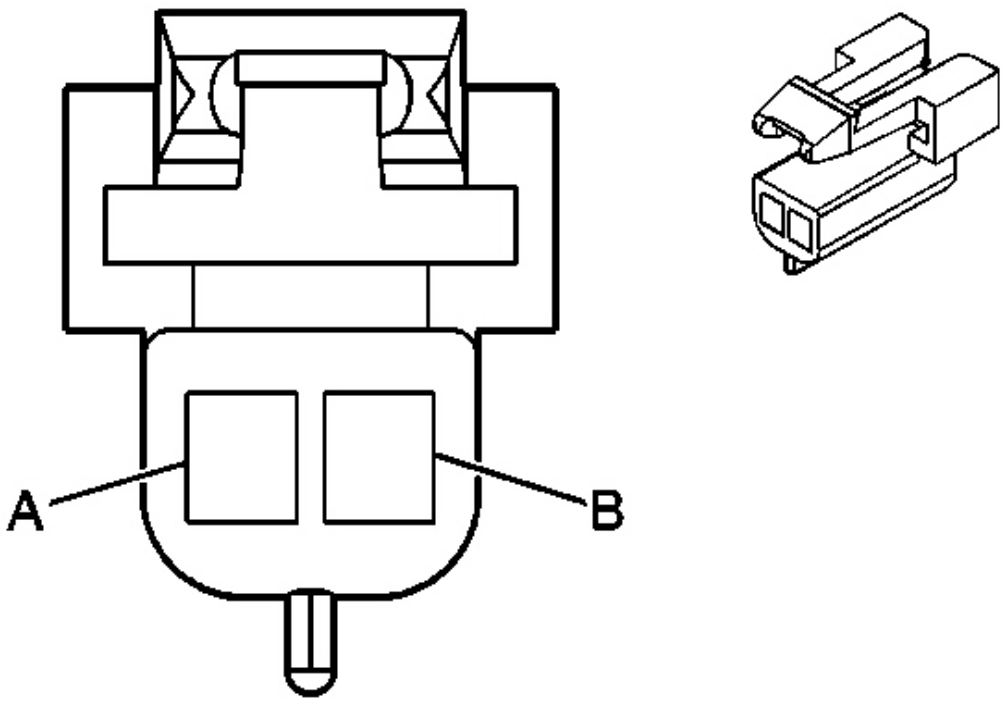


Fig. 71: Speaker - LR (UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR (UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR (UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.35 WH	1959	Left Rear Midrange Speaker Output (-)
B	0.35 TN	1859	Left Rear Midrange Speaker Output (+)

Speaker - LR Door (WDA+UQA/UQS)

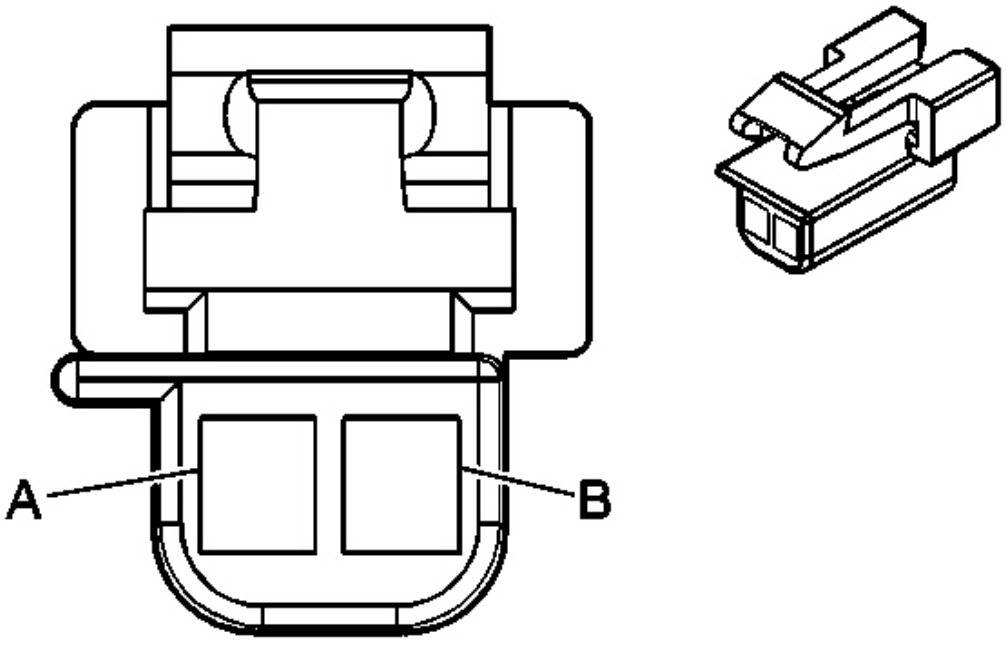


Fig. 72: Speaker - LR Door (WDA+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR Door (WDA+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR Door (WDA+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 YE	116	Left Rear Speaker Output (-)
B	0.8 BN	199	Left Rear Speaker Output (+)

Speaker - LR Door (Z88+UQA/UQS)

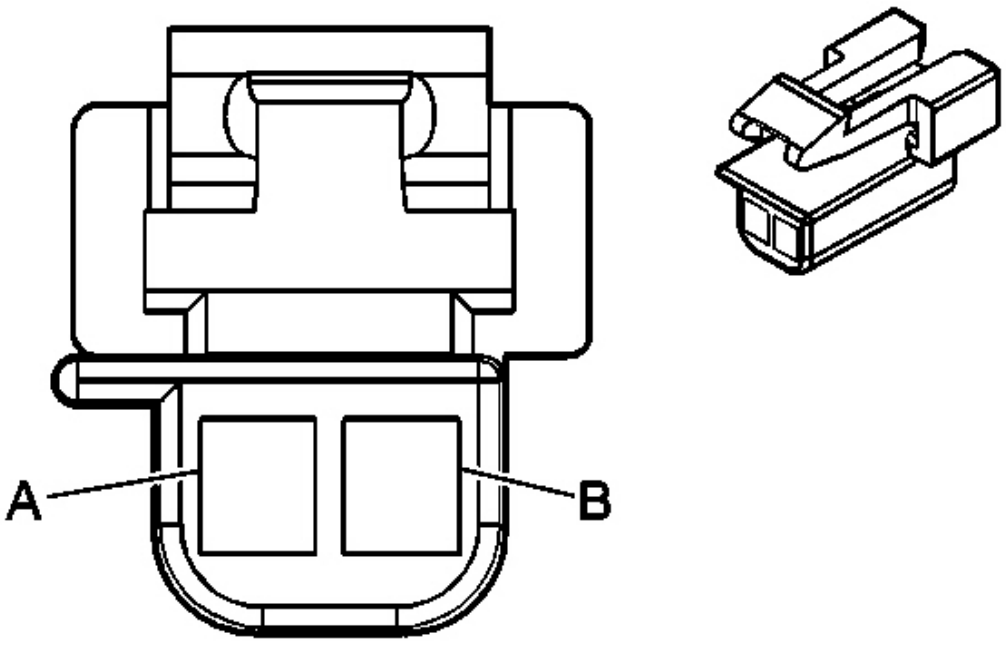


Fig. 73: Speaker - LR Door (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR Door (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR Door (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

A	0.8 YE	116	Left Rear Speaker Output (-)
B	0.8 BN	199	Left Rear Speaker Output (+)

Speaker - LR Door (WDA+UQF)

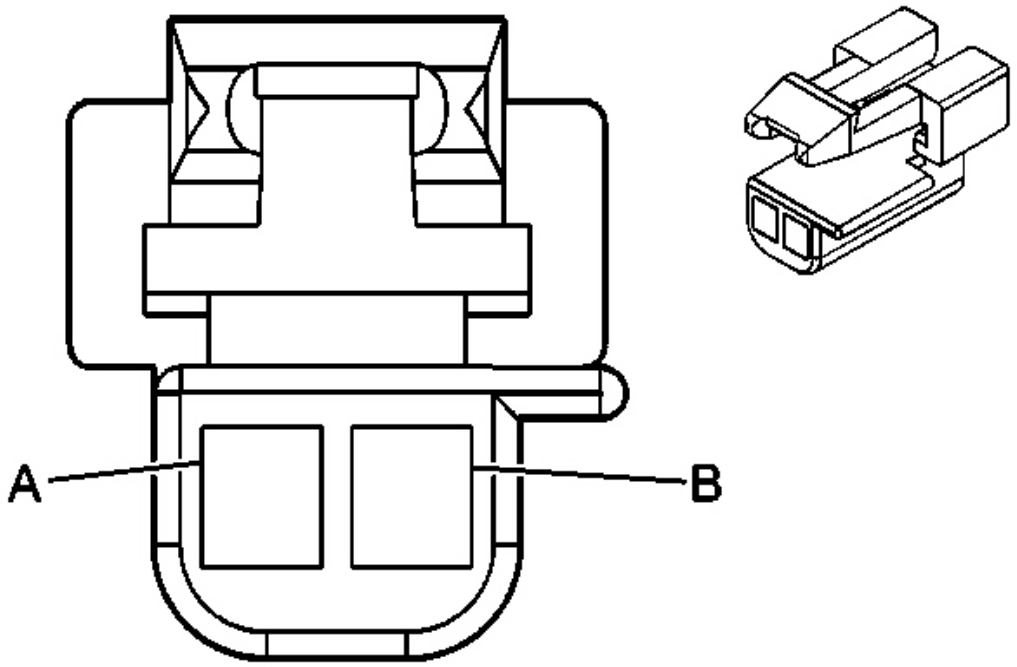


Fig. 74: Speaker - LR Door (WDA+UQF) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR Door (WDA+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867
- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2

- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR Door (WDA+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 YE	116	Left Rear Speaker Output (-)
B	0.8 BN	199	Left Rear Speaker Output (+)

Speaker - LR Door (Z88+UQF)

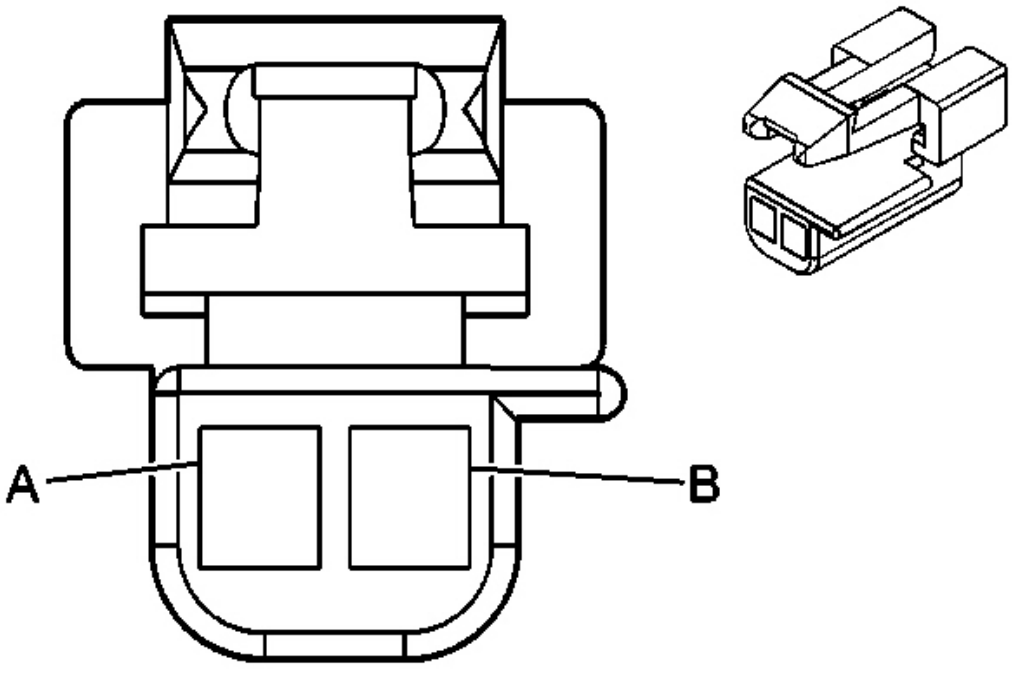


Fig. 75: Speaker - LR Door (Z88+UQF) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR Door (Z88+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867

- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR Door (Z88+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 YE	116	Left Rear Speaker Output (-)
B	0.8 BN	199	Left Rear Speaker Output (+)

Speaker - LR Door (WDA+UQG)

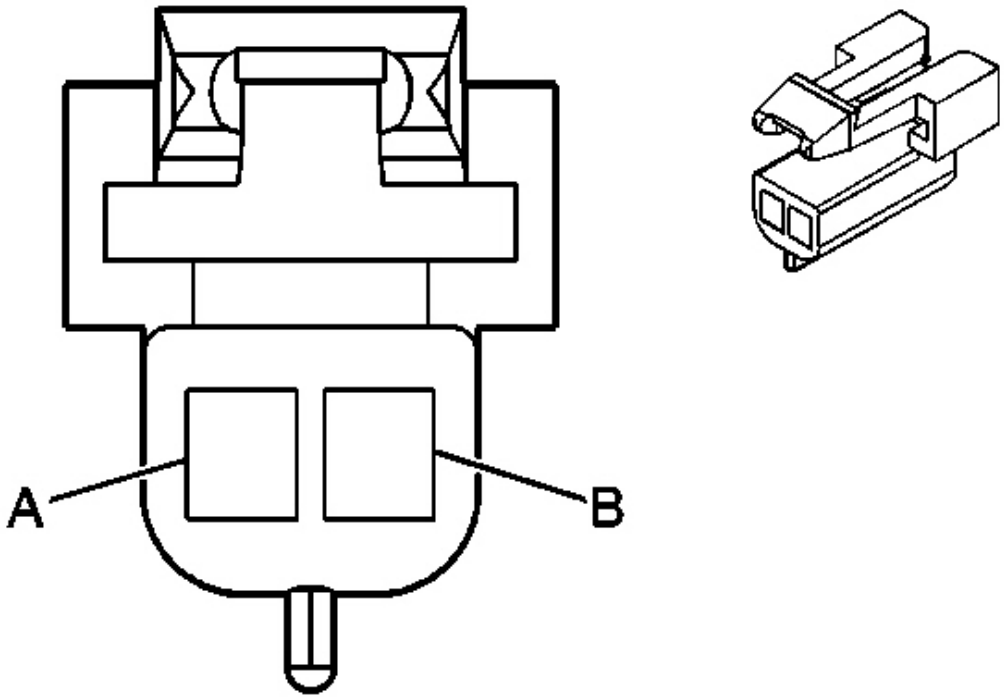


Fig. 76: Speaker - LR Door (WDA+UQG) Connector End View

Courtesy of GENERAL MOTORS CORP.

Speaker - LR Door (WDA+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR Door (WDA+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 YE	116	Left Rear Speaker Output (-)
B	0.8 BN	199	Left Rear Speaker Output (+)

Speaker - LR Door (Z88+UQG)

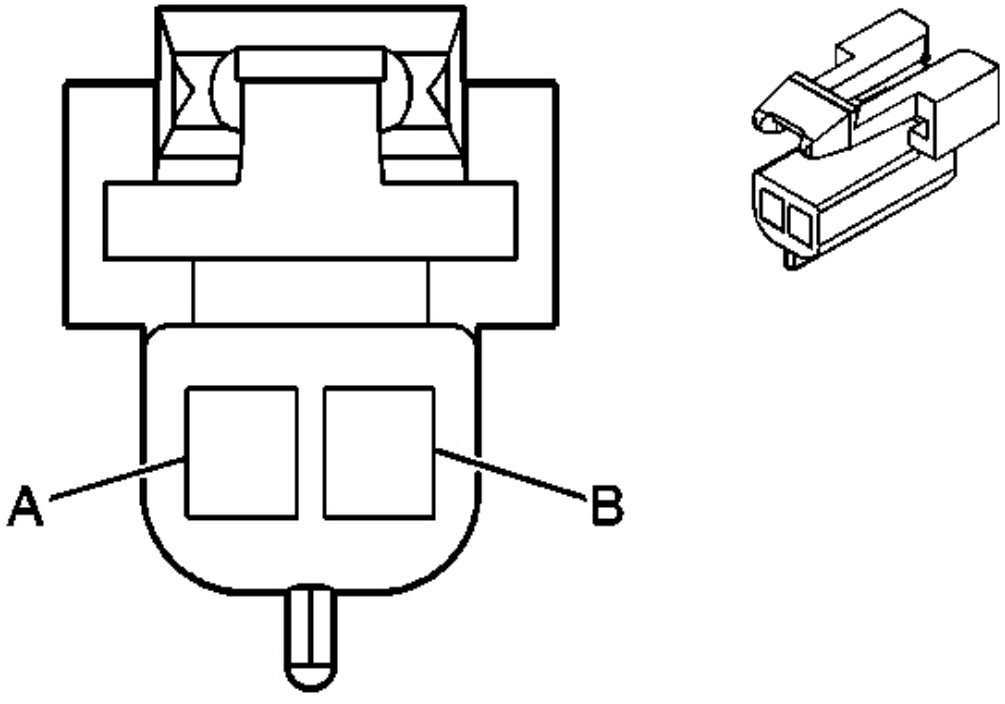


Fig. 77: Speaker - LR Door (Z88+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - LR Door (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - LR Door (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 YE	116	Left Rear Speaker Output (-)
B	0.8 BN	199	Left Rear Speaker Output (+)

Speaker - RF Door (WDA+UQA/UQS)

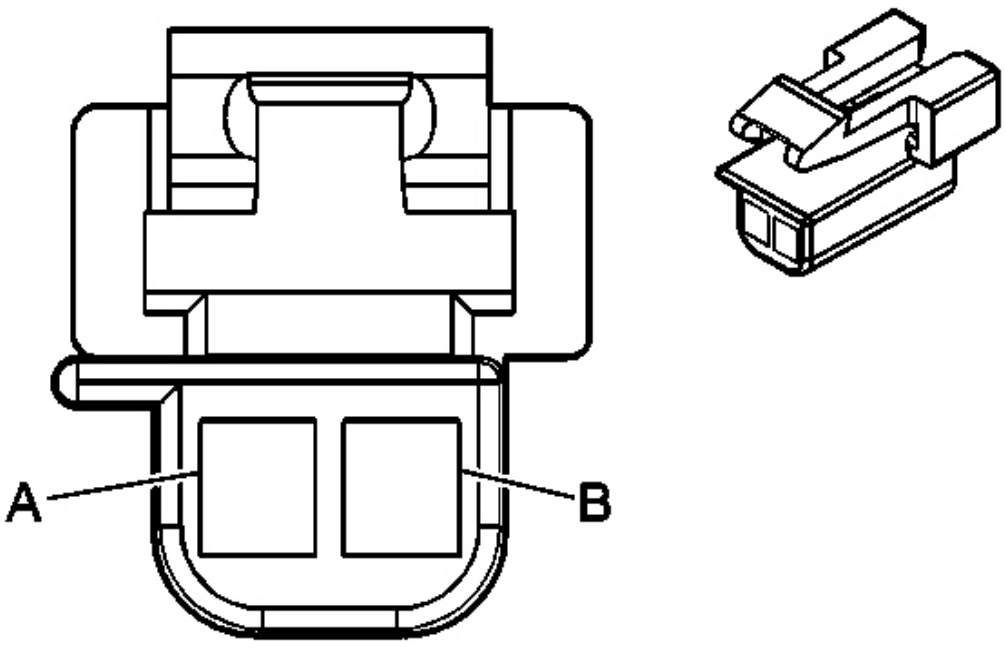


Fig. 78: Speaker - RF Door (WDA+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door (WDA+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2

- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RF Door (WDA+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-GN	117	Right Front Speaker Output (-)
B	0.8 L-GN	200	Right Front Speaker Output (+)

Speaker - RF Door (Z88+UQA/UQS)

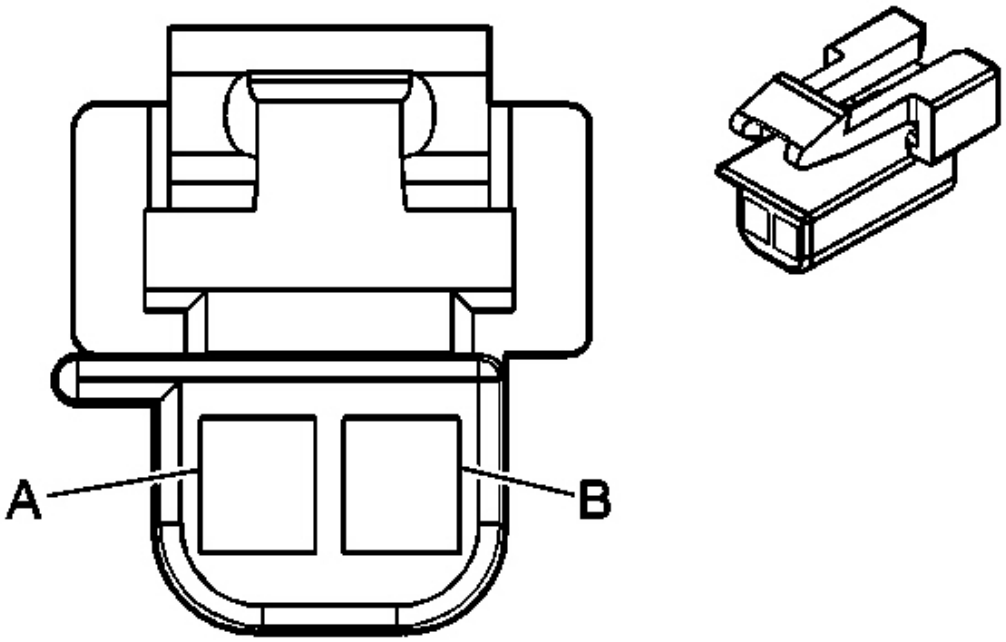


Fig. 79: Speaker - RF Door (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869

- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RF Door (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-GN	117	Right Front Speaker Output (-)
B	0.8 L-GN	200	Right Front Speaker Output (+)

Speaker - RF Door (WDA+UQF)

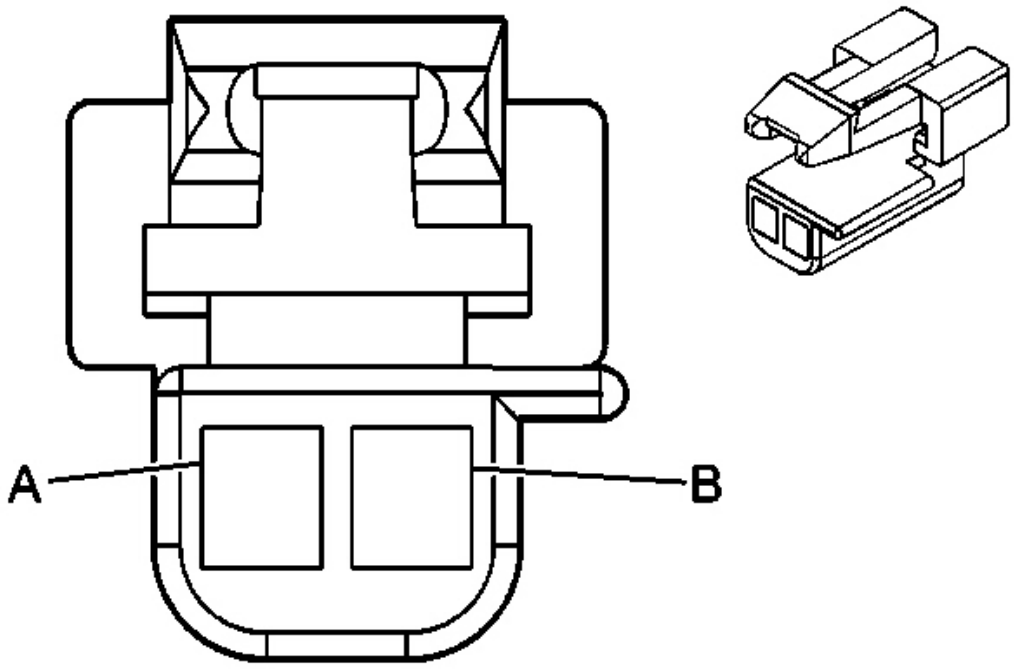


Fig. 80: Speaker - RF Door (WDA+UQF) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door (WDA+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867
- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RF Door (WDA+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-GN	117	Right Front Speaker Output (-)
B	0.8 L-GN	200	Right Front Speaker Output (+)

Speaker - RF Door (Z88+UQF)

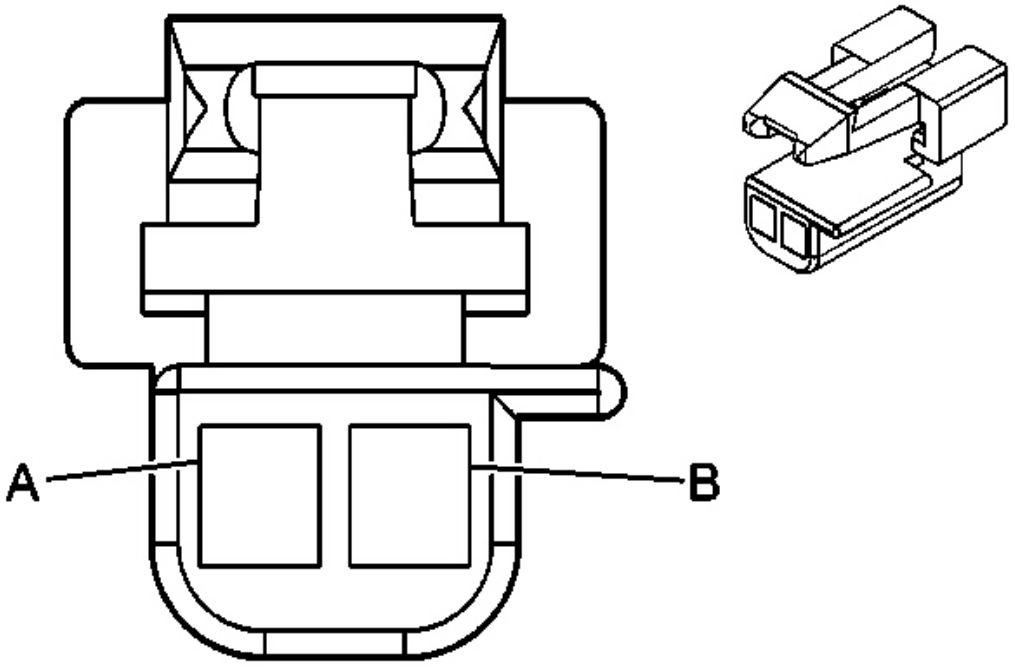


Fig. 81: Speaker - RF Door (Z88+UQF) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door (Z88+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867
- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RF Door (Z88+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

A	0.8 D-GN	117	Right Front Speaker Output (-)
B	0.8 L-GN	200	Right Front Speaker Output (+)

Speaker - RF Door (WDA+UQG)

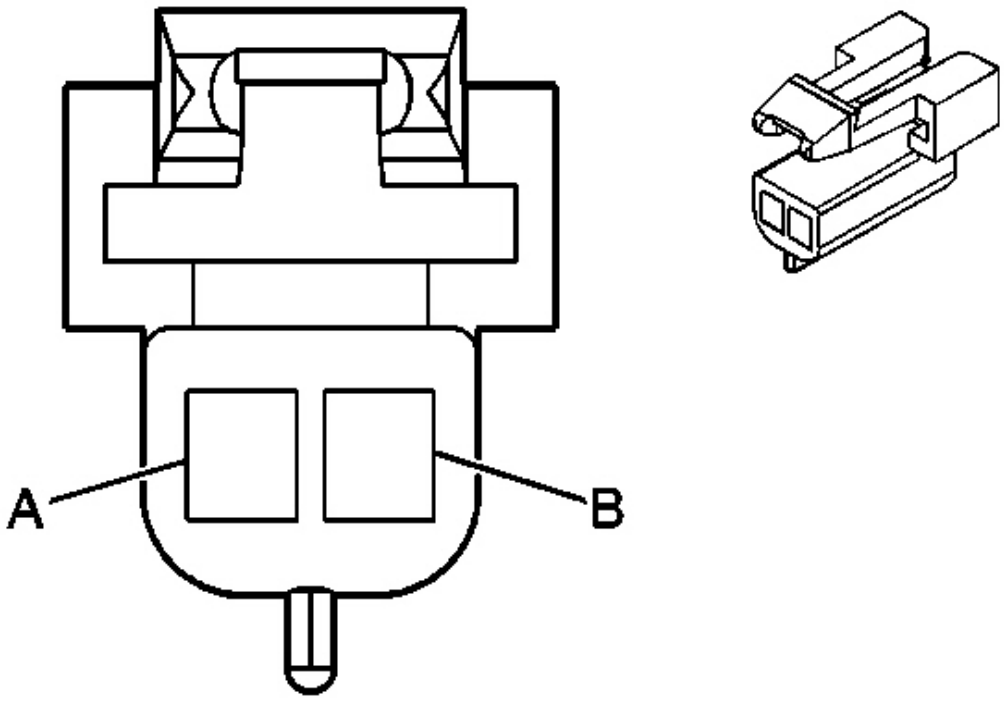


Fig. 82: Speaker - RF Door (WDA+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door (WDA+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RF Door (WDA+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-GN	117	Right Front Speaker Output (-)
B	0.8 L-GN	200	Right Front Speaker Output (+)

Speaker - RF Door (Z88+UQG)

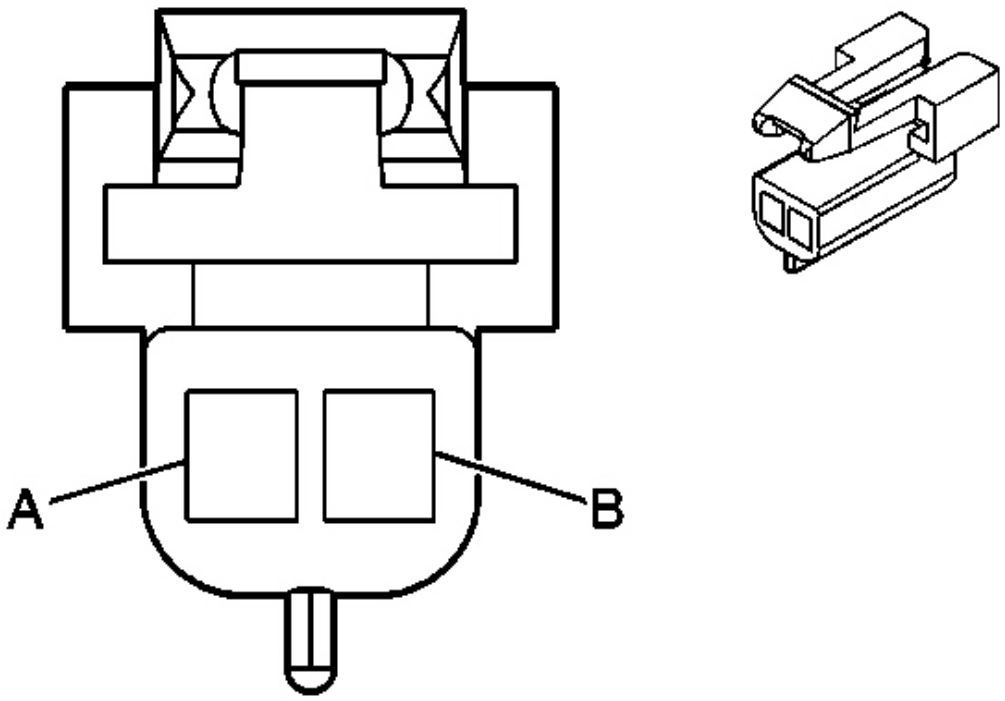


Fig. 83: Speaker - RF Door (Z88+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RF Door (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-GN	117	Right Front Speaker Output (-)
B	0.8 L-GN	200	Right Front Speaker Output (+)

Speaker - RF Door Tweeter (WDA)

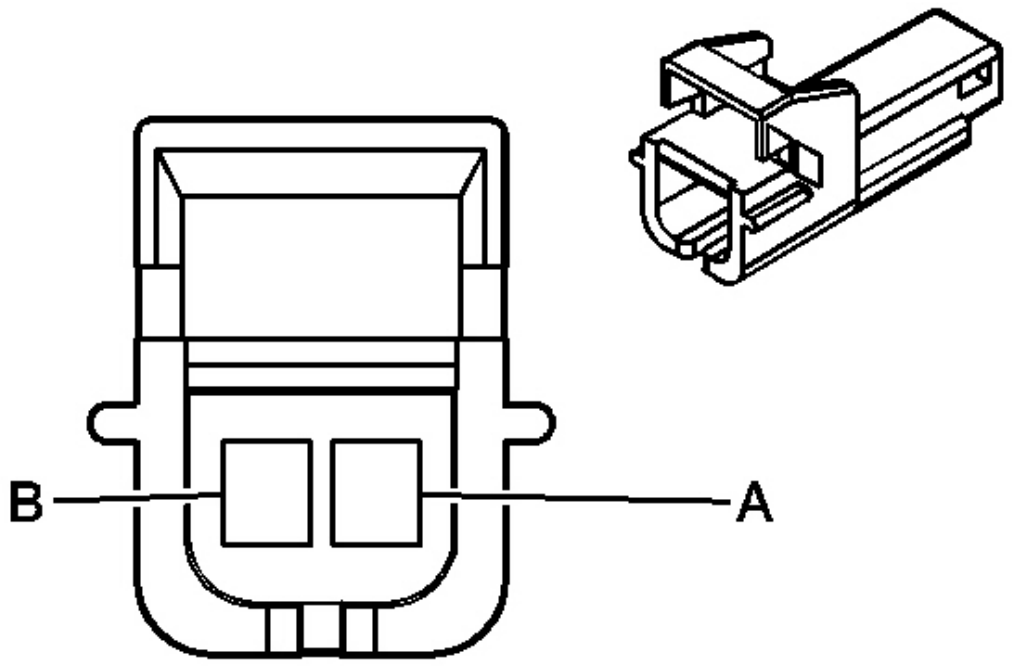


Fig. 84: Speaker - RF Door Tweeter (WDA) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door Tweeter (WDA) Connector Parts Information

Connector Part Information

- OEM: 12052833
- Service: 12117275
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Speaker - RF Door Tweeter (WDA) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 D-GN	117	Right Front Speaker Output (-) (UQA/UQS)
	0.8 D-GN	117	Right Front Speaker Output (-) (UQG)
	0.8 D-GN	117	Right Front Speaker Output (-) (UQF)
B	0.8 L-GN	200	Right Front Speaker Output (+) (UQF)
	0.8 L-GN	200	Right Front Speaker Output (+) (UQG)
	0.8 L-GN	200	Right Front Speaker Output (+) (UQA/UQS)

Speaker - RF Door Tweeter (Z88)

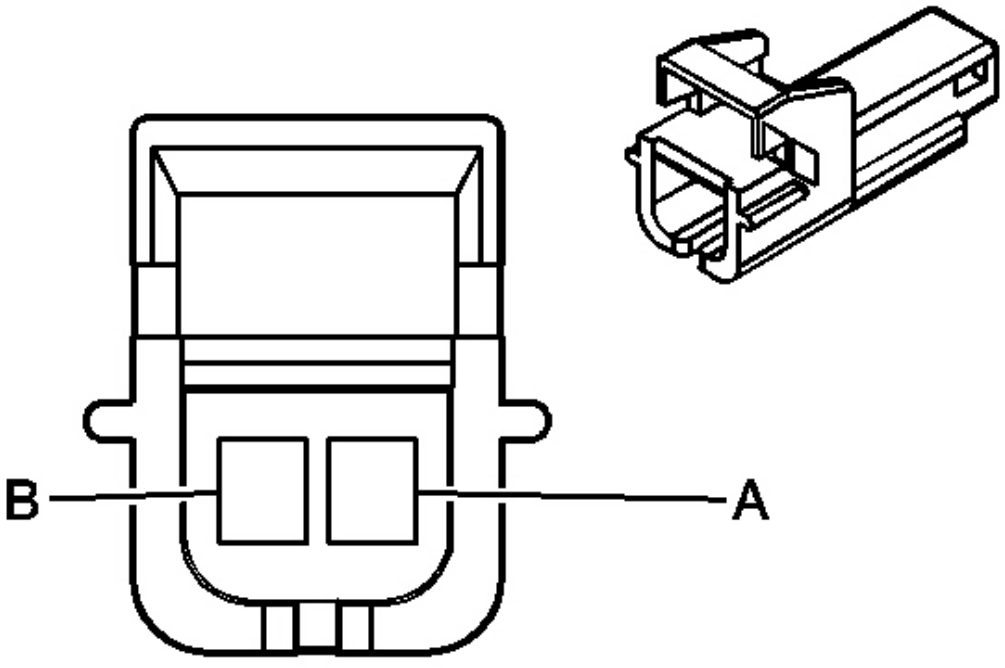


Fig. 85: Speaker - RF Door Tweeter (Z88) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RF Door Tweeter (Z88) Connector Parts Information

Connector Part Information

- OEM: 12052833
- Service: 12117275
- Description: 2-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Speaker - RF Door Tweeter (Z88) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

A	0.8 D-GN	117	Right Front Speaker Output (-) (UQF)
	0.8 D-GN	117	Right Front Speaker Output (-) (UQA/UQS)
B	0.8 L-GN	200	Right Front Speaker Output (+) (UQF)
	0.8 L-GN	200	Right Front Speaker Output (+) (UQA/UQS)

Speaker - RR (WDA+UQA/UQS)

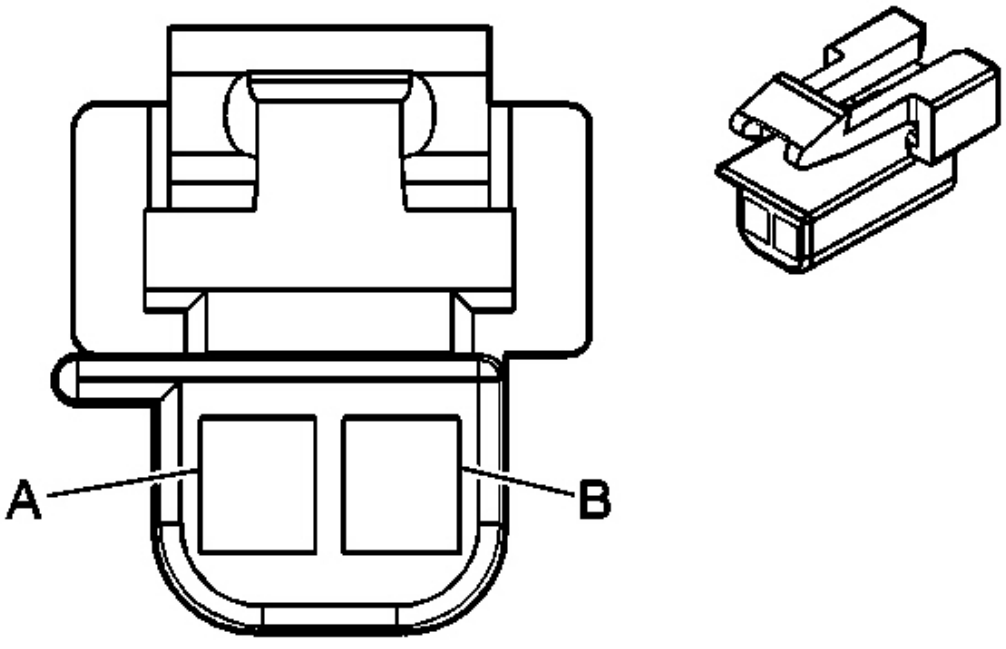


Fig. 86: Speaker - RR (WDA+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR (WDA+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR (WDA+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 WH	1959	Left Rear Midrange Speaker Output (-)
B	0.8 TN	1859	Left Rear Midrange Speaker Output (+)

Speaker - RR (Z88+UQA/UQS)

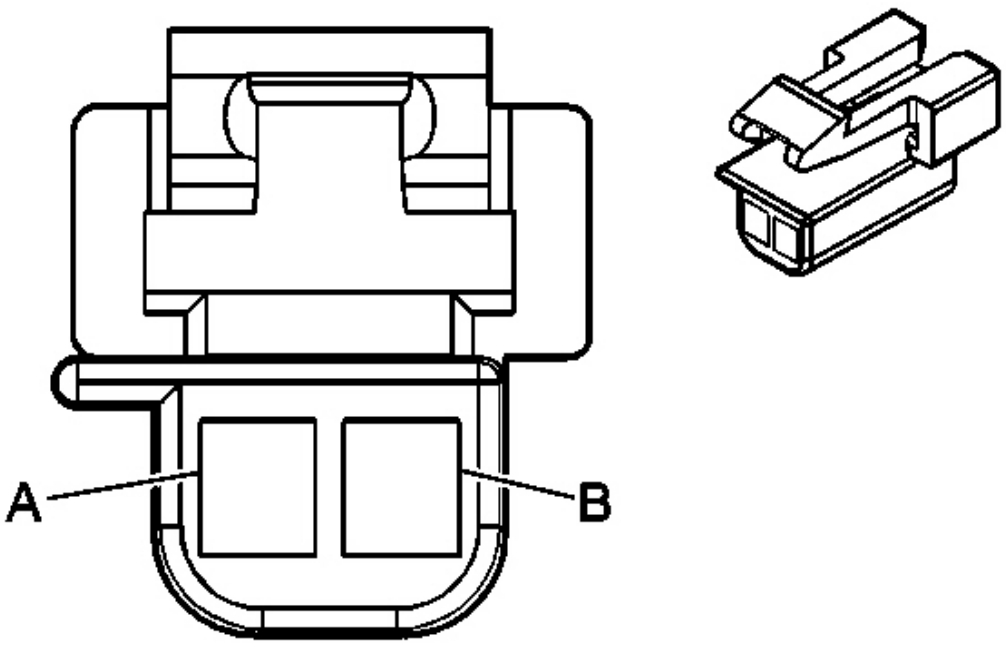


Fig. 87: Speaker - RR (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 WH	1959	Left Rear Midrange Speaker Output (-)
B	0.8 TN	1859	Left Rear Midrange Speaker Output (+)

Speaker - RR (UQG)

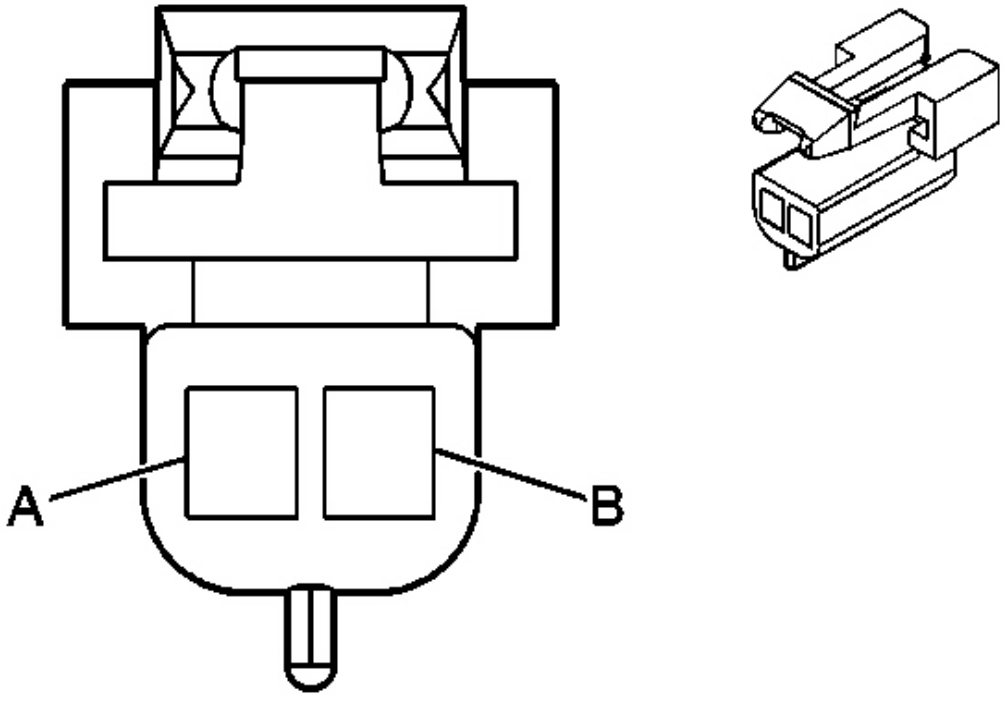


Fig. 88: Speaker - RR (UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR (UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12064971/5
- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR (UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.5 WH	1959	Left Rear Midrange Speaker Output (-)
B	0.5 TN	1859	Left Rear Midrange Speaker Output (+)

Speaker - RR Door (WDA+UQA/UQS)

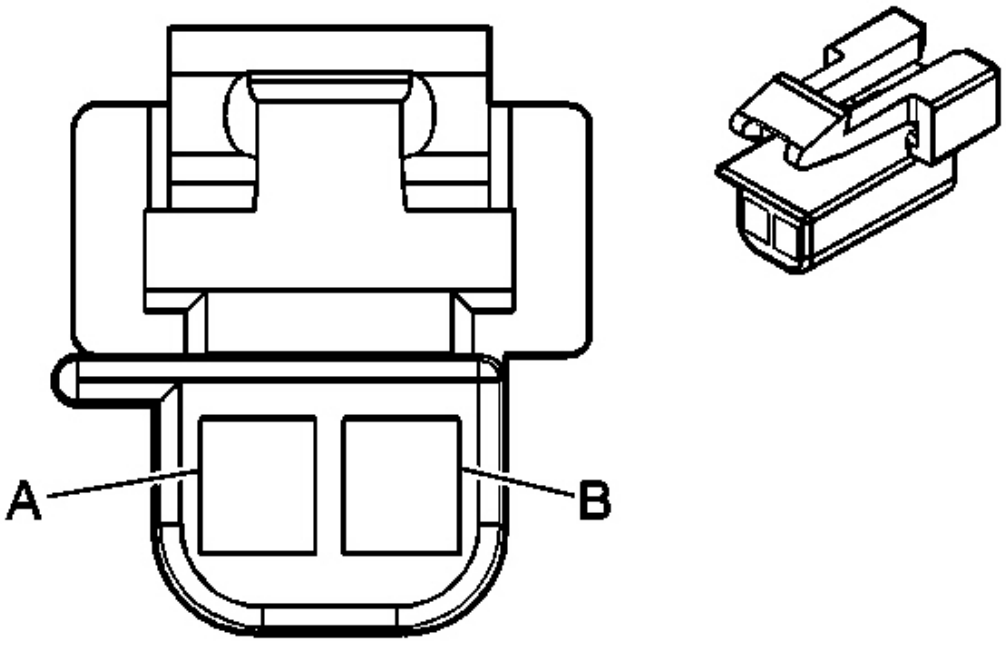


Fig. 89: Speaker - RR Door (WDA+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR Door (WDA+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR Door (WDA+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 L-BU	115	Right Rear Speaker Output (-)
B	0.8 D-BU	46	Right Rear Speaker Output (+)

Speaker - RR Door (Z88+UQA/UQS)

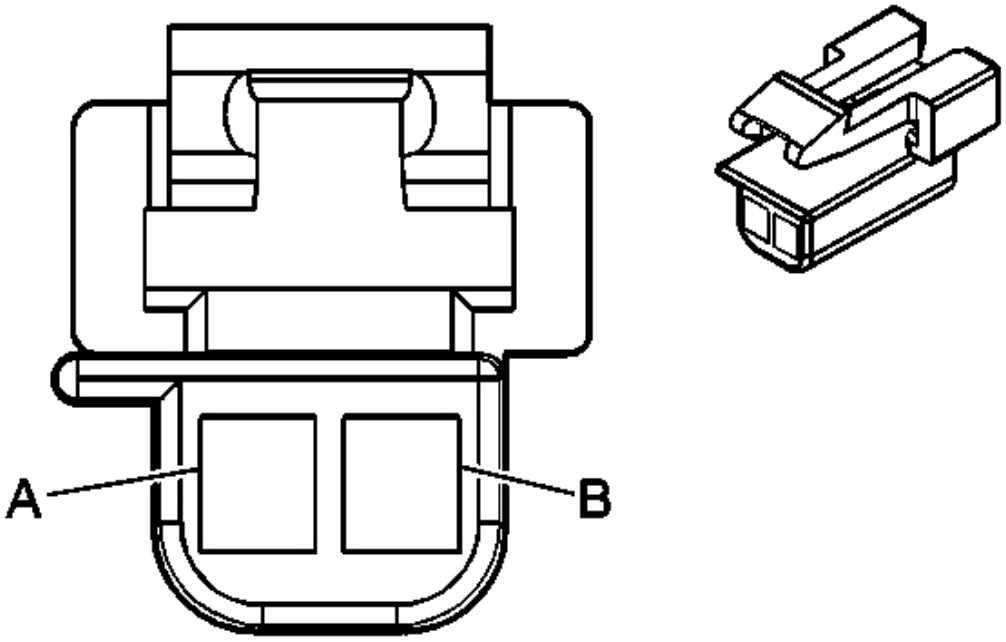


Fig. 90: Speaker - RR Door (Z88+UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR Door (Z88+UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12064869
- Service: 12117323
- Description: 2-Way F Metri-Pack 150 Series (BU)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR Door (Z88+UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 L-BU	115	Right Rear Speaker Output (-)
B	0.8 D-BU	46	Right Rear Speaker Output (+)

Speaker - RR Door (WDA+UQF)

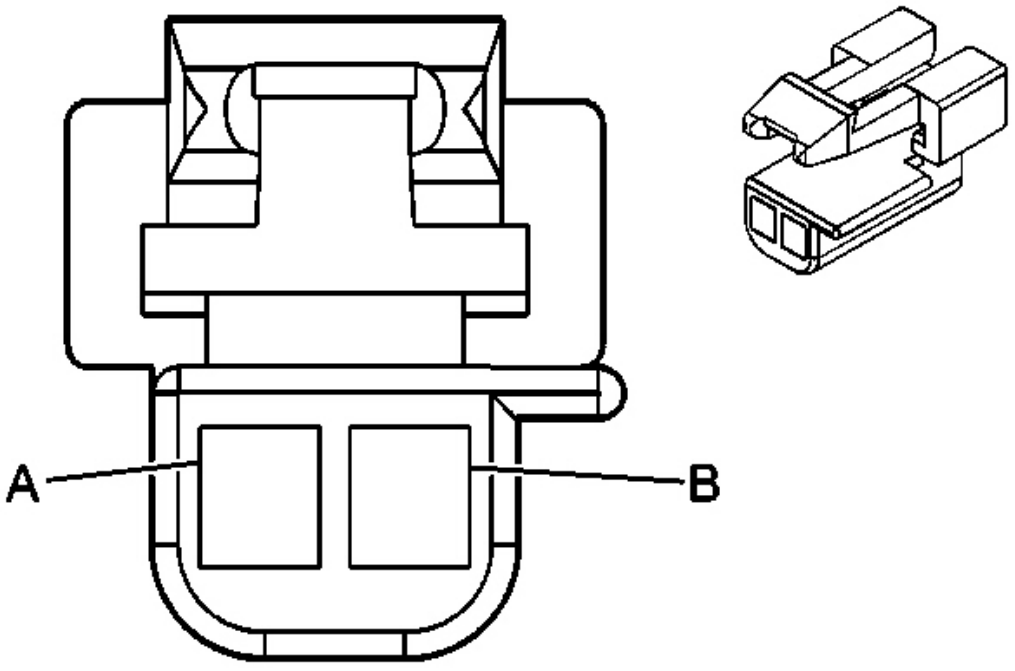


Fig. 91: Speaker - RR Door (WDA+UQF) Connector End View

Courtesy of GENERAL MOTORS CORP.

Speaker - RR Door (WDA+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867
- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR Door (WDA+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 L-BU	115	Right Rear Speaker Output (-)
B	0.8 D-BU	46	Right Rear Speaker Output (+)

Speaker - RR Door (Z88+UQF)

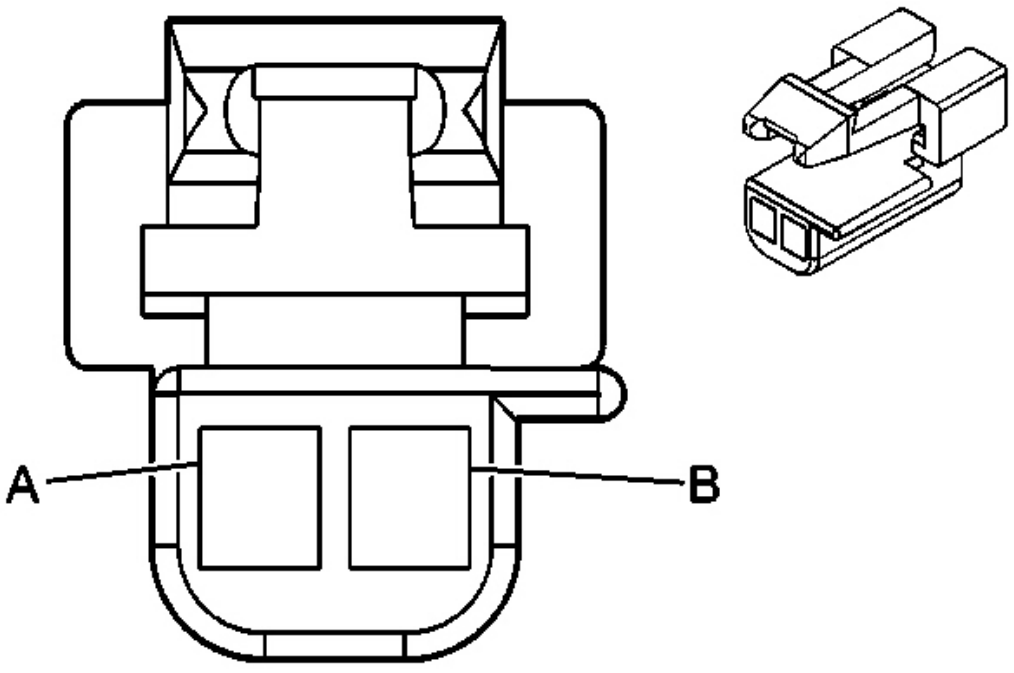


Fig. 92: Speaker - RR Door (Z88+UQF) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR Door (Z88+UQF) Connector Parts Information

Connector Part Information

- OEM: 12064867
- Service: 88987981
- Description: 2-Way F Metri-Pack 150 Series (NA)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR Door (Z88+UQF) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

A	0.8 L-BU	115	Right Rear Speaker Output (-)
B	0.8 D-BU	46	Right Rear Speaker Output (+)

Speaker - RR Door (WDA+UQG)

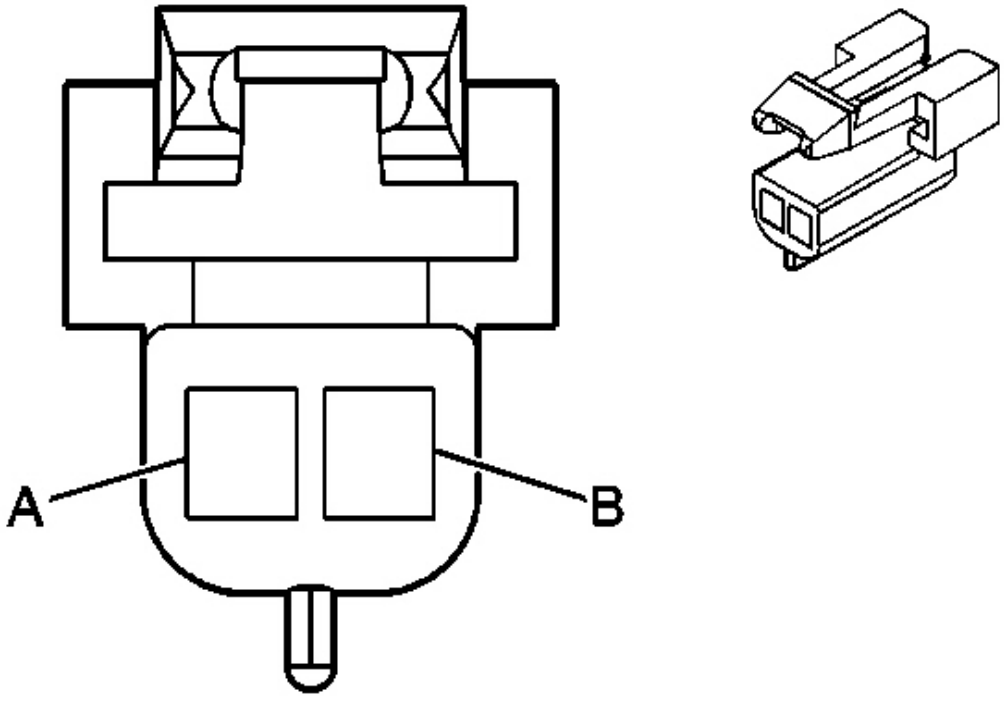


Fig. 93: Speaker - RR Door (WDA+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR Door (WDA+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR Door (WDA+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 L-BU	115	Right Rear Speaker Output (-)
B	0.8 D-BU	46	Right Rear Speaker Output (+)

Speaker - RR Door (Z88+UQG)

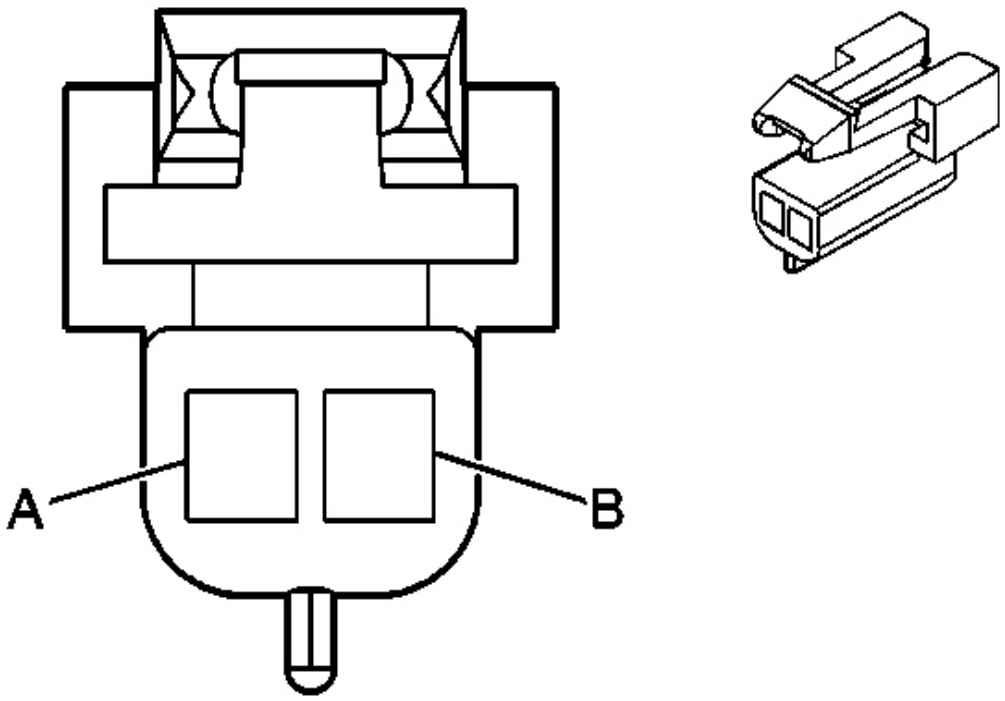


Fig. 94: Speaker - RR Door (Z88+UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - RR Door (Z88+UQG) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: 12047767/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-14 (GN)

Speaker - RR Door (Z88+UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.8 L-BU	115	Right Rear Speaker Output (-)
B	0.8 D-BU	46	Right Rear Speaker Output (+)

Speaker - Subwoofer (UQA/UQS)

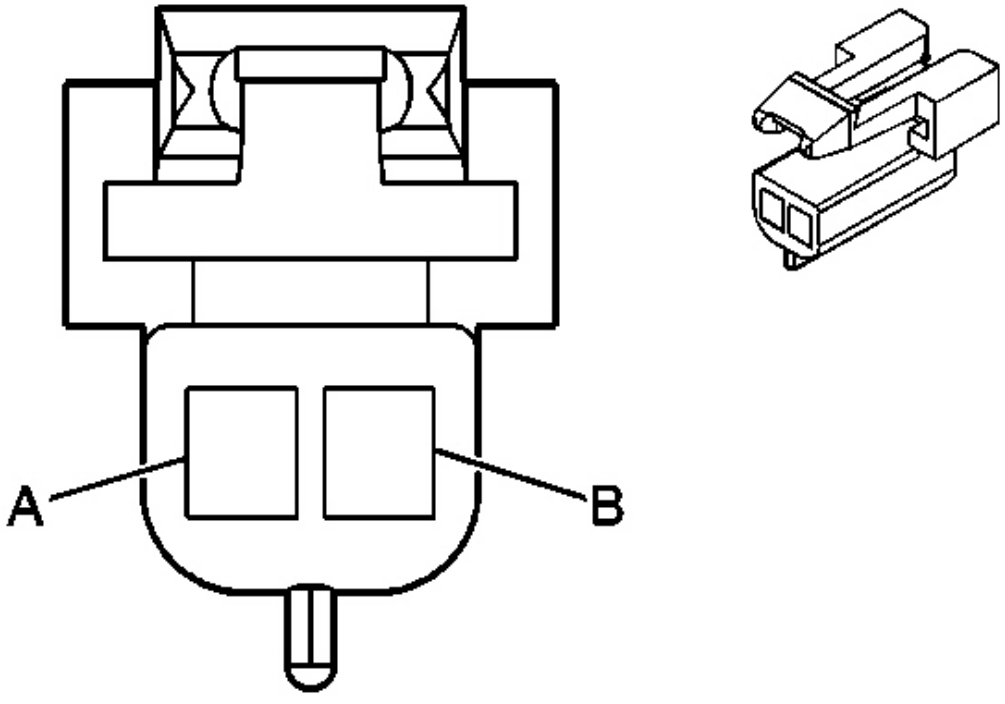


Fig. 95: Speaker - Subwoofer (UQA/UQS) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - Subwoofer (UQA/UQS) Connector Parts Information

Connector Part Information

- OEM: 12052832
- Service: 12101825
- Description: 2-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Speaker - Subwoofer (UQA/UQS) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	1 L-GN/BK	1794	Subwoofer Speaker Output (-)
B	1 D-BU/WH	346	Subwoofer Speaker Output (+)

Speaker - Subwoofer (UQG)

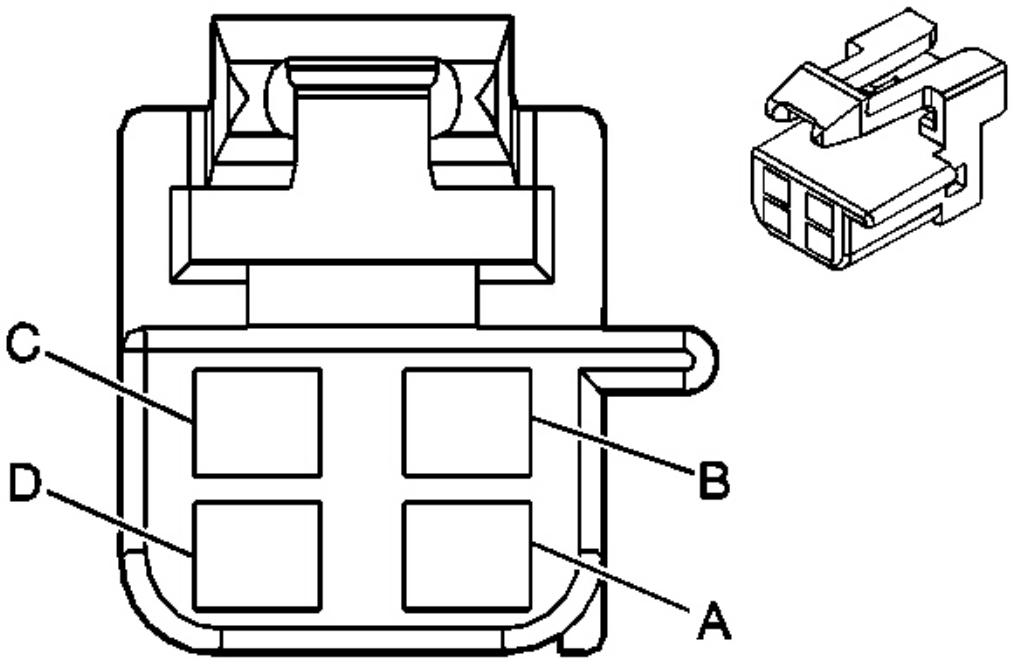


Fig. 96: Speaker - Subwoofer (UQG) Connector End View
Courtesy of GENERAL MOTORS CORP.

Speaker - Subwoofer (UQG) Connector Parts Information

Connector Part Information

- OEM: 12064760
- Service: 12085208
- Description: 4-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit

- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Speaker - Subwoofer (UQG) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.5 L-GN/BK	1794	Subwoofer Speaker Output (-)
B	0.5 D-BU/WH	346	Subwoofer Speaker Output (+)
C	0.5 L-BU/BK	315	Right Subwoofer Speaker Output (-)
D	0.5 D-GN	1795	Right Subwoofer Speaker (+)

Vehicle Communication Unit (VCU) X1 (WDA+UE1)

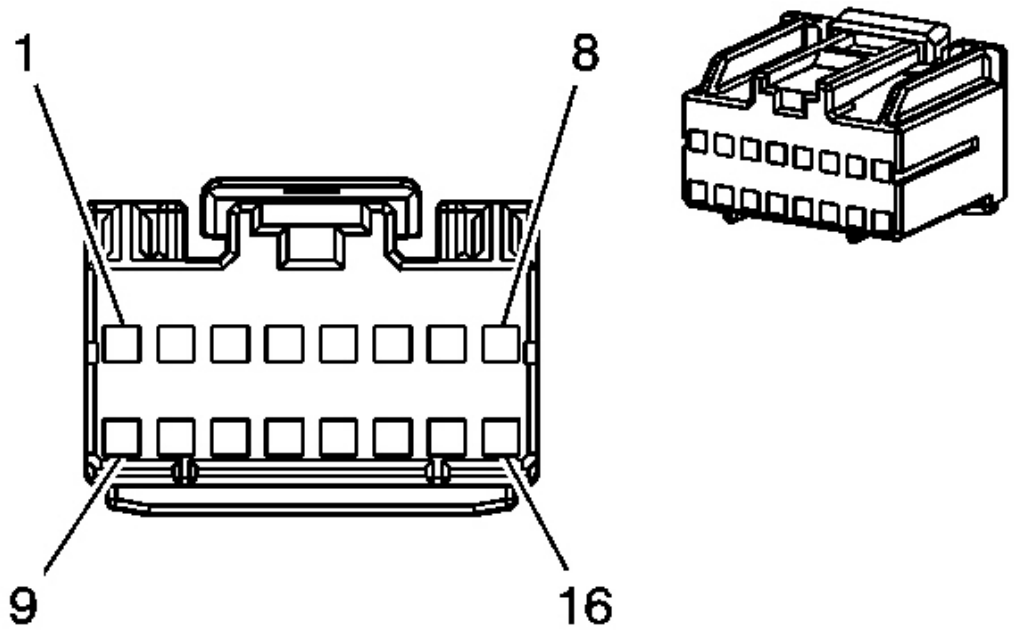


Fig. 97: Vehicle Communication Unit (VCU) X1 (WDA+UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Vehicle Communication Unit (VCU) X1 (WDA+UE1) Connector Parts Information

Connector Part Information

- OEM: 15431362
- Service: 15306351
- Description: 16-Way F Micro64 Unsealed (NA)

Terminal Part Information

- Pins: 1- 3, 6, 7, 10- 12, 15
- Terminal/Tray: 15445905/23
- Core/Insulation Crimp: Pins 1- 3, 6, 10- 12 - J/J
- Core/Insulation Crimp: Pins 7, 15 - K/K
- Release Tool/Test Probe: 12180559/J-35616-6 (BN)

Vehicle Communication Unit (VCU) X1 (WDA+UE1) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 D-GN	5060	Low Speed GMLAN Serial Data
2	0.35 BN/WH	2517	Keypad Red LED Signal
3	0.35 YE/BK	2516	Keypad Green LED Signal
4-5	-	-	Not Used
6	0.35 L-GN/BK	2515	Keypad Supply Voltage
7	0.8 BK/WH	351	Ground
8-9	-	-	Not Used
10	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
11	0.35 D-GN/WH	2514	Keypad Signal
12	0.35 TN	2501	High Speed GMLAN Serial Data Bus-
13-14	-	-	Not Used
15	0.8 RD/WH	4640	Battery Positive Voltage
16	-	-	Not Used

Vehicle Communication Unit (VCU) X1 (Z88+UE1)

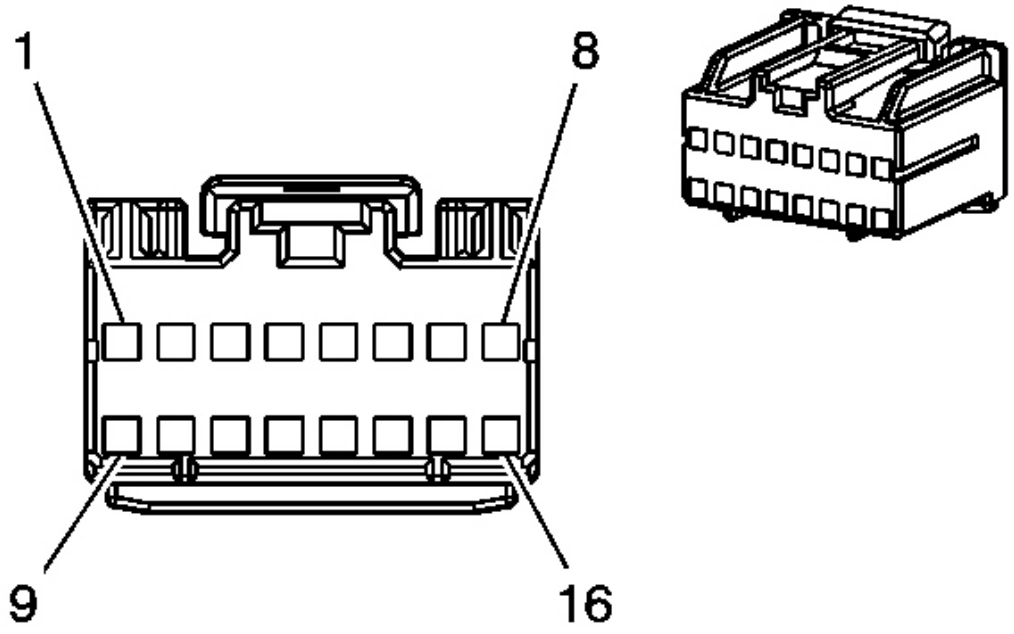


Fig. 98: Vehicle Communication Unit (VCU) X1 (Z88+UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Vehicle Communication Unit (VCU) X1 (Z88+UE1) Connector Parts Information

Connector Part Information

- OEM: 15431362
- Service: 15306351
- Description: 16-Way F Micro64 Unsealed (NA)

Terminal Part Information

- Pins: 1- 3, 6, 7, 10-12, 15
- Terminal/Tray: 15445905/23
- Core/Insulation Crimp: Pins 1- 3, 6, 10- 12 - J/J
- Core/Insulation Crimp: Pins 7, 15 - K/K
- Release Tool/Test Probe: 12180559/J-35616-6 (BN)

Vehicle Communication Unit (VCU) X1 (Z88+UE1) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 D-GN	5060	Low Speed GMLAN Serial Data
2	0.35 BN/WH	2517	Keypad Red LED Signal
3	0.35 YE/BK	2516	Keypad Green LED Signal
4-5	-	-	Not Used
6	0.35 L-GN/BK	2515	Keypad Supply Voltage
7	0.8 BK/WH	351	Ground
8-9	-	-	Not Used
10	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
11	0.35 D-GN/WH	2514	Keypad Signal
12	0.35 TN	2501	High Speed GMLAN Serial Data Bus-
13-14	-	-	Not Used
15	0.8 RD/WH	4640	Battery Positive Voltage
16	-	-	Not Used

Vehicle Communication Unit (VCU) X2 (WDA+UE1)

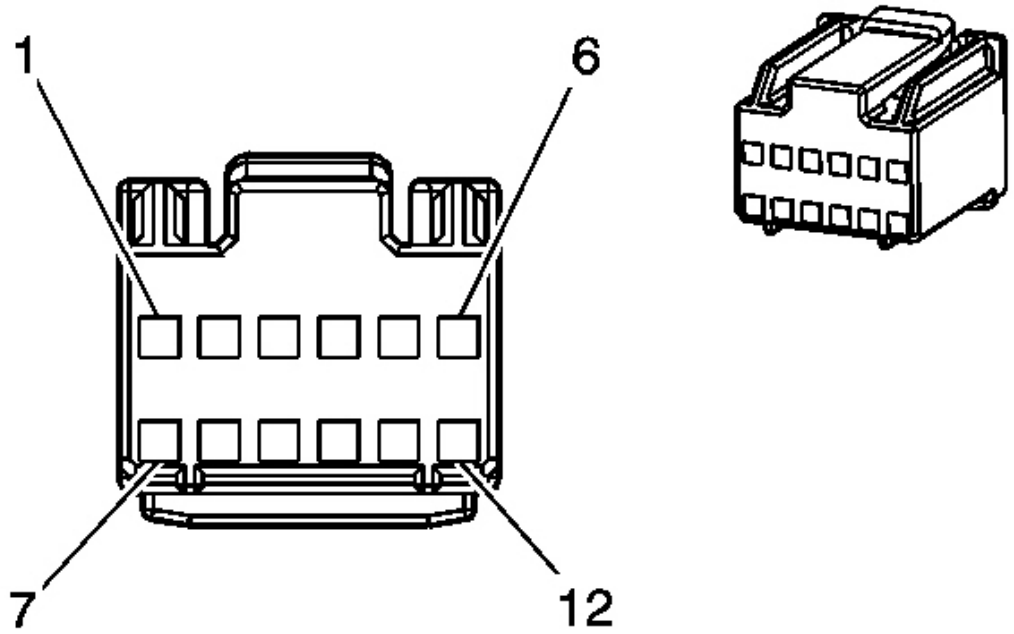


Fig. 99: Vehicle Communication Unit (VCU) X2 (WDA+UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Vehicle Communication Unit (VCU) X2 (WDA+UE1) Connector Parts Information

Connector Part Information

- OEM: 15431365
- Service: 88952886
- Description: 12-Way F Micro64 Series, Unsealed (NA)

Terminal Part Information

- Terminal/Tray: 15445905/23
- Core/Insulation Crimp: J/J
- Release Tool/Test Probe: 12180559/J-35616-6 (BN)

Vehicle Communication Unit (VCU) X2 (WDA+UE1) Connector Terminal Identification

Pin	Wire	Circuit No.	Function

1	0.35 OG/BK	1406	Remote Playback Device Left Audio Signal
2	0.35 L-BU	1405	Remote Playback Device Audio Common Signal
3	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
4	0.35 TN	2501	High Speed GMLAN Serial Data Bus-
5-7	-	-	Not Used
8	0.35 BARE	814	Drain Wire
9	0.35 GY	655	Cellular Microphone Signal
10	0.35 BARE	514	Ground
11-12	-	-	Not Used

Vehicle Communication Unit (VCU) X2 (Z88+UE1)

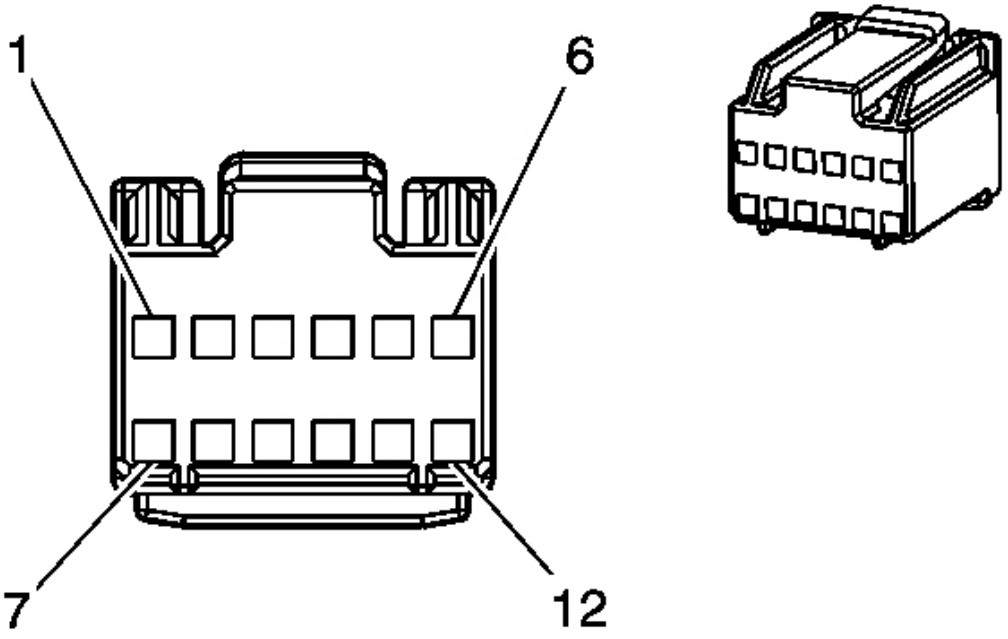


Fig. 100: Vehicle Communication Unit (VCU) X2 (Z88+UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Vehicle Communication Unit (VCU) X2 (Z88+UE1) Connector Parts Information

Connector Part Information

- OEM: 15431365
- Service: 88952886
- Description: 12-Way F Micro64 Series, Unsealed (NA)

Terminal Part Information

- Terminal/Tray: 15445905/23
- Core/Insulation Crimp: J/J
- Release Tool/Test Probe: 12180559/J-35616-6 (BN)

Vehicle Communication Unit (VCU) X2 (Z88+UE1) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 OG/BK	1406	Remote Playback Device Left Audio Signal
2	0.35 L-BU	1405	Remote Playback Device Audio Common Signal
3	0.35 TN/BK	2500	High Speed GMLAN Serial Data Bus+
4	0.35 TN	2501	High Speed GMLAN Serial Data Bus-
5-8	-	-	Not Used
9	0.35 GY	655	Cellular Microphone Signal
10	0.35 BARE	514	Ground
11-12	-	-	Not Used

Vehicle Communication Unit (VCU) X3 (WDA+UE1)

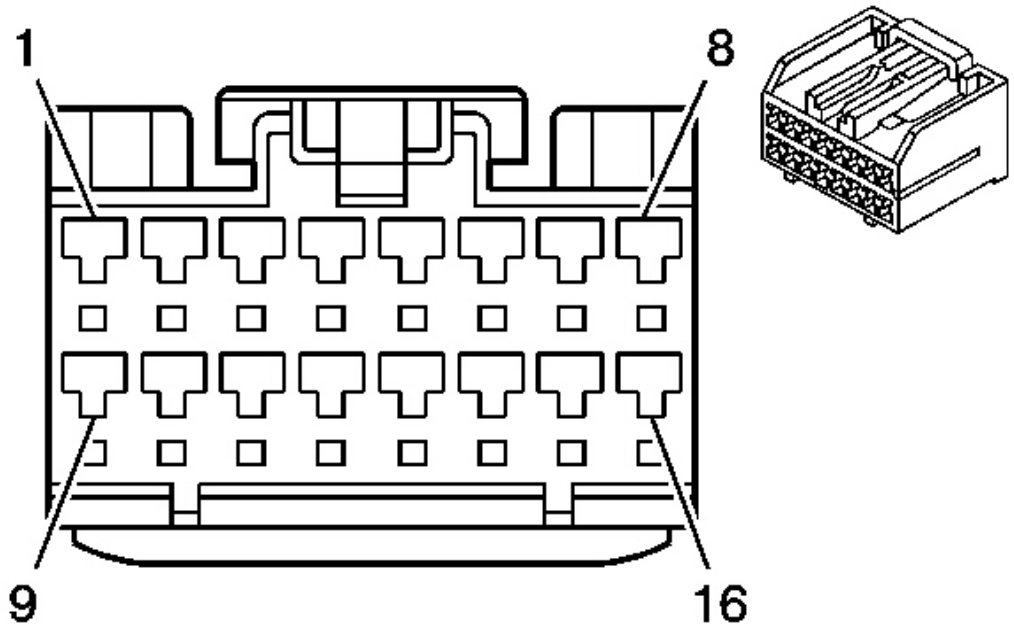


Fig. 101: Vehicle Communication Unit (VCU) X3 (WDA+UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Vehicle Communication Unit (VCU) X3 (WDA+UE1) Connector Parts Information

Connector Part Information

- OEM: 15431359
- Service: See Catalog
- Description: 16-Way F Micro 100A (GY)

Terminal Part Information

- Terminal/Tray: 175266-5/15
- Core/Insulation Crimp: J/J
- Release Tool/Test Probe: 15315247/J-35616-16 (L-GN)

Vehicle Communication Unit (VCU) X3 (WDA+UE1) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	-	-	Not Used

2	0.35 PK	5149	Voice Recognition Audio Signal (UE1+U3R/UZR)
3	-	-	Not Used
4	0.35 PK/BK	5152	Voice Recognition Audio Low Reference (UE1+U3R/UZR)
5	0.35 BARE	1792	Drain Wire (UE1+U3R/UZR)
6-16	-	-	Not Used

Vehicle Communication Unit (VCU) X3 (Z88+UE1)

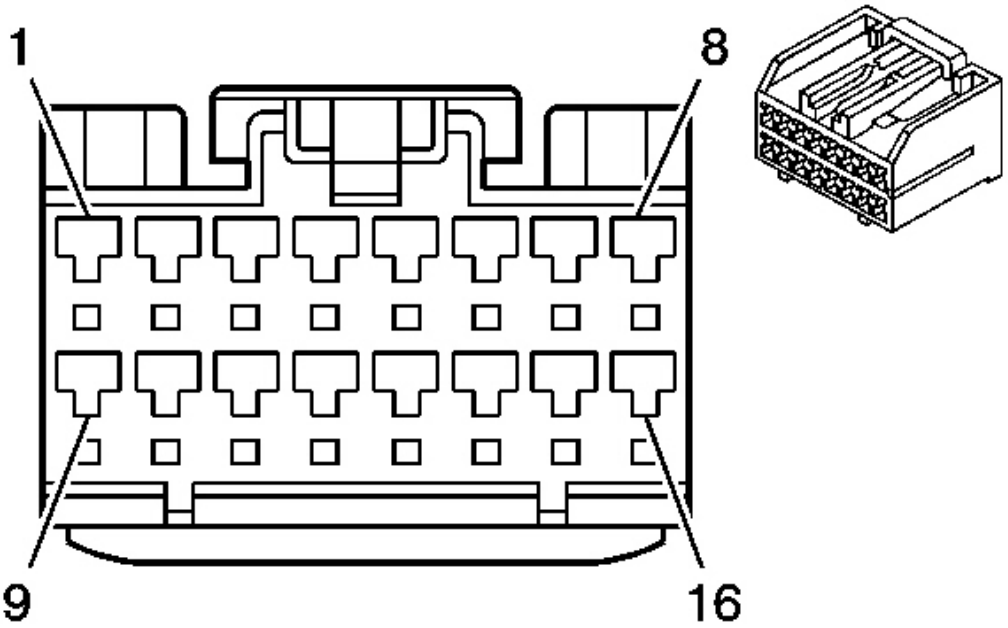


Fig. 102: Vehicle Communication Unit (VCU) X3 (Z88+UE1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Vehicle Communication Unit (VCU) X3 (Z88+UE1) Connector Parts Information

Connector Part Information

- OEM: 15431359
- Service: See Catalog

- Description: 16-Way F Micro 100A (GY)

Terminal Part Information

- Terminal/Tray: 175266-5/15
- Core/Insulation Crimp: J/J
- Release Tool/Test Probe: 15315247/J-35616-16 (L-GN)

Vehicle Communication Unit (VCU) X3 (Z88+UE1) Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	-	-	Not Used
2	0.35 PK	5149	Voice Recognition Audio Signal (UE1+U3R/UZR)
3	-	-	Not Used
4	0.35 PK/BK	5152	Voice Recognition Audio Low Reference (UE1+U3R/UZR)
5	0.35 BARE	1792	Drain Wire (UE1+U3R/UZR)
6-16	-	-	Not Used

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B0000	Vehicle Speed Information Circuit Plausibility Failure
DTC B1024 (With Bose Amplifier)	Circuit Board Temperature Sensor Above Maximum Threshold
DTC B1025-B1095	Audio Output 1 Or 2 Left Front Circuit Malfunction(s)
DTC B1259	Antenna Ground Circuit Short to Battery, Ground Or Open
DTC B1287	Amplifier Control Signal Circuit Short to Battery, Ground Or Open
DTC B1288	Video Display Mode Control Signal Short to Battery, Ground Or Open
DTC B1289	Video Display Brightness Control Signal Short to Battery, Ground Or Open
DTC B2455	Cellular Phone Microphone Circuit
DTC B2462	Global Positioning System (GPS) Short to Ground Or Open

	Circuit
DTC B2470	Cellular Phone Antenna Circuit Malfunction
DTC B2474	Navigation Display Head Backlighting Performance
DTC B2476	Cellular Phone Select Service Switch Malfunction
DTC B2482	Cellular Phone Select Service Switch Range/Performance
DTC B2483 or B2484	GPS Sensor Circuit Low Or Open
DTC U1500	Inter-Device Dedicated Bus Malfunction

DIAGNOSTIC STARTING POINT - CELLULAR, ENTERTAINMENT AND NAVIGATION

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

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

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

SCAN TOOL OUTPUT CONTROLS

Amplifier (Bose)

Scan Tool Output Control	Additional Menu Selections	Description
Center IP Speaker	Front Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Left Front Tweeter	Front Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.

Left Front Door Speaker	Front Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Right Front Door Speaker	Front Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Right Front Tweeter	Front Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Left Rear D-Pillar Speaker	Rear Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Left Rear Door Speaker	Rear Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Rear Subwoofer	Rear Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF

		all speakers.
Right Rear D-Pillar Speaker	Rear Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Right Rear Door Speaker	Rear Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.

Radio

Scan Tool Output Control	Additional Menu Selections	Description
Left Front Speaker	Front Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Right Front Speaker	Front Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.
Left Rear Speaker	Rear Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.

Left Rear Speaker	Rear Speakers	• Commanding the speaker ON will turn OFF all speakers except this speaker. • Commanding the speaker ON will produce a tone heard from this speaker. • Commanding the speaker OFF will turn OFF all speakers.

Rear HVAC/RSA Module

Scan Tool Output Control	Additional Menu Selections	Description
Display Test	Special Functions	The Rear HVAC/RSA module will illuminate all indicators and display segments on the module display.
Infrared Transmitter Power Control	Special Functions	The Rear HVAC/RSA module will activate the infrared transmitter, which sends wireless signals to the RSA headphones.

Vehicle Communication Interface Module (VCIM)

Scan Tool Output Control	Additional Menu Selection(s)	Description
Green LED	-	The VCIM illuminates the green LED on the inside rearview mirror when ON is selected.
Phone Call Test	-	When ON is selected VCIM commands OnStar to connect to OnStar Center.
Red LED	-	The VCIM illuminates the red LED on the inside rearview mirror when ON is selected.

SCAN TOOL DATA LIST

Amplifier (Bose)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Radio ON			
Base Model Part Number	Module Information	Numeric	Varies
Battery Voltage	Data	Volts	Varies
Calculated System Temperature	Data	Celsius	Varies

Component Serial No. 13-16	Module Information	Numeric	Varies
End Model Part Number	Module Information	Numeric	Varies
Software Part Number	Module Information	Numeric	Varies
Julian Date of Build	Module Information	Numeric	Varies
Year Module Built	Module Information	Numeric	Varies

Vehicle Communication Interface Module (VCIM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON with Engine OFF			
8-Digit GM Part Number	Module 2	8 Digits	Varies
Component Serial Number 13-16	Module 1	4 Digits	Varies
Date	GPS Data	Date	DD/MM/YY
Electronic Serial Number	Module 2	11 Digits	Varies
GPS Signal	GPS Data	Yes/No	Yes
Julian Date of Build	Module 1	3 Digits	Varies
Module ID	Module 2	Alpha-numeric	Varies
Signal Strength	Signal Strength	0-100	68
Signal Type	Signal Strength	Analog/Digital	Digital
Software ID	Module 1	3 Digits	Varies
Time	GPS Data	Time	HH:MM:SS
Transceiver ID	Signal Strength	2-5 Digits	Varies
VCI Module Station ID	Module 2	10 Digits	Varies
Year Module Built	Module 1	4 Digits	Varies

Digital Radio Receiver

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Radio ON			
8-Digit GM Part Number	Module Information	Numeric	Varies

Component Serial No.	Module Information	Numeric	Varies
Battery Voltage	Module Information	Volts	Varies
Ignition Counter	Module Information	Numeric	Varies
Power Mode	Module Information	Alphanumeric	Run
Radio ID	Module Information	Numeric	Varies
VIN Information	Module Information	Alphanumeric	Varies

Rear HVAC/RSA

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Radio ON			
Base Model Part Number	Module Information	Numeric	Varies
Battery Voltage Signal	Data	Volts	Varies
Component Serial No. 13-16	Module Information	Numeric	Varies
Julian Date of Build	Module Information	Numeric	Varies
Rear Audio Seek Down Switch	Data	Inactive/Active	Varies
Rear Audio Seek Up Switch	Data	Inactive/Active	Varies
Software Part Number	Module Information	Numeric	Varies
Source Button	Data	Inactive/Active	Audio Source
Year Module Built	Module Information	Numeric	Varies

Radio

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Radio ON			
Antenna Module	Data	Enabled/Disabled	Enabled

Auxiliary Audio Input	Data	Present/Not Present	Varies
Base Model Part Number	Module Information	Numeric	Varies
Battery Voltage Signal	Data	Numeric	Varies
CD S.W. Level	CD/DVD/Map Information	-	-
CD H.W. Level	CD/DVD/Map Information	-	-
Component Serial No. 13-16	Module Information	Numeric	Varies
DRR	Data	Present/Not Present	Varies
DVD H/W Part Number	CD/DVD/Map Information	Numeric	-
DVD S/W Part Number	CD/DVD/Map Information	Numeric	-
End Model Part Number	Module Information	Numeric	Varies
Ign. Cycles Since Last	Data	Numeric	Varies
Julian Date of Build	Module Information	Numeric	Varies
Navigation Software Version	CD/DVD/Map Information	Numeric	Varies
Navigation Hardware Level	CD/DVD/Map Information	Numeric	Varies
Phone Signal	Data	Present/Not Present	Varies
Power Mode	Data	Off/Accessory/Run/Crank Request	Run
Power Mode Config.	Data	Bench/Normal Mode	Normal
Signal Strength	Data	Numeric	19
Software Part Number	Module Information	Numeric	Varies
Theft Armed	Data	No VIN/Learned VIN	Learned VIN
Theft Lock Status	Data	Active/Inactive	Inactive
Video Display	Data	Present/Not Present	Varies
Year Module Built	Module Information	Numeric	Varies

SCAN TOOL DATA DEFINITIONS

8-Digit GM Part Number

This displays the part number for the vehicle communication interface mode (VCIM).

Antenna Module

This displays if the vehicle is equipped with an antenna module.

Auxiliary Audio Input

This displays present if an auxiliary audio device is connected to the radio.

Base Model Part Number

Part number of the module hardware only.

Battery Voltage

Battery voltage received at the module.

Calculated System Temperature

The amplifier calculates the internal operating temperature based off operating time and volume.

CD H.W. Level

This displays the compact disk hardware level.

CD S.W. Level

This displays the compact disk software level.

Component Serial Number 13-16

This is the third partition of the serial number.

Date

This is the date as synchronized with global positioning system (GPS) satellites.

DRR

This parameter displays present if the vehicle is equipped with a digital radio receiver.

DVD H/W Part Number

This displays the DVD player hardware level.

DVD S/W Part Number

This displays the DVD player software level.

Electronic Serial Number

This is the electronic serial number stored in the VCIM which is used by the OnStar® Call Center.

End Model Part Number

Part number of module with software.

GPS Signal

This displays the status of a received GPS signal.

Ign. Cycles Since Last DTC

This displays the number of times the ignition has been cycled from the OFF to ON position since the last DTC was set.

Ignition Counter

This displays the number of times the ignition has been cycled from the OFF to ON position.

Julian Date of Build

This displays the day of the year the module was built.

Module ID

This displays the version of OnStar® which the vehicle is equipped with.

Navigation Hardware Level

This displays the navigation hardware version.

Navigation Software Version

This displays the navigation software version.

Phone Signal

This verifies if the VCIM has phone reception.

Power Mode

This displays the status of the vehicle power mode (ignition switch).

Radio ID

This displays the version of radio the vehicle is equipped with.

Rear Audio Seek Down Switch

This displays active when the rear audio seek down switch button is pressed and then inactive when released.

Rear Audio Seek Up Switch

This parameter displays active when the rear audio seek up switch button is pressed and then inactive when released.

Signal Strength

This displays a calculated value for cellular reception signal strength. A higher number indicates a stronger signal.

Signal Type

This displays whether the Generation 6 OnStar® VCIM is currently operating in a digital or analog market.

Software ID

This displays the 3-digit number of the software version used on the OnStar® VCIM.

Software Part Number

The part number of the software currently installed in the module.

Source Button

This displays active when the source button is pressed and then inactive when released.

Theft Lock Status

This displays if theft lock is active.

Time

This displays the time as synchronized with GPS Satellites.

Transceiver ID

This displays the ID number of the cellular tower that the OnStar® VCIM is using for cellular signal.

Video Display

This displays present when the vehicle is equipped with a rear seat entertainment system.

VIN Information

This displays the vehicle VIN number stored in the module.

VCI Module Station ID

This is the station identification number stored in the VCIM which is used by the OnStar® Call Center.

Year Module Build

This displays the year the module was built.

DTC B0000

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 B0000 5A

Vehicle Speed Information Circuit Plausibility Failure

Circuit/System Description

The radio receives a vehicle speed signal from the electronic brake control module (EBCM) in order to correlate actual vehicle speed to the movement of the vehicle calculated by the navigation system and reported serial data.

Conditions for Running the DTC

The radio is in ACCESSORY, RUN or RAP power mode.

Conditions for Setting the DTC

The DTC will set for one or more of the following conditions.

- Vehicle speed from serial data is more than 5 km/h (3 mph) and vehicle speed pulse from the EBCM is 0 km/h (0 mph).
- Vehicle speed calculated from the navigation processing software is more than 36 km/h (22 mph) and vehicle speed pulse from the EBCM is 0 km/h (0 mph) for 10 seconds continuously.

Action Taken When the DTC Sets

No action taken.

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

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Testing

Test or repair open, short to ground or short to voltage on the vehicle speed sensor circuit.

- If all circuits test normal, replace the EBCM.

Repair Procedures

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

Control Module References for EBCM replacement, setup and programming

DTC B1024 (WITH BOSE AMPLIFIER)

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

Circuit/System Description

The internal amplifier circuitry is monitored for temperature. If the amplifier senses an overheat condition higher than 95°C (203°F) of the internal circuitry, the amplifier will shut down until the internal circuitry cools below 90°C (194°F).

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

Amplifier senses an over-heat condition higher than 95°C (203°F) of the internal circuitry.

Action Taken When the DTC Sets

Amplifier mutes all speaker channels.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Verification

The amplifier should operate normally at a reasonably high volume for an extended period of time.

Circuit/System Testing

Extended use of extremely high volume, especially in warm weather conditions, may induce this DTC. Under these conditions it may be normal for this DTC to set to prevent permanent damage to the amplifier circuitry. If DTC persists without excessive volume, replace the amplifier.

Repair Procedures

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

Control Module References for audio amplifier replacement, setup and programming

DTC B1025-B1095

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

DTC B1025 02

Audio Output 1 Left Front Circuit Short to Ground

DTC B1025 04

Audio Output 1 Left Front Circuit Open

DTC B1035 01

Audio Output 2 Right Front Circuit Short to Battery

DTC B1035 02

Audio Output 2 Right Front Circuit Short to Ground

DTC B1035 04

Audio Output 2 Right Front Circuit Open

DTC B1045 01

Audio Output 3 Left Rear Circuit Short to Battery

DTC B1045 02

Audio Output 3 Left Rear Circuit Short to Ground

DTC B1045 04

Audio Output 3 Left Rear Circuit Open

DTC B1055 01

Audio Output 4 Right Rear Circuit Short to Battery

DTC B1055 02

Audio Output 4 Right Rear Circuit Short to Ground

DTC B1055 04

Audio Output 4 Right Rear Circuit Open

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 B1075 04

Audio Output 6 Circuit Open (Subwoofer)

DTC B1085 01

Audio Output 7 Circuit Short to Battery (LR D-Pillar)

DTC B1085 02

Audio Output 7 Circuit Short to Ground (LR D-Pillar)

DTC B1085 04

Audio Output 7 Circuit Open (LR D-Pillar)

DTC B1095 01

Audio Output 8 Circuit Short to Battery (RR D-Pillar)

DTC B1095 02

Audio Output 8 Circuit Short to Ground (RR D-Pillar)

DTC B1095 04

Audio Output 8 Circuit Open (RR D-Pillar)

Diagnostic Fault Information

DTC B1025-B1095

	Short to	Open/High	Short to	Signal

Circuit	Ground	Resistance	Voltage	Performance
Left Front Speaker Signal Circuits (Front Door and Tweeter)	B1025 02	B1025 04	B1025 01	-
Right Front Speaker Signal Circuits (Front Door and Tweeter)	B1035 02	B1035 04	B1035 01	-
Left Rear Speaker Signal Circuits (Rear Door)	B1045 02	B1045 04	B1045 01	-
Right Rear Speaker Signal Circuits (Rear Door)	B1055 02	B1055 04	B1055 01	-
Front Center Speaker Signal Circuits (Center IP)	B1065 02	B1065 04	B1065 01	-
Subwoofer Low Level Audio Signal Circuits (Center Console)	B1075 02	B1075 04	B1075 01	-
Left Midrange Speaker Signal Circuits (LR D-Pillar)	B1085 02	B1085 04	B1085 01	-
Right Midrange Speaker Signal Circuits (RR D-Pillar)	B1095 02	B1055 04	B1095 01	-

Circuit/System Description

The up-level radio (UQA) supplies 4 channels of audio to an amplifier. The amplifier supplies 6 input signal channels to 8 speakers.

Conditions for Running the DTC

The radio is ON.

Conditions for Setting the DTC

Set by Radio

The radio sets a current status for this DTC when a short to ground, short to voltage or an open is detected on any of the 4 speaker channel outputs from the radio.

Set by Bose Amplifier

The DTC will not set during normal amplifier operation. The vehicle must have the ignition OFF for several hours and the fault must be present during amplifier power-up.

Action Taken When the DTC Sets

No sound is present from one or more of the speakers.

Conditions for Clearing the DTC

Set by Radio

The fault condition becomes history if not present for 0.25 seconds.

Set by Bose Amplifier

The fault condition becomes history after the vehicle ignition has been OFF for several hours and then the ignition turns ON.

Diagnostic Aids

Speakers located in the front A-pillar are connected to the same channel as the speaker in the door. A DTC will only set after the amplifier only on up-level radios.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Verification

Set by Radio

All speakers should function properly and the DTC does not reset.

Set by Bose Amplifier

1. Clear the DTC with the scan tool.
2. Disconnect the battery for 30 seconds and then reconnect the battery.
3. Ignition ON, all speakers should function properly and the DTC does not reset.

Circuit/System Testing

IMPORTANT: The DTC can be set by either the radio or the amplifier. If the DTC was set by the radio, diagnose suspect audio input circuits to the speakers or the amplifier (if equipped). Diagnose audio input signals to the speakers from the amplifier if the DTC was set by the amplifier.

DTC Set In Amplifier

1. With the scan tool, verify the DTC is set by the amplifier.
2. Ignition OFF, disconnect the suspect speaker. Test for 1-50 ohms across the speaker terminals.
    - If not within the specified range specified range replace the suspect speaker.
3. Disconnect the suspect audio amplifier harness connector.
4. Test for less than 1 volt on both of the suspect speaker output circuits.
    - If greater than 1 volt repair short to voltage.
5. Test for infinite resistance between both of the suspect speaker output circuits and ground.
    - If resistance is less than specified value, repair short to ground.
6. Test for less than 1 ohm between suspect speaker output circuits amplifier harness connector and the suspect speaker harness connector.
    - If greater than specified value repair open or high resistance.

- If all circuits test normal, replace the amplifier.

DTC Set In Radio With Amplifier

1. With the scan tool, verify the DTC is set by the radio.
2. Disconnect the suspect audio amplifier harness connector.
3. Disconnect the radio harness connector.
4. Test for less than 1 volt on both of the suspect low level audio signal circuits.
    - If greater than 1 volt repair short to voltage.
5. Test for infinite resistance between both low level audio signal circuits and ground.
    - If less than specified value, repair short to ground.
6. Test for less than 1 ohm between the suspect low level audio signal circuits amplifier harness connector and the suspect speaker harness connector.
    - If greater than specified value repair open or high resistance.

- If all circuits test normal, replace the amplifier.

DTC Set In Radio Without Amplifier

1. With the scan tool, verify the DTC is set by the radio.
2. Ignition OFF, disconnect the suspect speaker. Test for 1-50 ohms across the suspect speaker terminals.
    - If not within the specified range specified range replace the suspect speaker.
3. Disconnect the suspect radio harness connector.
4. Test for less than 1 volt on both of the low level audio signal circuits.
    - If greater than 1 volt repair short to voltage.
5. Test for infinite resistance between both of the suspect low level audio signal circuits and ground.
    - If resistance is less than specified value, repair short to ground.
6. Test for less than 1 ohm between the suspect speaker harness connector both low level audio signal circuits and the suspect radio harness connector.
    - If greater than specified value repair open or high resistance.

- If all circuits test normal, replace the radio.

Repair Procedures

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

- **Speaker Replacement Reference**
- **Control Module References** for Amplifier and Radio replacement, setup and

programming

DTC B1259

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 B1259 02

Antenna Ground Circuit Short to Ground

DTC B1259 05

Antenna Ground Circuit Short to Battery or Open

Circuit/System Description

The antenna signal circuit is a coaxial cable that carries the radio signal information received by the antenna to the digital radio receiver (DRR).

Conditions for Running the DTC

This test is run every 300 milliseconds.

Conditions for Setting the DTC

The DRR detects an antenna fault.

Action Taken When the DTC Sets

The radio displays "No XM Signal" or "Check Antenna".

Conditions for Clearing the DTC

- The condition must be corrected.
- The DTC clears after 100 malfunction-free ignition cycles.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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 Testing

1. Ignition OFF, disconnect the DRR antenna coax cable from the DRR. Connect the test antenna to the DRR.
2. Turn the ignition ON, radio ON tuned to XM. Verify that DTC B1259 is not current.
    - If the DTC B1259 is still current, replace the DRR.
3. Ignition OFF, disconnect the radio antenna base from the DRR coaxial cable. Test the resistance of the DRR antenna coaxial cable center conductor from end to end. Verify the resistance is less than 5 ohms.
    - If the resistance is greater than 5 ohms, replace the DRR antenna coaxial cable.
4. Test the resistance of the DRR antenna coaxial cable outer shield from end to end. Verify the resistance is less than 5 ohms.
    - If the resistance is greater than 5 ohms, replace the DRR antenna coaxial cable.
5. Test the resistance of the DRR antenna coaxial cable between the center conductor and the outer conductor. Verify there is infinite resistance between both conductors.
    - If there is less than infinite resistance between the inner conductor and the outer conductor of the DRR antenna coaxial cable, replace the DRR antenna coaxial cable. If the DRR antenna coaxial cable tests normal, replace the radio antenna base.

Repair Procedures

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

- **Digital Radio Antenna Cable Replacement**
- **Radio Antenna Base Replacement**
- **Control Module References** for DRR replacement, setup and programming

DTC B1287

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

DTC B1287

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Amp Control	DTC B1287 02[2]	DTC B1287 04[2]	DTC B1287 01[1]	-
Remote Enable	DTC B1287 02[1]	DTC B1287 04[1]	DTC B1287 01[3]	-

[1] No audio output.

[2] 4 Channel unmute, possible noise in speakers when radio muted or turned off

[3] Possible parasitic draw with the ignition OFF.

Circuit/System Description

The radio provides a remote amp mute output circuit to control overall muting of remote amplifiers (UQA without Y91 only). The amplifier receives pulse width modulated (PWM) signals on the circuit at varying duty cycle percentages for controlling the muted and unmuted functions of the amplifier. The RSA enable circuit in the radio enables the rear seat channel muting of the amplifier. A diagnostic sense circuit internal to the radio monitors the remote amp mute circuit for faults and sets the appropriate DTC when detected.

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

Circuit failure 400 ms after radio activates Remote Enable.

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

Entertainment/Communication Connector End Views

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

Ignition OFF, test the amplifier control and remote enable signal circuits for an open, a short to voltage or a short to ground.

- If the circuit tests normal, replace the radio.

Repair Procedures

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

Control Module References for radio replacement, setup and programming

DTC B1288

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 B1288 01

Video Display Mode Control Signal Short to Battery

DTC B1288 02

Video Display Mode Control Signal Short to Ground

DTC B1288 04

Video Display Mode Control Signal Open

Diagnostic Fault Information

DTC B1288

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Video Display Mode Control Signal	B1288 02[1]	B1288 04[1]	B1288 01[1]	-
[1] Display mode will not change from Normal mode.				

Circuit/System Description

The radio can control the video display mode on vehicles equipped with rear seat entertainment (RSE) Video. The radio varies a pulse with modulated (PWM) signal to the rear entertainment video screen to command the display mode.

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

Circuit failure 400 ms after radio activates Remote Enable.

Action Taken When the DTC Sets

Radio sets the DTC and defaults the video display to Normal mode.

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

Video System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Verification

Verify the video will change display.

Circuit/System Testing

Without Third Row Display

1. Ignition OFF, disconnect the harness connector of the rear video display. Ignition ON, with a DMM verify there is 100 to 300 Hz on the video display mode control signal circuit.
    - If 100 to 300 Hz is not present on the video display mode signal circuit test for an open, a short to voltage or a short to ground. If the video display mode signal circuit tests normal, replace the radio.
2. If 100 to 300 Hz is present and the video display mode signal circuit tests normal, replace the rear video display.

With Third Row Display

1. With a scan tool clear the DTC. Ignition OFF, Disconnect the third row video display. Ignition ON, verify the DTC resets.
    - If the DTC does not reset, replace the third row video display.
2. Ignition OFF, disconnect the harness connector of the rear video display. Ignition ON, with a DMM verify there is 100 to 300 Hz on the video display mode control signal circuit.
    - If 100 to 300 Hz is present and the video display mode signal circuit tests normal, replace the front rear video display.

- If 100 to 300 Hz is not present on the video display mode signal circuit test for an open, a short to voltage or a short to ground. If the video display mode signal circuit tests normal, replace the radio.

Repair Procedures

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

Control Module References for radio replacement, setup and programming

DTC B1289

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 B1289 01

Video Display Brightness Control Signal Short to Battery

DTC B1289 02

Video Display Brightness Control Signal Short to Ground

DTC B1289 04

Video Display Brightness Control Signal Open

Diagnostic Fault Information

DTC B1289

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Video Display Brightness Control Signal	B1289 02[1]	B1289 04[1]	B1289 01[1]	-
1. Display will not change from full brightness.				

Circuit/System Description

The radio can control the video display brightness on vehicles equipped with rear seat entertainment (RSE) video. The radio varies a pulse with modulated (PWM) signal to the rear entertainment video screen to command the screen brightness.

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

Circuit failure 400 ms after radio activates Remote Enable.

Action Taken When the DTC Sets

Radio sets the DTC and defaults the video display to Full Brightness mode.

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

Video System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Verification

Verify the video will change display.

Circuit/System Testing

Without Third Row Display

1. Ignition OFF, disconnect the harness connector of the rear video display. Ignition ON, with a DMM verify there is 100 to 300 Hz on the video display brightness control signal circuit.
    - If 100 to 300 Hz is not present on the video display brightness control signal circuit test for an open, a short to voltage or a short to ground. If the video display brightness control signal circuit tests normal, replace the radio.
2. If 100 to 300 Hz is present and the video display brightness control signal circuit tests normal, replace the rear video display.

With Third Row Display

1. With a scan tool clear the DTC. Ignition OFF, Disconnect the third row video display. Ignition ON, verify the DTC resets.
    - If the DTC does not reset, replace the third row video display.
2. Ignition OFF, disconnect the harness connector of the rear video display. Ignition ON, with a DMM verify there is 100 to 300 Hz on the video display brightness control signal circuit.
    - If 100 to 300 Hz is present and the video display brightness control signal circuit tests normal, replace the front rear video display.
    - If 200 Hz is not present on the video display brightness control signal circuit test for an open, a short to voltage or a short to ground. If the video display brightness control signal circuit tests normal, replace the radio.

Repair Procedures

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

Control Module References for radio replacement, setup and programming

DTC B2455

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 Descriptor

DTC B2455 00

Cellular Phone Microphone Circuit

Circuit/System Description

The vehicle communication interface module (VCIM) detects that the cellular microphone is connected through the cellular microphone signal circuit and the drain wire.

Conditions for Running the DTC

- 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.
- All the above conditions are present for greater than 10 seconds.

Conditions for Setting the DTC

- The VCIM detects an open in the drain wire circuit or a short to voltage in the cellular microphone signal circuit.
- The above conditions are present for greater than 10 seconds.

Action Taken When the DTC Sets

- The VCIM will not receive any signal from the microphone.
- Calls can be placed but the caller cannot be heard.
- The OnStar® status LED turns red.

Conditions for Clearing the DTC

- The VCIM detects the microphone connected for 5 consecutive 100 millisecond cycles.
- A history DTC clears after 50 malfunction-free ignition cycles.
- The VCIM receives the clear DTC command from the scan tool.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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 Testing

1. Ignition OFF. Disconnect the harness connector at the cellular microphone and the harness connector C2 at the VCIM.
2. Test for less than 1 ohm of resistance between terminal A and terminal 10.
   - If greater than the specified value, test the drain wire circuit for an open/high resistance.
3. Reconnect the harness connector C2 at the VCIM.
4. Ignition ON, test for less than 9.5 volts at the signal circuit terminal B.
   - If greater than the specified value, test the signal circuit for a short to voltage. If the circuit tests normal, replace the VCIM.
5. If all circuits test normal, test or replace the cellular microphone.

Repair Procedures

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

- **Control Module References** for VCIM replacement, setup and programming
- **Mobile Telephone Microphone Replacement**

DTC B2462

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.

Conditions for Running the DTC

The radio must detect one of the following power modes:

- ACC
- ON
- RAP
- RAP UNLK

Conditions for Setting the DTC

- The navigation radio test the GPS antenna every 10 seconds.
- The radio determines there is an open in the GPS antenna.

Action Taken When the DTC Sets

- Unable to get GPS location updated, the radio uses the last reported position and the vehicle speed signal to calculate the vehicle position.
- Route guidance may be inaccurate.
- This failure has no effect outside the navigation system.

Conditions for Clearing the DTC

- A current DTC clears when the radio does not detect the failure for more than 10 seconds.
- A history DTC clears after 50 ignition cycles with no repeat of the failure.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Testing

1. Turn ON the ignition. Disconnect the GPS coaxial cable from the GPS antenna. Verify there is 4-5.5 volts between the center conductor and the shield of the coaxial cable.
    - If 4-5.5 volts are present, replace the GPS antenna.
2. Turn the ignition OFF. Disconnect the GPS coaxial cable from the radio. Test the resistance of the GPS coaxial cable center conductor from end to end. Verify the resistance is less than 5 ohms.
    - If the resistance greater than 5 ohms, replace the GPS coaxial cable.
3. Test the resistance of the GPS coaxial cable between the center conductor and the outer conductor. Verify there is infinite resistance between both conductors.
    - If there is less than infinite resistance between the inner conductor and the outer conductor of the GPS coaxial cable, replace the GPS coaxial cable. If the GPS coaxial cable tests normal, replace the radio.

Repair Procedures

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

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

- **Global Positioning System (GPS) Antenna Replacement**

DTC B2470

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 B2470 00

Cellular Phone Antenna Circuit Malfunction

Circuit/System Description

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

Conditions for Running the DTC

- 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.
- All 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 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 antenna.
- A history DTC clears after 50 malfunction-free ignition cycles.

- The VCIM receives the clear DTC command from the scan tool.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

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

- If the antenna assembly is damaged, replace the cellular antenna.

Component Testing

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

1. Disconnect the cellular antenna coax connector at the VCIM.
2. Test for infinite resistance between the center conductor and the outer metal shield of the cellular antenna coax cable.
    - If meter does not read infinite, replace the cellular antenna coax cable.
3. Test for less than 1 ohm of resistance at the cellular antenna coax connector from end to end.

- If greater than specified value, replace the cellular antenna coax cable.

4. If coax cable tests normal, test or replace the VCIM.

Repair Procedures

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

- **Radio Antenna Base Replacement**
- **Control Module References** for VCIM replacement, setup and programming

DTC B2474

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 B2474 07

Navigation Display Head Backlighting Performance

Circuit Description

The internal backlighting of the navigation display screen located in the navigation radio.

Conditions for Running the DTC

The radio must detect one of the following power modes:

- ACC
- ON
- RAP
- RAP UNLK

Conditions for Setting the DTC

- The navigation radio test the navigation display backlighting antenna every 1 second.
- The radio determines there is a malfunction or overheat condition in the navigation display

backlighting.

Action Taken When the DTC Sets

The navigation backlight may be too bright, dim or blank.

Conditions for Clearing the DTC

- A current DTC goes to history when the radio does not detect the failure for more than 1 second.
- A history DTC clears after 50 ignition cycles with no repeat of the failure.

Diagnostic Aids

Occasionally it is possible to overheat the navigation display backlighting due to excessive ambient heat inside the vehicle. In this instance it may be necessary to allow time for the display to cool.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Testing

1. Allow the navigation display to cool if the ambient temperature inside the vehicle is excessive and the radio is hot to the touch. Verify the navigation display is cool and the DTC has cleared and gone to history.
    - If the DTC has gone to history and the navigation display backlighting operates normal clear the DTC and go to **Diagnostic Aids**.

2. Observe the brightness of the navigation display backlighting. Verify the backlighting can be adjusted or the screen is not blank.
    - If the display backlighting is malfunctioning or the DTC will not clear, replace the radio.

Repair Procedures

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

Control Module References for radio replacement, setup and programming

DTC B2476

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 B2476 00

Cellular Phone Select Service Switch Malfunction

Circuit/System Description

The OnStar® button assembly consists of 3 buttons, Call/Answer, OnStar® Call Center and OnStar® Emergency. Ten volts is supplied to the button assembly on 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 vehicle communication interface module (VCIM) on the keypad signal circuit. Depending upon the voltage range returned, the VCIM is able to identify which button has been pressed.

Conditions for Running the DTC

- 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.
- All the above conditions are present for greater than 300 milliseconds.

Conditions for Setting the DTC

- The VCIM powers the button assembly through the keypad supply voltage circuit for 11.5 ms, turns the power OFF, then waits for 50 ms and sees a voltage value greater than 1.8 volts on this circuit.
- The above conditions are present for greater than 300 milliseconds.

Action Taken When the DTC Sets

- The VCIM will ignore all inputs from the OnStar® button assembly.
- No calls can be placed.
- The OnStar® status LED turns red.

Conditions for Clearing the DTC

- The VCIM powers the button assembly through the keypad supply voltage circuit for 11.5 ms, turns the power OFF, then waits for 50 ms and sees a voltage value less than 1.8 volts on this circuit.
- A history DTC clears after 50 malfunction-free ignition cycles.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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 Testing

1. Ignition OFF, disconnect the harness connector at the inside rearview mirror.
2. Test for greater than 1 ohm between the keypad supply voltage terminal 12 and ground.
   - If less than specified value, repair short to ground or replace the VCIM.
3. Ignition ON, test for 9.8-10.2 volts between keypad supply voltage terminal 12 and ground.
   - If less than the specified range, repair open circuit or replace the VCIM.
   - If greater than the specified range, repair short to voltage or replace the VCIM.
4. If all circuit test normal, replace the inside rearview mirror.

Repair Procedures

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

- **Rearview Mirror Replacement**
- **Control Module References** for VCIM replacement, setup and programming

DTC B2482

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 B2482 00

Cellular Phone Select Service Switch Range/Performance

Circuit/System Description

The OnStar® button assembly consists of 3 buttons, Call/Answer, OnStar® Call Center and OnStar® Emergency. Ten volts is supplied to the button assembly on the keypad supply voltage circuit. Each of the buttons, when pressed, completes the circuit across a resister allowing a specific voltage to be returned to the vehicle communication interface module (VCIM) on the keypad signal circuit. Depending upon the voltage range returned, the VCIM is able to identify which button has been pressed.

Conditions for Running the DTC

- 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.
- All the above conditions are present for greater than 15 seconds.

Conditions for Setting the DTC

- A button is pressed or stuck for more than 15 seconds.
- The above conditions are present for greater than 15 seconds.

Action Taken When the DTC Sets

- The VCIM will ignore all inputs from the OnStar® button assembly.
- No calls can be placed.
- The OnStar® status LED turns red.

Conditions for Clearing the DTC

- The button will be declared unstuck after a 50 millisecond normal cycle.
- A history DTC clears after 50 malfunction-free ignition cycles.
- The VCIM receives the clear DTC command from the scan tool.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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 Testing

1. Ignition OFF, disconnect the harness connector at the OnStar button assembly.
2. Ignition ON, test for less than 1 volt at the keypad signal terminal 11.
   - If greater than specified value, test the circuit for short to voltage. If the circuit tests normal, test or replace the VCIM.
3. Test for less than 1 ohm of resistance between the VCIM and OnStar button assembly.
   - If greater than specified value, test the circuit for open/high resistance or for short to ground.
4. If the circuit tests normal, test or replace the OnStar button assembly.

Repair Procedures

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

- **Rearview Mirror Replacement**
- **Control Module References** for VCIM replacement, setup and programming

DTC B2483 OR B2484

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 B2483 00

GPS Sensor Circuit Low

DTC B2484 00

GPS Sensor Circuit Open

Circuit/System Description

The navigation antenna is connected to the vehicle communication interface module (VCIM) with

a RG-174 coax cable. The VCIM polls the data from the navigation antenna once every second.

Conditions for Running the DTC

- 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.
- All the above conditions are present for greater than 1 second.

Conditions for Setting the DTC

- The VCIM does not detect a navigation signal.
- The above conditions are present for greater than 1 second.

Action Taken When the DTC Sets

- The OnStar® Call Center cannot locate the vehicle.
- The OnStar® status LED turns red.

Conditions for Clearing the DTC

- The VCIM detects the presence of a navigation antenna.
- A history DTC clears after 50 malfunction-free ignition cycles.
- The VCIM receives the clear DTC command from the scan tool.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

Observe that the cellular antenna and cellular antenna coupling assembly are not damaged.

- If it is damaged, replace the cellular antenna.

Component Testing

IMPORTANT: Using a DMM to measure the resistance of the navigation antenna coax from the center conductor to the outer shield while the antenna is still connected will damage the navigation antenna.

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

1. Disconnect the navigation antenna coax connector from the navigation antenna.
2. Test for infinite resistance between the center conductor of the coax to the metal outer shield.
    - If not specified value, replace the navigation antenna coax.
3. Test for less than 1 ohm resistance of navigation antenna coax connector from end to end.
    - If not specified value, replace the navigation antenna coax.
4. If cellular antenna coax tests normal, test or replace the VCIM.

Repair Procedures

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

- **Radio Antenna Base Replacement**
- **Control Module References** for VCIM replacement, setup and programming

DTC U1500

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 U1500

Inter-Device Dedicated Bus Malfunction

Circuit/System Description

This DTC indicates an internal fault and is set within the vehicle communication interface module (VCIM). No external circuits are involved.

Conditions for Running the DTC

The microprocessor runs the program to detect an internal fault during module power up and every 10 seconds thereafter until the module re-enters the sleep mode.

Conditions for Setting the DTC

The VCIM detects an internal communication malfunction.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- A current DTC clears when the malfunction is no longer present.
- A history DTC clears after 50 malfunction-free ignition cycles.

Diagnostic Aids

The diagnostic procedure used for DTC U1500 in OnStar® systems with single module generations of OnStar® differ greatly from previous generations with 2 modules. While these older generations denoted a failure of the 3 wire bus between the modules by setting a U1500, single module OnStar® systems use this DTC to denote an internal module failure. The determination of whether a 1 or 2 module generation of OnStar® is used should be confirmed. Refer to **OnStar Description and Operation**.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Verification

1. Ignition ON, verify DTC U1500 is set as current.
   - If DTC U1500 is not current, refer to **Testing for Intermittent Conditions and Poor Connections** .
2. Replace the VCIM.

Repair Procedures

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

Control Module References for VCIM replacement, setup and programming

SYMPTOMS - CELLULAR COMMUNICATION

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 **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:

- **Global Positioning System (GPS) Data Not Current or Inaccurate**
- **Microphone Inoperative - Caller Cannot Be Heard**
- **No (or Noisy) OnStar Audio**
- **OnStar Button LED Inoperative**
- **OnStar Call Center Remote Function Requests Inoperative**
- **OnStar One or More Buttons Inoperative**
- **Unable to Contact OnStar Call Center**
- **Voice Recognition Inoperative**

SYMPTOMS - ENTERTAINMENT

IMPORTANT: 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 the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Radio Poor Reception**
- **Digital Radio Poor or No Reception**
- **Audio Distortion - One or More Speakers**
- **Radio Displays LOC, LOCKED or CODE**
- **Radio Displays CAL or CAL ERR**
- **Reduced Volume - One or More Speakers**
- **Noise Compensated Volume Inoperative**
- **Speakers Inoperative - One or More**

AUDIO SYSTEM TROUBLESHOOTING HINTS

Many conditions that affect radio operation may be corrected without removing the radio from the car. Verify the condition and follow the diagnostic procedures in order to isolate and correct the condition. In order to properly diagnose any audio system problems, ensure that you have a fully charged battery.

Preliminary Inspections

IMPORTANT: When testing the audio system for poor reception or noise, the vehicle should be outside away from metal buildings and utility lines, with the hood and rear compartment closed.

- Check for any aftermarket equipment that may have been installed on the vehicle. If aftermarket equipment is found disconnect it and check if the audio noise is still present.

  Inspect that the antenna connector and the antenna coaxial cable are clean and tight.

- For reception concerns, first determine if the customer is within the listening area of the stations they are attempting to receive.
- Stations at the lower end of the FM band are more susceptible to audio noises than stations

at the higher end.

- If the noise is only from one speaker check for the following before speaker replacement:
  - Isolate the noise using the **J 39916-A** CD and Cassette Diagnostic Audio Kit. See **Special Tools**.
  - Inspect the speaker connections to ensure they are clean and tight. Refer to **Testing for Intermittent Conditions and Poor Connections** .
  - Inspect for a loose or incorrectly installed speaker or surrounding trim. Loose trim can cause a buzz or flutter which sounds like a malfunctioning speaker.
- Ignition noise on the FM band may be an indication of an ignition system problem.
- Inspect that all vehicle grounds are clean, tight and free of corrosion.
- Inspect the rear defogger grid lines for large breaks or dark spots.
- Inspect the connections at the radio antenna module to ensure that they are clean and tight.
- Compare the customers vehicle to another of similar model and audio system to determine if the condition is abnormal.

Identifying Concerns

1. In order to isolate the source of the noise/poor reception, identify the ignition switch position that the concern is most noticeable:
   1. Turn the ignition switch to the accessory position.
   2. Turn ON the radio.
   3. Seek up 88-108 FM then 550-1600 AM.
   4. Record the number of valid radio stations where the tuner stops.
   5. Repeat these steps with the ignition ON and the engine OFF then again with the engine running.
2. Return the ignition switch to the position that the concern was most noticeable.
3. Remove fuses or circuit breakers one at a time until the noise has been eliminated.
4. Identify what systems or components are powered by the fuse.
5. Reinstall all fuses and circuit breakers.
6. Disconnect the components powered by the fuse one at a time until the concern has been eliminated.

Corrective Action

- Inspect the ground integrity of the component or system causing the noise.
- Malfunctioning and marginal components such as relays and solenoids may cause noise

and/or poor reception.

- Always use a braided ground strap when applying additional grounds and keep the ground strap as short as possible.
- If the noise source is found to be coming from the vehicle harness:
  - Route the antenna cable separately from the wire harness that is emitting the noise.
  - Use aluminum or nickel tape in order to shield the antenna cable. Attempt variations of the following repairs:
    - Add only aluminum or nickel tape before adding a ground strap to the tape.
    - Wrap a ground strap 360 degrees around the tape, securing the other end of the strap to chassis ground.

IMPORTANT: When installing suppression devices, signal wires such as sensor and communication circuits should not be suppressed. Battery and ignition voltage circuits are the best choices for suppressing.

- Capacitors work best on switch pops and low frequency noise.
- Filters work best on high frequency whines and static.
- After adding any suppression device, inspect all of the vehicle systems for proper operation and function.
- Whenever possible, make a test harness that includes filters or capacitors. Always inspect the effectiveness and operation before permanent installation.
- If an audible pop is caused due to operating a switch, perform the following repairs as necessary:
  - Add a capacitor across the contacts of the switch.
  - Add a capacitor from the battery positive voltage (B+) side of the switch to chassis ground.
  - Add a capacitor from the ground side of the switch to chassis ground.
- Use the following available noise suppression devices:
  - 220 micro farad (50 V) capacitor GM P/N 1227895-Works well for ignition system related noise.
  - 0.47 micro farad capacitor GM P/N 1227894-Works well for switches and relays.
  - Feed through capacitor GM P/N 477371-Works well for high current situations.
  - Filter package GM P/N 1224205-Works well for low current situations.
  - Fuel pump suppressor GM P/N 25027405

- 53.34 cm (21 in) braided ground strap GM P/N 8910791
- 48.26 cm (19 in) braided ground strap GM P/N 6286800
- 26.67 cm (10.5 in) braided ground strap GM P/N 6287160
- 21.59 cm (8.5 in) braided ground strap GM P/N 12091511

Generator Whine Concerns

1. Inspect the ground terminal and cable for high resistance.
2. Inspect the generator and brackets for loose or coated mounting bolts.
3. Inspect that the ground straps between the engine and the frame are clean and tight.
4. If the noise is still present, inspect the charging system for proper operation.
5. Install a filter GM P/N 1224205 in the battery voltage feed circuit to the radio.
6. If the noise is not eliminated, install the filter in each following variation:
   - Install the filter with the single wire side toward the radio and the ground wire attached to chassis ground.
   - Remove the ground to the filter.
   - Reverse the filter so the 2-wire side is toward the radio with the ground wire attached to chassis ground.
   - Remove the ground from the filter.
7. If the filter GM P/N 1224205 causes a delay when turning the radio ON or OFF or other problems, remove the filter and install a 0.47 micro farad capacitor to chassis ground.
8. Before reassembling the vehicle, remove any unneeded filters.
9. Test the functionality all of the vehicle systems for proper operation and function.

VIDEO ENTERTAINMENT SYSTEM TROUBLESHOOTING HINTS

Schematic Reference: Video System Schematics

- Many conditions that affect video system operation may be corrected without removing the radio, the digital video disc (DVD) player or the video entertainment overhead console from the vehicle. Make sure to understand all features of system operation before beginning the diagnosis of the system. Verify the condition and follow the diagnostic procedures in order to isolate and correct the condition.
- Be sure the vehicle battery is fully charged before beginning video entertainment system diagnosis.

Video or Audio Distortion

The manufacturing process for producing DVDs does not have the same quality control processes in place that compact disk manufacturing does. If there are video or audio quality problems with an individual DVD, try playing that disk in another DVD player. If the quality is poor for both players, return the disk to the place of purchase and request an exchange. If the quality problem is only seen in one of the players, examine the disk for scratches dirt or smudges and attempt to clean the disk with one of the disk cleaning systems that are commercially available.

Video or audio distortion during auxiliary playback can often be attributed to the DC to AC inverter that is used to power the auxiliary device. The power inverters tend to introduce noisy signals into the vehicle electrical system.

Video Entertainment System Wireless Headphone Inoperative

IMPORTANT: The following information lists the most probable cause of the concern to the least probable cause followed by the appropriate test for that condition.

1. Volume control on the wireless headphone set is turned all the way down. Adjust the volume control on the headphones.
2. Dead batteries in the wireless headphone set. Turn on power to the headphone set. If the headset indicator does not turn on, replace the batteries in the headset as needed.
3. Faulty headphone set. Test the operation of the system using a known good headphone set. If operation is OK, replace the vehicle headphone set.

Video Entertainment System Remote Control Inoperative

The buttons on the video remote control do not operate the video disc player but the buttons on the video disc player operate normally.

IMPORTANT: The following information lists the most probable cause of the concern to the least probable cause followed by the appropriate test for that condition.

1. Dead batteries in the video remote control. Replace the dead batteries.
2. Faulty remote control. Test the operation of the system using a known good remote control. If operation is OK, replace the remote control.

Discs Will Not Eject

1. Attempt to remove the CDs/DVDs from the radio by pushing the "Eject" button on the

radio. If there is a "chatter" noise, go to **step two** . If there is no chatter noise and the discs will not eject from the radio, send the radio to your authorized Electronic Service Center for repair.

2. Remove the radio from the Instrument Panel of the vehicle but do not remove the electrical connectors. Refer to **Radio Replacement**.
3. Some versions of these radios have a 9.5 mm x 13 mm oval hole on the top cover of the radio, near the back of the case. If the radio being serviced has this hole, proceed to step four. Otherwise the radio will need to be returned to your authorized Electronic Service Center for repair.
4. Push the "Eject" button. While the discs are attempting to eject, insert a plastic pen cap or similar plastic object into the hole to assist the top disc out of the radio.
5. After the top disc is removed, push the "Eject" button again to remove the bottom disc.
6. Check the operation of the radio to see if a CD or DVD can be inserted and then ejected. If a CD or DVD can be inserted and ejected from the radio, then reinstall the radio into the Instrument Panel. If a CD or DVD cannot be inserted and then ejected from the radio, send the radio to your authorized Electronic Service Center for repair.

AUDIO DISTORTION - ONE OR MORE SPEAKERS

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

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

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

Scan Tool Reference

Scan Tool Data List

Special Tools Required

J 39916-A CD Diagnostic Audio Kit. See **Special Tools**.

Circuit/System Testing

Without GMLAN Amplifier

Turn ON the ignition, with the engine OFF and turn ON the radio. Adjust the fade and balance controls to mid range and insert the CD from the **J 39916-A** to identify the suspect speaker. See **Special Tools**.

- Replace suspect speaker if distortion is found.

With GMLAN Amplifier (UQA Without Y91)

1. Turn ON the ignition, with the engine OFF and turn ON the radio. Adjust the fade and balance controls to mid range and Insert the CD from the **J 39916-A** to identify the suspect speaker. See **Special Tools**.
2. Test for a short to B+ or short to ground on the suspected speaker circuits between the amplifier and the suspect speaker.
    - If all circuits test normal, replace suspect speaker if distortion is found.

Repair Procedures

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

Speaker Replacement Reference

AUDIO/VIDEO DISC PLAYER ADAPTER - AUDIO OR VIDEO INOPERATIVE OR DEGRA DEGRADED QUALITY

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.

Reference Information

Schematic Reference

Video System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

IMPORTANT: Verify the auxiliary audio or video input device is operating normally before performing this diagnostic.

Auxiliary Video Inoperative or Degraded

Test for an open, short to ground or short to B+ on the auxiliary video high signal and drain wire.

- If all circuits test normal, replace the audio/video adapter.

Auxiliary Audio Inoperative or Degraded - Left or Right Channel

1. Install the left and right audio inputs into the audio/video adapter. Operate the auxiliary device audio and note the malfunctioning channel (left or right). Swap the left and right auxiliary audio inputs and verify that the original malfunction is still present.
    - If the malfunction now appears on the opposite audio channel, the auxiliary audio

device is not operating normally.

2. Test the suspect auxiliary audio signal circuit and drain wire for a open, short to ground or short to B+.
    - If all circuits test normal replace the audio/video adapter.

Repair Procedures

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

Audio/Video Disc Player Adapter Replacement

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 DRR antenna signal circuit is a coaxial cable that carries the digital radio signal information received by the antenna. The antenna cable also provides a path for DC current for powering the antenna base.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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**

Tools Required

EL-48028 Digital Radio Test Antenna. See **Special Tools**.

Circuit/System Verification

Make sure the vehicle is outside in an area with an unobstructed view of the southern sky. Turn ON XM radio. Tune the radio to satellite channel 1. If the reception is not clear, contact XM at 1-800-852-9696 to verify customer account status or possible network problems.

Circuit/System Testing

IMPORTANT: Check for the proper operation of the OnStar® System before using this diagnostic. Address any concerns with the OnStar® System prior to diagnosing or repairing the XM radio concern.

1. Ignition OFF, disconnect the antenna coax from the digital radio receiver (DRR). Connect the **EL-48028** to the DRR. See **Special Tools**.
2. Turn the ignition ON, radio ON tuned to XM. Verify XM reception has improved.
   - If the reception is not improved, replace the DRR.
3. Ignition OFF. Disconnect the radio antenna base from the DRR coaxial cable. Test the resistance of the DRR antenna coaxial cable center conductor from end to end. Verify the resistance is less than 5 ohms.
   - If the resistance is greater than 5 ohms, replace the DRR antenna coaxial cable.
4. Test the resistance of the DRR antenna coaxial cable outer shield from end to end. Verify the resistance is less than 5 ohms.
   - If the resistance is greater than 5 ohms, replace the DRR antenna coaxial cable.
5. Test the resistance of the DRR antenna coaxial cable between the center conductor and the outer conductor. Verify there is infinite resistance between both conductors.
   - If there is less than infinite resistance between the inner conductor and the outer conductor of the DRR coaxial cable, replace the DRR antenna coaxial cable. If the coaxial cable tests normal, replace the radio antenna base.

Repair Procedures

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

- **Digital Radio Antenna Cable Replacement**
- **Radio Antenna Base Replacement**
- **Control Module References** for DRR replacement, setup and programming

DIGITAL RADIO RECEIVER SETUP

XM Activation

IMPORTANT: After replacement of an XM receiver, call XM radio to deactivate the receiver that has been removed from the vehicle. The vehicle must be parked in view of a satellite within 24 hours after an activation call.

1. Turn the radio ON, tune to the XM channel 0 and record the radio ID. The radio ID will be needed for activation of the new receiver.
2. Call XM radio at 1-800-556-3600 to deactivate the faulty receiver and activate the new receiver.
3. Park the vehicle outside in an area with an unobstructed view of the southern sky.
4. Leave the vehicle outside with the ignition switch in the ACC position and the radio on for 30 minutes to activate XM service.
5. Once activated, the radio will receive the remaining XM channels.

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) is a 3-watt cellular device that allows the user to communicate data and voice signals over the national cellular network. It is powered by a fused, battery positive, voltage circuit connected through the vehicle wiring to the 3-button assembly and the radio and attached by means of coax cables to the cellular and navigation antennas. Ground for the module is accomplished by means of dedicated circuits that are routed with body wiring systems to chassis ground points. The module houses 2 modems, one to process

global positioning system (GPS) data and the other for cellular information. Satellites orbiting earth are constantly transmitting signals of their current location, from which the OnStar® system is able to pinpoint its own location. The navigation antenna receives these GPS signals and provides the data to the VCIM to be processed. The VCIM communicates with the rest of the vehicle over the class 2 or GMLAN serial data bus, depending upon the serial data architecture of the vehicle. The ignition state is determined by the VCIM through class 2 or GMLAN messaging. The module also has the capability of commanding the horn, initiating door lock/unlock and operating the exterior lamps using the serial data circuits. When an OnStar® keypress 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 system is muted, the OnStar® signals are transmitted to the audio system on the cellular telephone voice signal circuit and returned to the module on the cellular telephone voice low reference circuit. The cellular modem connects the OnStar® 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 antenna and cellular antenna coax.

Diagnostic Aids

- The GPS signal title on the scan tool will display a Yes or No dependent 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 navigation antenna from a clear view of the satellites in the sky and may have caused this temporary data loss.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

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 satellites. It is also necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.

1. With the scan tool, observe the GPS signal status indicator for at least 10 seconds. Verify the indicator displays Yes.
   - If the indicator does not display Yes, go to **Component Testing**.
2. Call and verify the OnStar advisor receive GPS data.
   - If the advisor did not receive GPS data and the call was a 'fail to voice', contact the GM Technical Assistance Center.
   - If the advisor did not received GPS data and the call was not a 'fail to voice', go to **Component 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 VCIM.

Component Testing

IMPORTANT: Vehicle may be equipped with sectioned coax. Test each section and replace only the faulty section, not the entire length or coax.

1. Disconnect the navigation antenna coax cable from the navigation antenna within the wiring harness.
2. Disconnect the navigation antenna from the VCIM.
3. Test for infinite resistance between the center conductor of the coax to the metal outer shield.
    - If it does not read infinite, replace the navigation antenna coax cable.
4. Test for greater than 1 ohm resistance at the navigation antenna coax center conductor from end to end.
    - If less than specified value, replace the navigation antenna assembly.

- If greater specified value, replace the navigation antenna coax cable.

Repair Procedures

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

- **Radio Antenna Base Replacement**
- **Control Module References** for VCIM replacement, setup and programming

MICROPHONE INOPERATIVE - CALLER CANNOT BE HEARD

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 OnStar® vehicle communication interface module (VCIM) receives an audio input signal from the cellular microphone.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

Ignition ON, press OnStar® Call button. Verify that your voice cannot be heard clearly by the OnStar® Call Center.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the cellular microphone.
2. Ignition ON, test for greater than 9 volts between the signal circuit terminal B and ground.
    - If less than specified value, test the cellular microphone signal circuit for a short to ground, open/high resistance. If the circuit tests normal, replace the VCIM.
3. Test for greater than 9 volts between the cellular microphone signal circuit terminal B and the drain circuit terminal A.
    - If less than specified value, test the drain wire for an open/high resistance. If the circuit tests normal, replace the VCIM.
4. If all circuit test normal, test or replace the cellular microphone assembly.

Repair Procedures

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

- Mobile Telephone Microphone Replacement
- **Control Module References** for VCIM replacement, setup and programming

NAVIGATION SYSTEM - VOICE GUIDANCE INOPERATIVE OR DEGRADED QUALITY

Reference Information

Schematic Reference:

Radio/Navigation System Schematics

Connector End View Reference:

Entertainment/Communication Connector End Views

Diagnostic System Check - Vehicle

Perform the Diagnostic System Check - Vehicle before proceeding with these diagnostic procedures. Refer to **Diagnostic System Check - Vehicle** .

Voice Guidance Inoperative or Degraded

IMPORTANT: The following information lists the most probable cause of the concern to the least probable cause. If the list leads to the replacement of a component, always inspect for a poor connection before proceeding with replacement. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs .

1. Audio prompt out circuits open or shorted-Test the audio prompt out circuits for an open, short to ground or short to voltage. Refer to **Circuit Testing** and **Wiring Repairs** .
2. Defective radio-Replace the radio. Refer to **Control Module References** for replacement, setup and programming.
3. Defective amplifier-Replace the amplifier. Refer to **Control Module References** for replacement, setup and programming.

NAVIGATION SYSTEM - VOICE RECOGNITION INOPERATIVE

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Circuit/System Testing

Verify the OnStar® voice recognition is operating normally.

- If the OnStar® voice recognition is inoperative, refer to **Voice Recognition Inoperative**.
- If the OnStar® voice recognition operates normally, test the audio mic in circuits for an open, short to ground or a short to power. If all circuits test normal replace the radio.

Repair Procedures

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

Control Module References for radio replacement, setup and programming

NO (OR NOISY) ONSTAR AUDIO

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 3-watt cellular device that allows the user to communicate data and voice signals over the national cellular network. It is powered by a fused, battery positive, voltage circuit connected through the vehicle wiring to the 3-button assembly and the radio and attached by means of coax cables to the cellular and navigation antennas. Ground for the module is accomplished by means of dedicated circuits that are routed with body wiring systems to chassis ground points. The module houses 2 modems, one to process global positioning system (GPS) data and the other for cellular information. Satellites orbiting earth are constantly transmitting signals of their current location, from which the OnStar® system is able to pinpoint its own location. The navigation antenna receives these GPS signals and provides the data to the VCIM to be processed. The VCIM communicates with the rest of the vehicle over the class 2 or GMLAN serial data bus, depending upon the serial data architecture of

the vehicle. The ignition state is determined by the VCIM through class 2 or GMLAN messaging. The module also has the capability of commanding the horn, initiating door lock/unlock and operating the exterior lamps using the serial data circuits. When an OnStar® keypress 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 system is muted, the OnStar® signals are transmitted to the audio system on the cellular telephone voice signal circuit and returned to the module on the cellular telephone voice low reference circuit. The cellular modem connects the OnStar® 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 antenna and cellular antenna coax.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

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

- If no, refer to **Speakers Inoperative - One or More**.

Circuit/System Testing

IMPORTANT: If the navigation mono audio signal low reference circuit is shorted to voltage the VCIM has been damaged and requires replacement.

1. Test for high resistance at the navigation mono audio signal circuit terminal 1 for an open or for a short to ground or for a short to voltage.
2. Test for a high resistance or for a short to voltage at the navigation mono audio signal low reference circuit terminal 2 for an open.
3. If the circuits test normal, test or replace the VCIM.

Repair Procedures

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

- **Radio Antenna Base Replacement**
- **Control Module References** for VCIM 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.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

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. Remove the GPS antenna and cable and place it outside the vehicle. Verify the GPS reception is operational within 5 minutes.
   - If GPS becomes operational, remove any suspect window tint or objects that may obstruct the GPS signal.
2. Replace the GPS antenna. Verify the GPS reception is operational within 5 minutes.
   - If GPS is not operational, replace the radio.

Repair Procedures

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

- **Control Module References** for radio replacement, setup and programming
- **Global Positioning System (GPS) Antenna Replacement**

NOISE COMPENSATED VOLUME INOPERATIVE

Diagnostic Instructions

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

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

IMPORTANT: Noise compensated volume only available on vehicles equipped with Y91.

1. Turn the ignition ON. Disconnect the noise compensation microphone.
2. Measure for 7-9 volts between the noise compensation microphone supply circuit and the drain circuit.
    - If the voltage is in between 7-9 volts, replace the noise compensation microphone

- If the voltage is greater than 9 volts or less than 7 volts and a open, short to ground or short to voltage can not be found, replace the radio.

Repair Procedures

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

Control Module References for radio replacement, setup and programming

ONSTAR BUTTON LED INOPERATIVE

Diagnostic Instructions

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

Circuit/System Verification

Ignition ON, With the scan tool command the VCIM to turn on the red and green LED.

- If the red or green LED indicators do not illuminate, go to **Circuit/System Testing**.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

Ignition ON, With the scan tool command the VCIM to turn on the red and green LED.

- If the red or green LED indicators do not illuminate, go to Circuit/System Testing**Circuit/System Testing**

Circuit/System Testing

1. Ignition OFF, disconnect the inside rearview mirror harness connector.
2. Ignition ON, test for 9.2 to 10.2 volts on the keypad supply voltage circuit.
    - If less than the specified voltage repair short to ground or open or replace the VCIM.
3. Test for less than 1 ohm between the inside rearview mirror harness connector terminal 8 and ground.
    - If greater than specified value repair open or high resistance.

4. Connect a DMM between the inside rearview mirror harness connector terminal 14 and ground. With a scan tool command the green LED ON. Verify 9.2 to 10.2 volts is present with the green LED commanded ON.
    - If 9.2 to 10.2 volts is present with the green LED is commanded ON, replace the inside rearview mirror.
5. Connect a DMM between the inside rearview mirror harness connector terminal 15 and ground. With a scan tool command the red LED ON. Verify 9.2 to 10.2 volts is present with the red LED commanded ON.
    - If 9.2 to 10.2 volts is present with the red LED is commanded ON, replace the inside rearview mirror.
6. Disconnect the VCIM harness connector C1.
7. Test for less than 1 volt between the C1 VCIM connector terminal 3 and the inside rearview mirror harness connector terminal 14.
    - If more than the specified value repair short to voltage on the keypad green LED signal circuit.
8. Test for less than 1 volt between the C1 VCIM connector terminal 2 and the inside rearview mirror harness connector terminal 15.
    - If more than the specified value repair short to voltage on the keypad red LED signal circuit.
9. Test for less than 1 ohm between the C1 VCIM connector terminal 3 and the inside rearview mirror harness connector terminal 14.
    - If more than the specified value repair open or high resistance on the keypad green LED signal circuit.
10. Test for less than 1 ohm between the C1 VCIM connector terminal 2 and the inside rearview mirror harness connector terminal 15.
    - If more than the specified value repair open or high resistance on the keypad red LED signal circuit.
11. If all circuits test normal, test or replace the VCIM.

Repair Procedures

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

- **Control Module References** for VCIM replacement, setup and programming
- **Rearview Mirror Replacement**

ONSTAR CALL CENTER REMOTE FUNCTION REQUESTS INOPERATIVE

Diagnostic Instructions

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

Circuit/System Description

The vehicle communication interface module (VCIM) is a 3-watt cellular device that allows the user to communicate data and voice signals over the national cellular network. It is powered by a fused, battery positive, voltage circuit connected through the vehicle wiring to the 3-button assembly and the radio and attached by means of coax cables to the cellular and navigation antennas. Ground for the module is accomplished by means of dedicated circuits that are routed with body wiring systems to chassis ground points. The module houses 2 modems, one to process global positioning system (GPS) data and the other for cellular information. Satellites orbiting earth are constantly transmitting signals of their current location, from which the OnStar® system is able to pinpoint its own location. The navigation antenna receives these GPS signals and provides the data to the VCIM to be processed. The VCIM communicates with the rest of the vehicle over the class 2 or GMLAN serial data bus, depending upon the serial data architecture of the vehicle. The ignition state is determined by the VCIM through class 2 or GMLAN messaging. The module also has the capability of commanding the horn, initiating door lock/unlock and operating the exterior lamps using the serial data circuits. When an OnStar® keypress 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 system is muted, the OnStar® signals are transmitted to the audio system on the cellular telephone voice signal circuit and returned to the module on the cellular telephone voice low reference circuit. The cellular modem connects the OnStar® 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 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 that has since been corrected.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

Scan Tool Data List

Circuit/System Verification

IMPORTANT: It is necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.

1. Observe that the horn, lights and the doors locks on the vehicle operate properly.
   - If the applicable system does not operate properly, go to **Diagnostic Starting Point - Horns** , **Diagnostic Starting Point - Lighting Systems** or **Diagnostic Starting Point - Vehicle Access** respectively.
2. Contact the OnStar® Call Center by pressing the blue OnStar® button. Verify with the OnStar® advisor that all of the remote functions (door locks, lights or horn) work.
   - If the remote functions do not work, use the scan tool to access the STID and ESN and contact the General Motors Technical Assistance Center

Repair Procedures

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

ONSTAR ONE OR MORE BUTTONS INOPERATIVE

Diagnostic Instructions

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

Circuit/System Description

The OnStar® button assembly consists of 3 buttons, Call/Answer, OnStar® Call Center and OnStar® Emergency. Ten volts is supplied to the button assembly on the keypad supply voltage circuit. Each of the buttons, when pressed, completes the circuit across a resister allowing a specific voltage to be returned to the vehicle communication interface module (VCIM) on the keypad signal circuit. Depending upon the voltage range returned, the VCIM is able to identify which button has been pressed.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

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

Ignition ON, press the OnStar® Call buttons one at the time. Verify that all of the OnStar®

buttons are inoperative.

- If the OnStar® Call buttons are operative, refer to **Testing for Intermittent Conditions and Poor Connections** .

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the OnStar button assembly.
2. Ignition ON, test for voltage between 9.8-10.2 volts between the keypad supply voltage, terminal 6 and ground.
   - If less than specified values, test the circuit for an open/high resistance or for a short to ground. If the circuit tests normal, test or replace the VCIM.
   - If more than specified values, test the circuit for a short to voltage. If the circuit tests normal, test or replace the VCIM.
3. If the circuit tests normal, test or replace the OnStar button assembly.

Repair Procedures

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

- **Rearview Mirror Replacement**
- **Control Module References** for VCIM replacement, setup and programming

ONSTAR RECONFIGURATION (W/O SPS PROGRAMMING)

IMPORTANT: The vehicle communication interface module (VCIM) has a specific set of unique numbers that tie the module to a specific vehicle. These numbers, the 10-digit station identification and 11-digit electronic serial number (ESN), are used by the National Cellular Network and OnStar® to identify the specific vehicle. Because these numbers are tied to the vehicle identification number of the vehicle, these parts should NOT be exchanged with those of another vehicle. After replacing the VCIM, it is essential to reconfigure the OnStar® system. Failure to reconfigure the system will result in an additional customer visit for repair. In addition, pressing and holding the white dot button on the keypad will not reset this version of the OnStar® system. This action will cause a DTC to set.

1. Install the scan tool. Use the ID information menu on the scan tool to access and record the

new station ID (STID) and the ESN from the new VCIM.

2. Move the vehicle to an open area that is away from tall buildings with a clear view of unobstructed sky. Allow the vehicle to run for 10 minutes.
3. Use the special functions menu in order to begin the VCIM setup procedure for this vehicle.
4. Following this VCIM Setup procedure, a call will automatically be made to the OnStar® Call Center. Inform the Call Center Advisor of the following:
   - Tell the advisor that this vehicle has received a new VCIM.
   - Ask the advisor to add the new STID and the ESN to update the customer account.
   - Ask the advisor to activate the OnStar® Personal Calling feature, if available.
   - Follow any additional instructions from the OnStar® advisor.
5. Cycle the Ignition to complete the procedure and clear the DTC B1001 once the call to the OnStar® Call Center advisor is complete.
6. The default language for the new VCIM is English. Refer to the Module Setup screen if the customer requests French or Spanish Voice Recognition.

ONSTAR SYMPTOM DIAGNOSIS

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 3-watt cellular device that allows the user to communicate data and voice signals over the national cellular network. It is powered by a fused, battery positive, voltage circuit connected through the vehicle wiring to the 3-button assembly and the radio and attached by means of coax cables to the cellular and navigation antennas. Ground for the module is accomplished by means of dedicated circuits that are routed with body wiring systems to chassis ground points. The module houses 2 modems, one to process global positioning system (GPS) data and the other for cellular information. Satellites orbiting earth are constantly transmitting signals of their current location, from which the OnStar® system is able to pinpoint its own location. The navigation antenna receives these GPS signals and provides the data to the VCIM to be processed. The VCIM communicates with the rest of the vehicle over the class 2 or GMLAN serial data bus, depending upon the serial data architecture of the vehicle. The ignition state is determined by the VCIM through class 2 or GMLAN messaging. The module also has the capability of commanding the horn, initiating door lock/unlock and

operating the exterior lamps using the serial data circuits. When an OnStar® keypress 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 system is muted, the OnStar® signals are transmitted to the audio system on the cellular telephone voice signal circuit and returned to the module on the cellular telephone voice low reference circuit. The cellular modem connects the OnStar® 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 antenna and cellular antenna coax.

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.
- If the prompt OnStar Request Ended is heard without pressing the white dot button at the end of an OnStar® keypress, the OnStar® system at one time made a successful cellular connection, but was unable to complete the call. If repeated calls are placed with this result, contact the General Motors Technical Assistance Center.
- An inaccurate or aged GPS position may have been due to the temporary loss of GPS signal reception by the vehicle in instances, such as driving through tunnels or parking structures which restrict the navigation antenna from a clear view of the satellites in the sky.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

IMPORTANT:

- **To successfully diagnose and repair the OnStar® system it is necessary to comprehend its operation. Technicians should read and understand the OnStar Description and Operation before attempting to repair an OnStar® system. This symptom below will enable the user to verify the customer complaint and narrow it to its source. If there is a concern with voice recognition or OnStar® steering wheel control function, technicians should proceed directly to the applicable diagnostic in Symptoms - Cellular Communication.**
- **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.**
- **It is necessary to inform the OnStar® Call Center advisor that this call is for vehicle diagnostic purposes.**

1. Ignition ON, observe that the OnStar® status LED turns green.
   - If the LED does not turn green, refer to **OnStar Button LED Inoperative**.
2. Radio ON, set the volume to a comfortable level.
3. Press the OnStar® Call Center button and observe that the OnStar LED blinks.
   - If the OnStar® LED does not blink, refer to **OnStar One or More Buttons Inoperative**.
4. Listen that the radio muted and the Connecting to OnStar message played through the audio system.
   - If the radio did not mute or the Connecting to OnStar message did not play, refer to **No (or Noisy) OnStar Audio**.
5. Wait approximately 10 seconds, then end the call by pressing the white dot button and observe the OnStar LED stops blinking.
   - If the OnStar® LED continues blinking, refer to **OnStar One or More Buttons Inoperative**.
6. Press the OnStar® Call Center button and ensure that a connection was made with OnStar®.

- If the Unable to Contact OnStar® was heard, refer to **Unable to Contact OnStar Call Center**.
- If the OnStar® Request Ended was heard, go to **Diagnostic Aids**.

7. Ensure that OnStar® Call Center advisor can hear your voice clearly.
   - If the advisor cannot hear you clearly, refer to **Microphone Inoperative - Caller Cannot Be Heard**.
8. Ensure that OnStar® Call Center advisor received a data transfer from the vehicle.
   - If the data did not transfer, use the scan tool to access the STID and ESN and contact the General Motors Technical Assistance Center.
9. Ensure with the OnStar® Call Center advisor the vehicle has been configured.
   - If the vehicle has not been configured, ask the OnStar® Call Center advisor to perform a reconfiguration on the vehicle. If not successful, ask the advisor why the reconfiguration was not successful, use the scan tool to access the STID and ESN and contact the General Motors Technical Assistance Center.
10. Verify with the OnStar® Call Center advisor that the vehicle identification number (VIN) which they have on record matches the actual VIN.
    - Ask the OnStar® Call Center advisor to update the customer account with the correct information and to perform a reconfiguration of the vehicle. If the reconfiguration was not successful, ask the advisor why the reconfiguration was not successful, use the scan tool to access the STID and ESN and contact the General Motors Technical Assistance Center.
11. Verify that your position with the OnStar® Call Center advisor is within a reasonable distance from the actual location of the vehicle.
    - If not within a reasonable distance, refer to **Global Positioning System (GPS) Data Not Current or Inaccurate**.
12. Verify with the OnStar® Call Center advisor that the GPS position is marked as Current.
    - If not current, refer to **Global Positioning System (GPS) Data Not Current or Inaccurate**.
13. Ensure that the customer concern is the inability of the OnStar® Call Center to perform remote functions.
    - If the OnStar® Call Center is able to perform remote functions, go to **Diagnostic Aids**.
14. Refer to **OnStar Call Center Remote Function Requests Inoperative**.

Repair Procedures

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

Control Module References for VCIM replacement, setup and programming

RADIO AUDIO INOPERATIVE AT REAR SEAT AUDIO (RSA) CONTROL

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.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Center the balance and fade adjustment on the radio.
    - If adjustment of the fade and balance eliminates the concern, review the operation of the radio with the customer.
2. Verify that the wireless headphones are set to the proper channel and are working properly.
    - If the wireless headphones are not operating properly, go to **Video Entertainment**

System Wireless Headphone Inoperative.

3. Disconnect the C2 connector of the rear HVAC control module. Connect a DMM between the suspect speaker output circuits (input to the RSA) from the radio. Turn ON the radio and verify there is AC voltage present.
   - If AC voltage is not present, go to **Speakers Inoperative - One or More**.
4. Test or repair open, short to ground or short to voltage on the RSA ground circuit and battery positive voltage circuit.
   - If all circuits test normal, replace the rear HVAC control module.

Repair Procedures

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

Auxiliary Heater and Air Conditioning Control Module Replacement

RADIO CONTROLS INOPERATIVE - REAR SEAT

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.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

Test or repair open, short to ground or short to voltage on the RSA ground circuit and battery positive voltage circuit.

- If all circuits test normal, replace the rear HVAC control module.

Repair Procedures

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

Auxiliary Heater and Air Conditioning Control Module Replacement

RADIO DISPLAYS CAL OR CAL ERR

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

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

Program the radio.

- If the radio still displays CAL ERR, replace the radio.

Repair Procedures

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

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.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

Program the radio.

- If the radio still locked, replace the radio.

Repair Procedures

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** provide an overview of each diagnostic category.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

IMPORTANT: Perform the Audio System Troubleshooting Hints to properly identify the customers concern before using this diagnostic.

1. With the ignition OFF, disconnect the antenna cable from the radio. With a DMM, verify there is less than 0.20 ohms between the negative battery cable and the coaxial cable metal outer shield.
    - If greater than 0.20 ohms, test the antenna mast base for proper ground to the body. If antenna is properly grounded replace the antenna coax cable.
2. Disconnect the coax cable from the antenna mast. With a DMM, verify there is less than 3.5 ohms between the radio end coaxial cable conductor and the antenna end coaxial cable conductor.
    - If greater than 3.5 ohms, replace the coax cable.

- If no problems are found with the coax cable or the grounding of the antenna mast replace the radio.

Repair Procedures

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

- **Control Module References** for radio replacement, setup and programming
- **Radio Antenna Base Replacement**
- **Antenna Cable Replacement**

RADIO SETUP

Radio setup is completed using Service Programming System (SPS). Refer to **Service Programming System (SPS)** .

REDUCED VOLUME - ONE OR MORE SPEAKERS

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

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Special Tools Required

J 39916-A CD Diagnostic Audio Kit. See **Special Tools**.

Circuit/System Testing

Without Amplifier

1. Center the balance and fade adjustment on the radio.
    - If adjustment of the fade and balance eliminates the concern, review the operation of the radio with the customer.
2. Connect a DMM between the suspect low level audio signal circuits.
3. Turn ON the radio and use the CD Diagnostic kit or tune the radio to a channel with no reception (static). Record the AC voltage of the suspect speaker channel and compare and verify the AC voltage output of the suspect low level audio signal is the same as the opposite low level channel.
    - If the suspect speaker channel low level audio signal AC voltage is lower than other channels, replace the radio.

- If the recorded AC voltage is the same level as other speaker low level audio signal AC outputs, replace the suspect speaker.

With Amplifier

1. Center the balance and fade adjustment on the radio.
    - If adjustment of the fade and balance eliminates the concern, review the operation of the radio with the customer.
2. Disconnect the harness connector containing the low level audio circuits at the amplifier. Connect a DMM between the suspect low level audio signal circuits. Turn ON the radio and record the AC voltage of the suspect speaker channel. Compare and verify the AC voltage output of the suspect low level audio signal is the same as opposite low level channel.
    - If the suspect speaker channel low level audio signal AC voltage is lower than other channels, replace the radio.
3. Reconnect the harness connector containing the low level audio circuits and disconnect the harness connector at the individual speakers. Connect a DMM between the suspect speaker signal circuits. With Turn ON the radio and record the AC voltage of the suspect speaker channel. Compare and verify the AC voltage output of the suspect speaker signal is similar to other speakers.
    - If the suspect channel speaker signal AC voltage is lower than other channels, replace the amplifier.

- If the recorded AC voltage is the same level as other speaker signal AC outputs, replace the suspect speaker.

Repair Procedures

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

- **Control Module References** for amplifier and radio replacement
- **Speaker Replacement Reference**

SPEAKER REPLACEMENT REFERENCE

Speaker Replacement Reference

Component	Repair Instruction
Front Floor Console Speaker	Refer to **Radio Front Floor Console Speaker Replacement**
Front Speakers	Refer to **Radio Front Speaker Replacement**
Front Door Speakers	Refer to **Radio Front Side Door Speaker Replacement**
Front Pillar Speakers	Refer to **Front Upper Speaker**

	Replacement
Rear Pillar Speakers	Refer to **Radio Rear Speaker Replacement**
Rear Door Speakers	Refer to **Radio Rear Side Door Speaker Replacement**

SPEAKERS 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

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Special Tools Required

J 39916-A CD Diagnostic Audio Kit. See **Special Tools**.

Circuit/System Testing (One or More Speakers Inoperative)

1. Center the balance and fade adjustment on the radio.

- If adjustment of the fade and balance eliminates the concern, review the operation of the radio with the customer.

2. Listen to the audio using a normal radio frequency and then a digital radio frequency, listen for any inoperative speakers. If speakers only become inoperative when using the digital radio, disconnect C2 harness connector from the radio. Verify there is AC voltage present on the suspect audio signal channel.
   - If AC voltage is not present test for an open, short to ground or short to power on the suspect remote radio audio signal circuit between the radio and the digital radio receiver (DRR). If all circuits test normal, replace the DRR.
   - If AC voltage is present, replace the radio.

IMPORTANT: If the vehicle is not equipped with an amplifier skip step 3 and 4.

3. Disconnect the harness connector at the amplifier that contains the suspect inoperative speaker inputs. If the suspect speaker inputs are contained in the same harness as the amplifier power and ground It will be required to re-connect the power and ground by using a jumper harness. Connect a DMM between the suspect low level audio signal circuits. With the scan tool, perform the radio tone test on the suspect speaker and verify there is an AC voltage and not DC 12V.
   - If the suspect speaker low level audio signal AC voltage is 0V AC or 12V DC, test or repair open, short to ground or short to power on the suspect speaker channel low level audio signal circuits. If a open, short to ground or a short to power can not be found, replace the radio.
4. Reconnect the amplifier harness connector.
5. Disconnect the harness connector of the suspect speaker. Connect a DMM to between the suspect speaker signal circuits at the speaker harness connector. With the scan tool, perform the amplifier tone test on the suspect speaker channel and record the AC and DC voltage. Verify there is an AC voltage and not DC 12V.
   - If the suspect channel speaker signal AC voltage is 0V AC or 12V DC, test or repair open, short to ground or short to power on the suspect speaker channel signal circuits. If a open, short to ground or a short to power can not be found, replace the amplifier if equipped. Replace the radio if not equipped with an amplifier.
   - If the suspect speaker channel signal circuits test normal, replace the suspect speaker.

Circuit/System Testing (All Speakers Inoperative)

1. Ignition OFF, Disconnect the C1 amplifier harness connector.

2. Connect a test lamp between the B+ circuit terminal 4 and ground. Verify the test lamp illuminates.
    - If the test lamp does not illuminate, repair open/high resistance.
3. Connect a test lamp between the ground circuit terminal 8 and B+. Verify the test lamp illuminates.
    - If the test lamp does not illuminate, repair short to voltage or open/high resistance.
4. Disconnect the C3 amplifier harness connector.
5. Ignition ON, test for greater than 9 volts on the remote enable circuit terminal 8.
    - If less than specified value repair open/high resistance or replace the radio.

- If all circuits test normal replace the amplifier.

Repair Procedures

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

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

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 3-watt cellular device that allows the user to communicate data and voice signals over the national cellular network. It is powered by a fused, battery positive, voltage circuit connected through the vehicle wiring to the 3-button assembly and the radio and attached by means of coax cables to the cellular and navigation antennas. Ground for the module is accomplished by means of dedicated circuits that are routed with body wiring systems to chassis ground points. The module houses 2 modems, one to process global positioning system (GPS) data and the other for cellular information. Satellites orbiting earth are constantly transmitting signals of their current location, from which the OnStar® system is able to pinpoint its own location. The navigation antenna receives these GPS signals and provides the data to the VCIM to be processed. The VCIM communicates with the rest of the

vehicle over the class 2 or GMLAN serial data bus, depending upon the serial data architecture of the vehicle. The ignition state is determined by the VCIM through class 2 or GMLAN messaging. The module also has the capability of commanding the horn, initiating door lock/unlock and operating the exterior lamps using the serial data circuits. When an OnStar® keypress 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 system is muted, the OnStar® signals are transmitted to the audio system on the cellular telephone voice signal circuit and returned to the module on the cellular telephone voice low reference circuit. The cellular modem connects the OnStar® 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 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. If repeated calls are placed with this result, contact General Motors Technical Assistance Center.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

Scan Tool Data List

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 satellites.**
- **Placing an emergency call to the OnStar® Call Center should only be made if the diagnosis of the system leads to step 3. Immediately after an OnStar® advisor picks up the call, they should be told that this call is for diagnostic purposes only and there is no emergency.**

1. Press the OnStar® Call Center button. Verify a connection is not made with the OnStar® Call Center.
   - If a connection is made with the OnStar® Call Center, go to **Diagnostic Aids**.
2. Listen for other tones or cellular messages rather than the normal progression tones or the Unable to Contact OnStar® prompt.
   - If no other tones or cellular messages are heard other than the normal progression tones or the Unable to Contact OnStar® prompt, go to **Component Testing**.
3. Record all messages heard from the OnStar® Call Center button press.
4. Press the OnStar® emergency button. Verify a connection to the OnStar® Call Center is made within 10 minutes.
   - If a connection is not made within specified time, go to **Component Testing**.
5. Hear all messages during the course of the tests available, use the scan tool to access the STID, ESN and Transceiver I.D. and contact the General Motors Technical Assistance Center.

Component Testing

IMPORTANT: Vehicle may be equipped with sectioned coax. Test each section and replace only the faulty section, not the entire length or coax.

1. Verify that there is no exterior damage to the cellular antenna.
    - If damaged, test or replace the cellular antenna assembly.
2. Disconnect the cellular antenna coax from the VCIM.
3. Disconnect the cellular antenna coax from the cellular antenna.
4. Test for infinite resistance between the center conductor of the coax and the outer metal shield.
    - If different than specified value, replace the cellular antenna coax.
5. Test for less than 1 ohm resistance at the cellular antenna coax center conductor from end to end.
    - If greater than specified value, replace the cellular antenna coax cable.
6. Use the scan tool to access the STID, ESN and Transceiver I.D. and contact the General Motors Technical Assistance Center.

Repair Procedures

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

Radio Antenna Base Replacement

VIDEO DISPLAY IS POOR OR BLANK

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

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

IMPORTANT: If rear video display does not turn ON, use diagnostic Video Entertainment System Inoperative.

Flip open the rear video display. With the ignition ON, operate the rear entertainment system using several known good DVD disks. Observe the rear video screen.

- If the screen turns on but is blank. Test for an open, short to ground and short to power on the DVD video signal circuits to the rear video display. If the DVD video signal circuits test normal, replace the video display.
- If the video screen is still malfunctioning, replace the radio.

Repair Procedures

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

- **Video Display Replacement (U42)** or **Video Display Replacement (U42/C3U)**
- **Control Module References** for radio replacement, setup and programming

VIDEO ENTERTAINMENT SYSTEM INOPERATIVE

Diagnostic Instructions

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

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

IMPORTANT: If rear video display turns ON but the video is blank, use diagnostic Video Display is Poor or Blank.

1. Disconnect the second row video (and third row if equipped) display harness connector. With the ignition ON, operate the rear entertainment system. Verify there is voltage on the remote enable signal circuit.
   - If voltage is not present on the remote enable signal circuit, test and repair open or short to ground.
   - If the enable signal circuit tests normal but there is no voltage, replace the radio.
2. Test and repair open, short to ground and short to power on the ground and battery positive voltage circuits at the second row video (and third row if equipped) display.
   - If the video display power and ground circuits test normal, replace the suspected rear video display.

Repair Procedures

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

Video Display Replacement (U42) or **Video Display Replacement (U42/C3U)**

VIDEO ENTERTAINMENT SYSTEM REMOTE CONTROL INOPERATIVE

Diagnostic Instructions

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

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

IMPORTANT: Test or replace the remote batteries before performing the circuit/system test.

1. Verify the system works with a known good remote
   - If the known good remote operates properly, replace the suspect remote.
2. Operate the radio and turn on the rear seat audio (RSA). Verify the remote headphones operate normally.
   - If the remote headphones do not operate properly, go to **Video Entertainment System Wireless Headphone Inoperative**.

3. Install a scan tool, monitor the button presses in the radio data display. Verify the radio responds to the remote when the buttons are pressed.
    - If the radio does not respond, test the remote infra-red signal circuits for an open, short to ground or short to B+. If the infra-red signal circuits test normal replace audio system transceiver module.

Repair Procedures

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

- **Control Module References** for radio replacement, setup and programming.
- **Auxiliary Heater and Air Conditioning Control Module Replacement**
- **Audio System Transceiver Module Replacement (U42)** or **Audio System Transceiver Module Replacement (U42/C3U)**

VIDEO ENTERTAINMENT SYSTEM WIRELESS HEADPHONE INOPERATIVE

Diagnostic Instructions

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

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

No Audio From Wireless Headphones

IMPORTANT: Center the balance and fade adjustment on the radio. If adjustment of the fade and balance eliminates the concern, review the operation of the radio with the customer.

1. Turn ON the wireless headphones. Verify the power indicator lamp on the wireless headphone illuminates.
    - If the power indicator lamp does not illuminate on the wireless headphones check or replace the wireless headphone batteries. If the batteries are OK replace the wireless headphones.
2. Activate the RSA. Set both wireless headphones to the proper channel to hear RSA. Adjust the volume up on both wireless headphones. Verify that only one set of wireless headphones operate properly.
    - If only one set of wireless headphones do not have audio, replace the suspect wireless headphone set.
3. With a DMM, verify there is B+ at the infra-red module supply voltage circuit when the RSA is activated.
    - If B+ is not present, test for a open or short to power on the infra-red module supply voltage circuit. If the infra-red module supply voltage circuit tests normal, replace the rear HVAC control module.
4. At the infra-red module connector harness, test for AC voltage between the low reference circuit and the left and right infra-red audio signal circuits. Verify there is AC voltage with the RSA activated.
    - If AC voltage is not present, test for an open, short to ground or short to B+ on the low reference and both left and right infra-red audio signal circuits. If the low reference and audio signals test normal replace the rear HVAC control module.
5. Ignition OFF, Disconnect the harness connector of the infra-red module. Test for less than 1.0 ohm of resistance between the ground circuit terminal 12 and ground.
    - If greater than the specified range, repair the ground circuit.

- If the ground circuit tests normal, replace the infra-red module.

Audio In One Channel of the Wireless Headphones or Distortion

IMPORTANT: Center the balance and fade adjustment on the radio. If adjustment of the fade and balance eliminates the concern, review the operation of the radio with the customer.

1. Activate the RSA. Set both wireless headphones to the proper channel to hear RSA. Adjust the volume up on both wireless headphones. Verify that only one set of wireless headphones operates properly.
    - If only one set of wireless headphones is faulty, replace the suspect wireless headphone set.
2. At the infra-red module connector harness, test for AC voltage between the low reference circuit and the left and right infra-red audio signal circuits. Verify there is AC voltage with the RSA activated.
    - If AC voltage is not present, test for an open, short to ground or short to B+ on the low reference and both left and right infra-red audio signal circuits. If the low reference and audio signals test normal replace the rear HVAC control module.
3. Test for an open, short to ground or short to B+ on the low reference and both left and right infra-red audio signal circuits.
    - If the low reference and audio signals test normal replace the infra-red module.

Repair Procedures

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

- **Auxiliary Heater and Air Conditioning Control Module Replacement**
- **Audio System Transceiver Module Replacement (U42)** or **Audio System Transceiver Module Replacement (U42/C3U)**

VOICE RECOGNITION INOPERATIVE

Diagnostic Instructions

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

Circuit/System Description

The vehicle communication interface module (VCIM) is a 3-watt cellular device that allows the

user to communicate data and voice signals over the national cellular network. It is powered by a fused, battery positive, voltage circuit connected through the vehicle wiring to the 3-button assembly and the radio and attached by means of coax cables to the cellular and navigation antennas. Ground for the module is accomplished by means of dedicated circuits that are routed with body wiring systems to chassis ground points. The module houses 2 modems, one to process global positioning system (GPS) data and the other for cellular information. Satellites orbiting earth are constantly transmitting signals of their current location, from which the OnStar® system is able to pinpoint its own location. The navigation antenna receives these GPS signals and provides the data to the VCIM to be processed. The VCIM communicates with the rest of the vehicle over the class 2 or GMLAN serial data bus, depending upon the serial data architecture of the vehicle. The ignition state is determined by the VCIM through class 2 or GMLAN messaging. The module also has the capability of commanding the horn, initiating door lock/unlock and operating the exterior lamps using the serial data circuits. When an OnStar® keypress 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 system is muted, the OnStar® signals are transmitted to the audio system on the cellular telephone voice signal circuit and returned to the module on the cellular telephone voice low reference circuit. The cellular modem connects the OnStar® 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 antenna and cellular antenna coax.

Reference Information

Schematic Reference

OnStar Schematics

Connector End View Reference

Entertainment/Communication Connector End Views

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

IMPORTANT: The vehicle must be located in a quiet area.

1. Ignition ON, press OnStar® Call button. Verify that your voice cannot be heard clearly by the OnStar® Call Center.
    - If your voice can not be heard clearly, refer to **Microphone Inoperative - Caller Cannot Be Heard**.
2. Press the OnStar® Call answer button. Verify that OnStar® system did not recognize any of your hands-free voice commands.
3. Press the OnStar® Call answer button. Verify that OnStar® system did not recognize any of another person voice commands either.
    - If the voice commands are not recognized by OnStar® system, refer to **OnStar Description and Operation**.
4. If the system is operational, but cannot identify certain word commands due to pronunciation, for tips on proper pronunciation refer to **OnStar Description and Operation**.

Repair Procedures

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

Control Module References for VCIM replacement, setup and programming

REPAIR INSTRUCTIONS

ONSTAR BUTTON ASSEMBLY REPLACEMENT

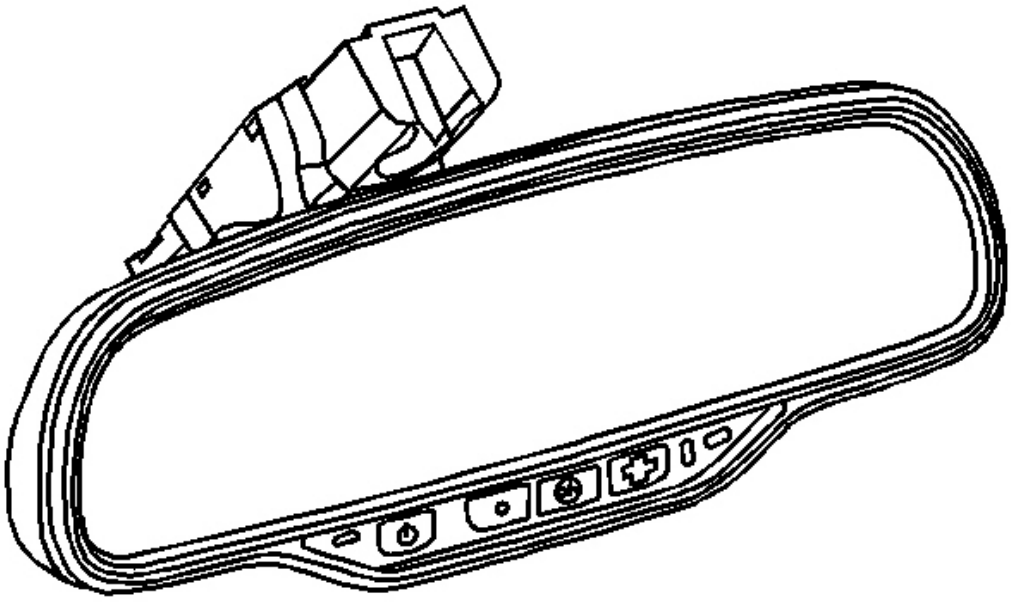


Fig. 103: View Of Rearview Mirror Assembly With OnStar Button
Courtesy of GENERAL MOTORS CORP.

The OnStar ® button assembly located on the inside rearview mirror can not be serviced separately. Should the button assembly need to be replaced, the entire inside rearview mirror assembly will need to be replaced. Refer to **Rearview Mirror Replacement** .

MOBILE TELEPHONE MICROPHONE REPLACEMENT

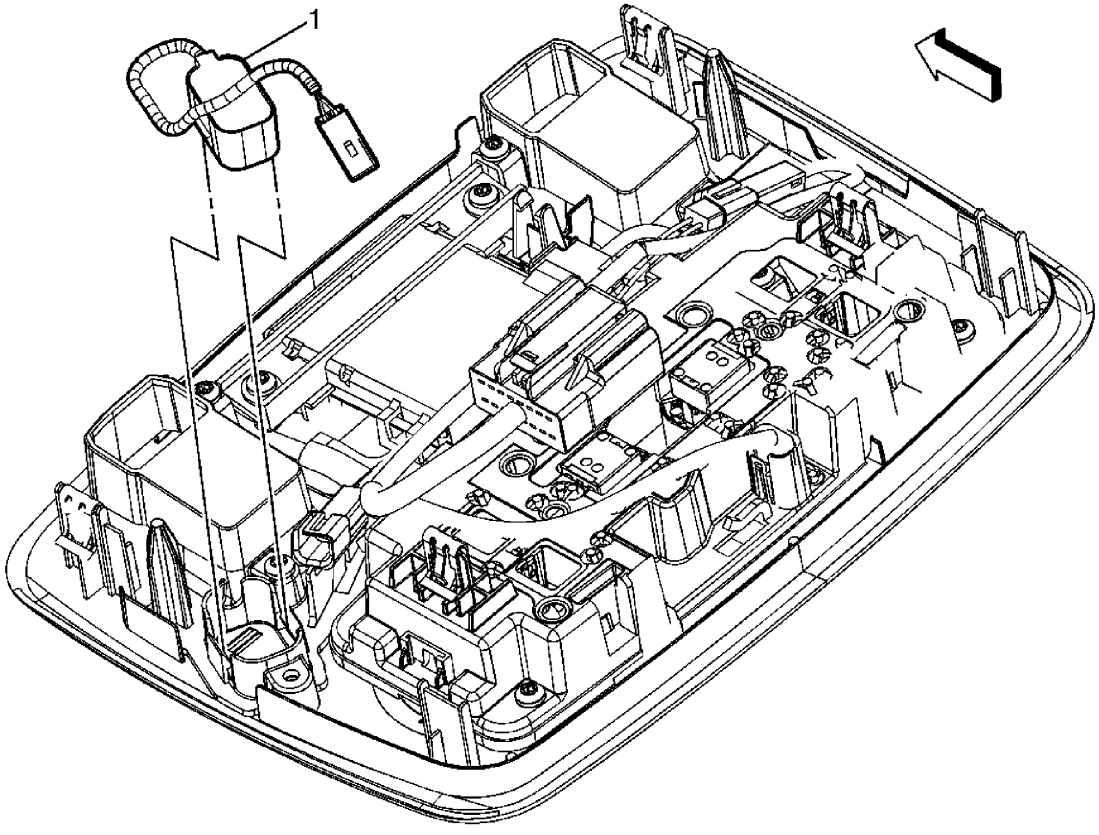


Fig. 104: Identifying Mobile Telephone Microphone
Courtesy of GENERAL MOTORS CORP.

Mobile Telephone Microphone Replacement

Callout	Component Name
Preliminary Procedure: Remove the overhead console assembly. Refer to **Roof Console Replacement** .	
1	Mobile Telephone Microphone Assembly **Procedure:** Disconnect the electrical connection.

COMMUNICATION INTERFACE MODULE REPLACEMENT

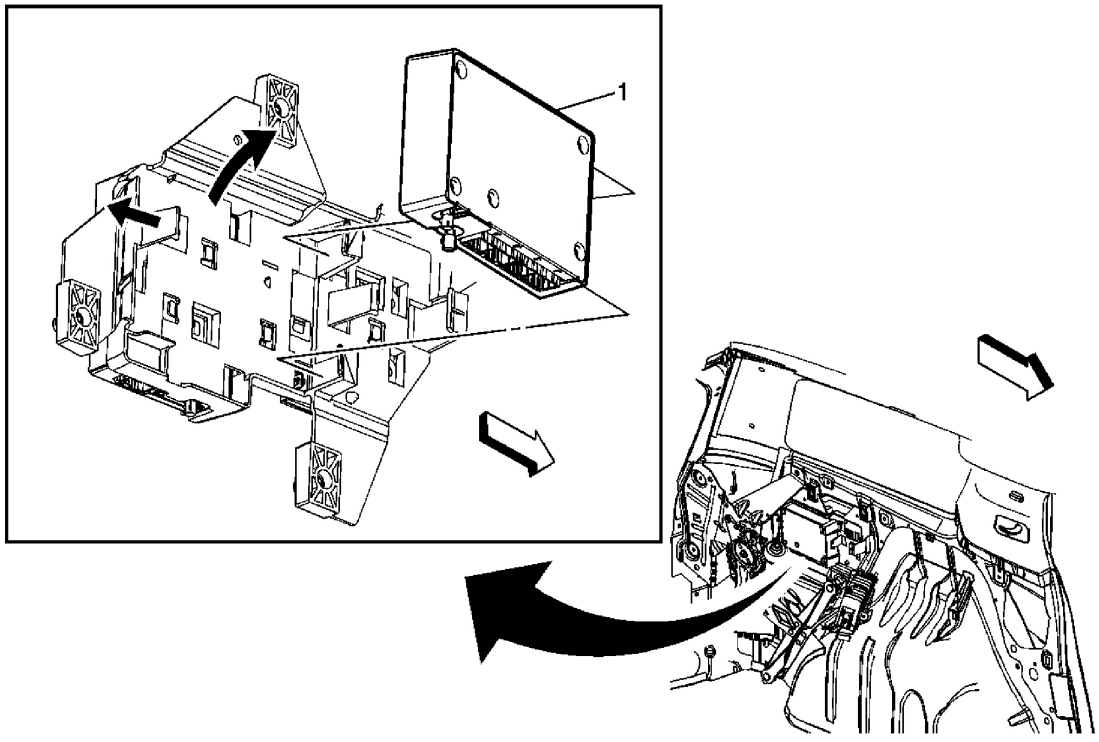


Fig. 105: View Of Communication Interface Module
Courtesy of GENERAL MOTORS CORP.

Communication Interface Module Replacement

Callout	Component Name
Preliminary Procedure: Remove the left rear quarter lower trim panel. Refer to **Rear Quarter Lower Trim Panel Replacement (without RPO E61)** or **Rear Quarter Lower Trim Panel Replacement (with RPO E61)** .	
	Communication Interface Module **Procedure** 1. Disconnect the electrical connectors. 2. Reprogram the communication interface module if replaced. Refer to **Control Module References** . 3. When replacing the VCIM, record the 11-digit electronic serial number (ESN) and the 10-digit station identification (STID) number from the label on the new VCIM.

1	**Tip:** • The vehicle communication interface module (VCIM) has a specific set of unique numbers that tie the module to each vehicle. These numbers, the 10-digit station identification and the 11-digit electronic serial number, are used by the National Cellular Network and OnStar® to identify the specific vehicle. Because these numbers are tied to the vehicle identification number of the vehicle, you must never exchange these parts with those of another vehicle. • After replacing the vehicle communication interface module, you must reconfigure the OnStar® system. Failure to reconfigure the system will result in an additional customer visit for repair. In addition, pressing and holding the white dot button on the keypad will NOT reset this version of the OnStar® system. This action will cause a DTC to set.

COMPACT DISC CARE AND CLEANING

Care of CDs

Handle CDs carefully. Store them in their original cases or other protective cases and away from direct sunlight and dust. The CD player scans the bottom surface of the disc. If the surface of a CD is damaged, such as cracked, broken, scratched or wrinkled labeling, the CD will not play properly or not at all. If the surface of a CD is soiled, take a soft, lint free cloth or dampen a clean, soft cloth in a mild, neutral detergent solution mixed with water and clean it. Make sure the wiping process starts from the center to the edge. Do not touch the bottom side of a CD while handling it. This could damage the surface. Pick up CDs by grasping the outer edges or the edge of the hole and the outer edge.

Care of the CD Player

The use of CD lens cleaners for CD players is not advised, due to the risk of contaminating the internal lens of the CD optics with lubricants.

Stuck CDs

Interrupting the battery power by pulling the fuse will sometimes release a stuck CD. If a CD is stuck and removed, inspect it for warps, cracks, etc. If the CD is damaged, do not replace the radio.

Labeling CDs

Paper labels can eventually warp and wrinkle and this will cause the disc to jam inside the CD player. Try labeling the top of the discs with a soft magic marker instead.

RADIO REPLACEMENT

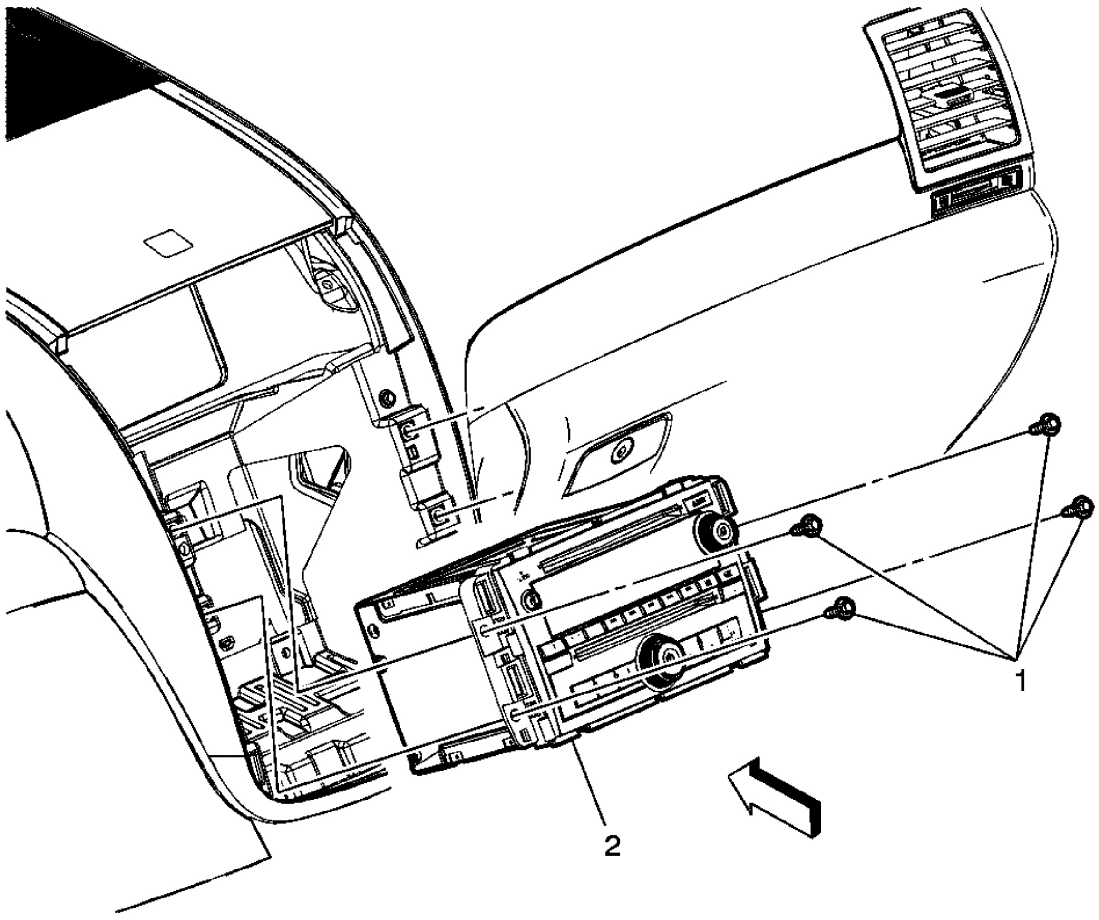


Fig. 106: View Of Radio
Courtesy of GENERAL MOTORS CORP.

Radio Replacement

Callout	Component Name
Preliminary Procedure: Remove the instrument panel accessory trim plate. Refer to **Instrument Panel Accessory Trim Plate Replacement** .	
1	Radio Screw (Qty: 4) **NOTE:**

	Refer to Fastener Notice . **Tighten:** 2.5 N.m (22 lb in)
2	Radio Assembly **Procedure** 1. Disconnect the electrical connector. 2. Disconnect the antenna cable. 3. Reprogram the radio after replacement. Refer to **Control Module References** . **Tip:** When installing the radio verify that the locator pin on the back of the radio is firmly seated in the I/P structure extension.

DIGITAL RADIO RECEIVER REPLACEMENT

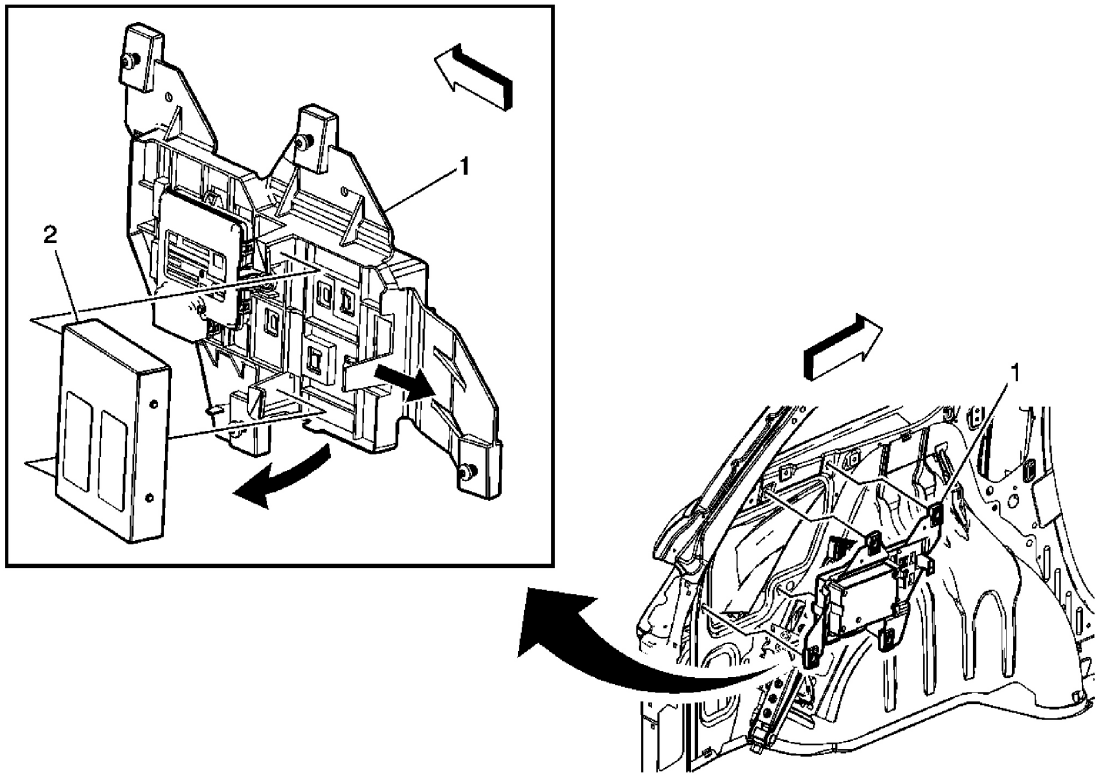


Fig. 107: Identifying Digital Radio Receiver

Courtesy of GENERAL MOTORS CORP.

Digital Radio Receiver Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the left rear quarter lower trim panel. Refer to **Rear Quarter Lower Trim Panel Replacement (without RPO E61)** or **Rear Quarter Lower Trim Panel Replacement (with RPO E61)** . 2. Remove the liftgate close actuator bracket (if equipped). Refer to **Liftgate Close Actuator Bracket Replacement** .	
1	Communication Interface Module Bracket **Procedure:** Disconnect the electrical connectors.
2	Digital Radio Receiver **Tip:** Pull tab to release the receiver.

AMPLIFIER REPLACEMENT (WITH UQG)

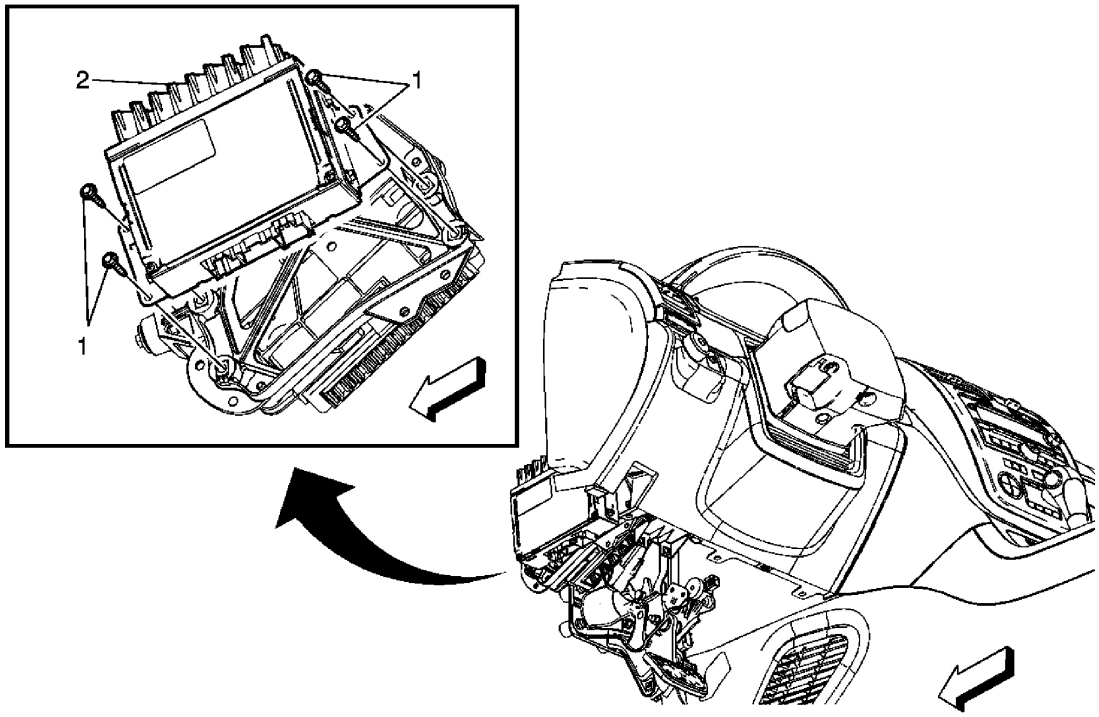


Fig. 108: Identifying Amplifier (With UQG)
Courtesy of GENERAL MOTORS CORP.

Amplifier Replacement (With UQG)

Callout	Component Name
Preliminary Procedure: Remove the left side instrument panel insulator panel. Refer to **Instrument Panel Insulator Panel Replacement - Left Side** .	
1	Radio Speaker Amplifier Screw (Qty: 4) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2.5 N.m (22 lb in)
2	Radio Speaker Amplifier Assembly **Procedure:** Disconnect the electrical connector.

AMPLIFIER REPLACEMENT (WITH UQA/UQS)

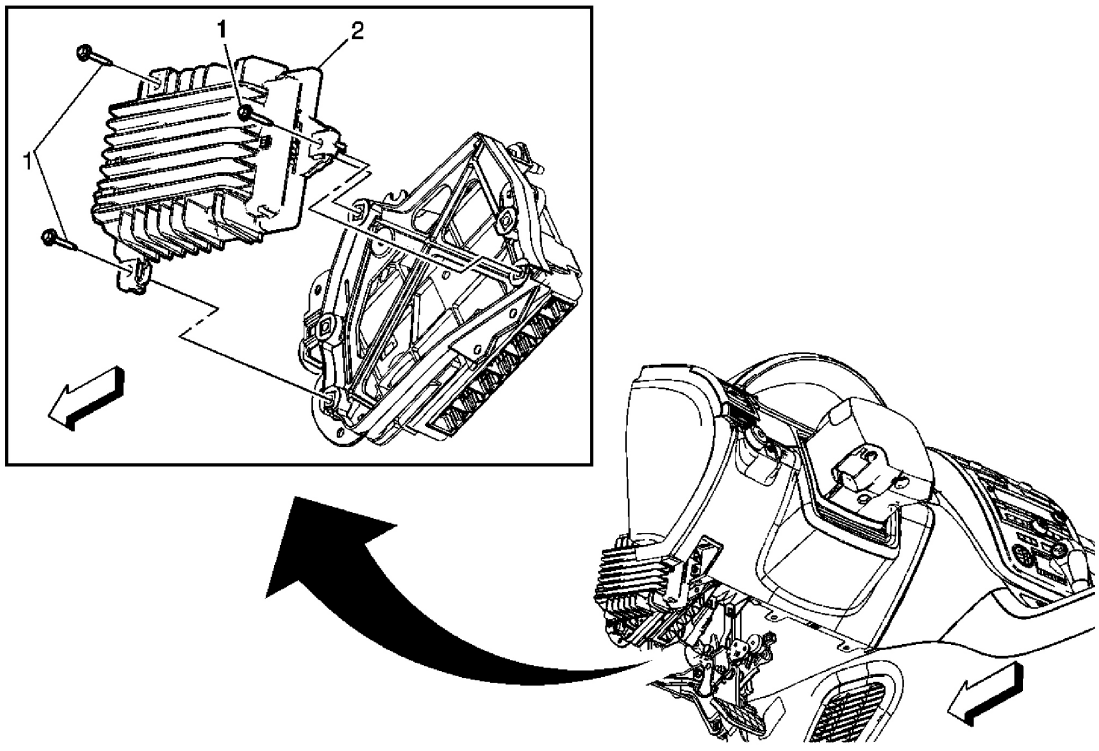


Fig. 109: Identifying Amplifier (With UQA/UQS)
Courtesy of GENERAL MOTORS CORP.

Amplifier Replacement (With UQA/UQS)

Callout	Component Name
Preliminary Procedure: Remove the left side instrument panel insulator panel. Refer to **Instrument Panel Insulator Panel Replacement - Left Side** .	
1	Radio Speaker Amplifier Screw (Qty: 3) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2.5 N.m (22 lb in)
2	Radio Speaker Amplifier Assembly **Procedure:** Disconnect the electrical connector.

RADIO ANTENNA BASE REPLACEMENT

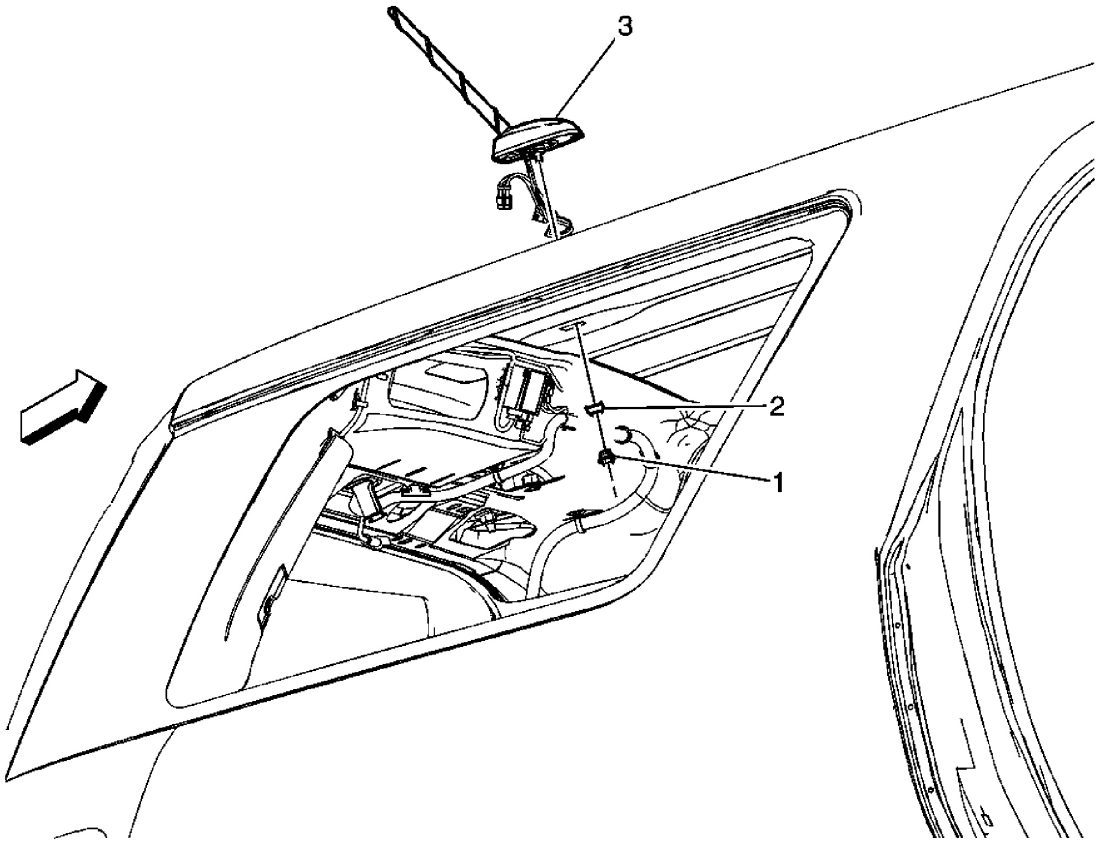


Fig. 110: View Of Radio Antenna Base

Courtesy of GENERAL MOTORS CORP.

Radio Antenna Base Replacement

Callout	Component Name
Preliminary Procedure: Lower the rear of the headliner. Refer to **Headlining Trim Panel Replacement** .	
1	Radio Antenna Base Nut **NOTE:** **Refer to Fastener Notice** **Tighten:** 9 N.m (80 lb in)
2	Radio Antenna Base Washer
3	Radio Antenna Base Assembly **Procedure:** Disconnect the electrical connections.

DIGITAL RADIO ANTENNA REPLACEMENT

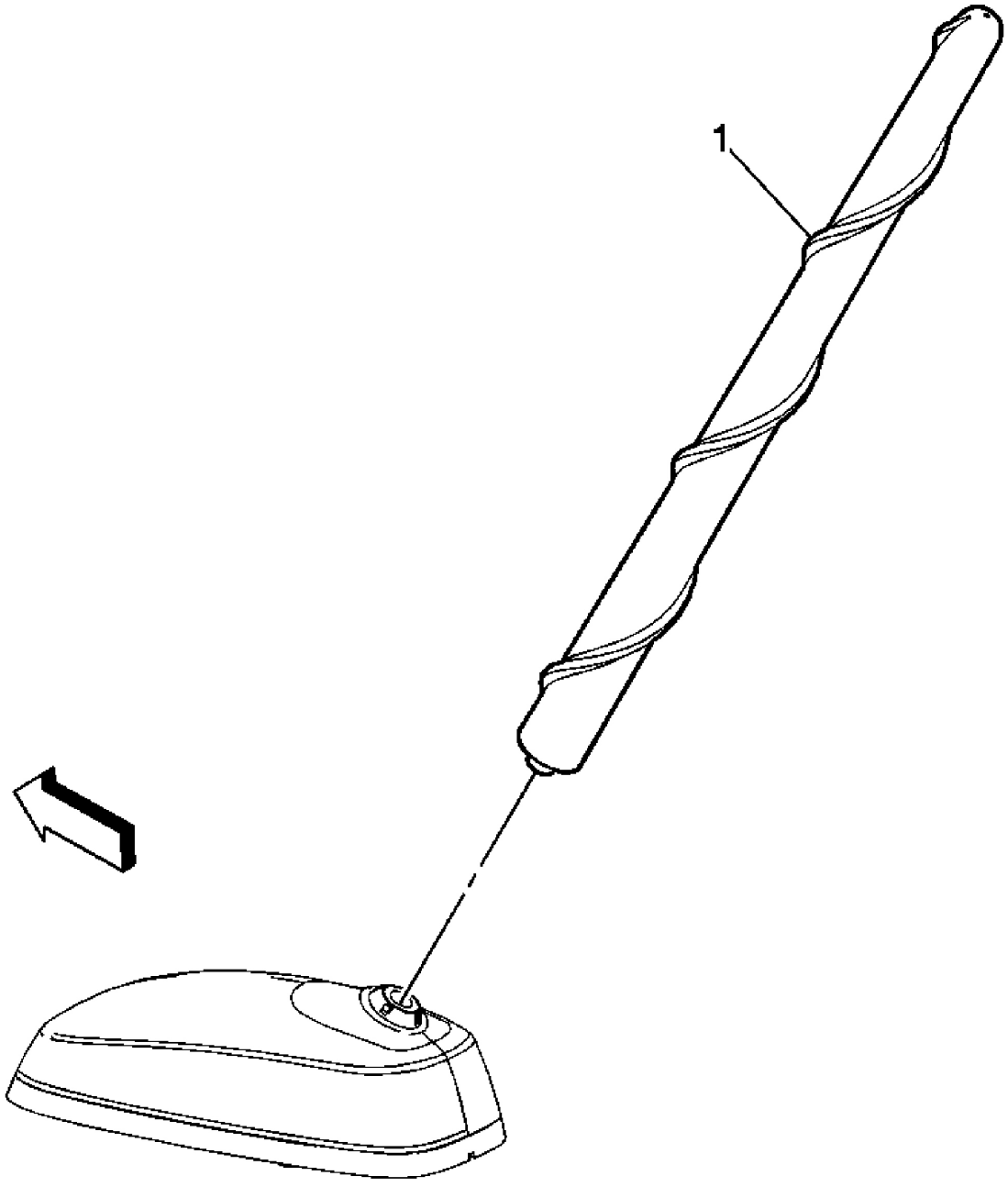


Fig. 111: Identifying Digital Radio Antenna
Courtesy of GENERAL MOTORS CORP.

Digital Radio Antenna Replacement

Callout	Component Name
1	Radio Antenna **Procedure:**

	Screw the radio antenna into the radio antenna base assembly.

GLOBAL POSITIONING SYSTEM (GPS) ANTENNA REPLACEMENT

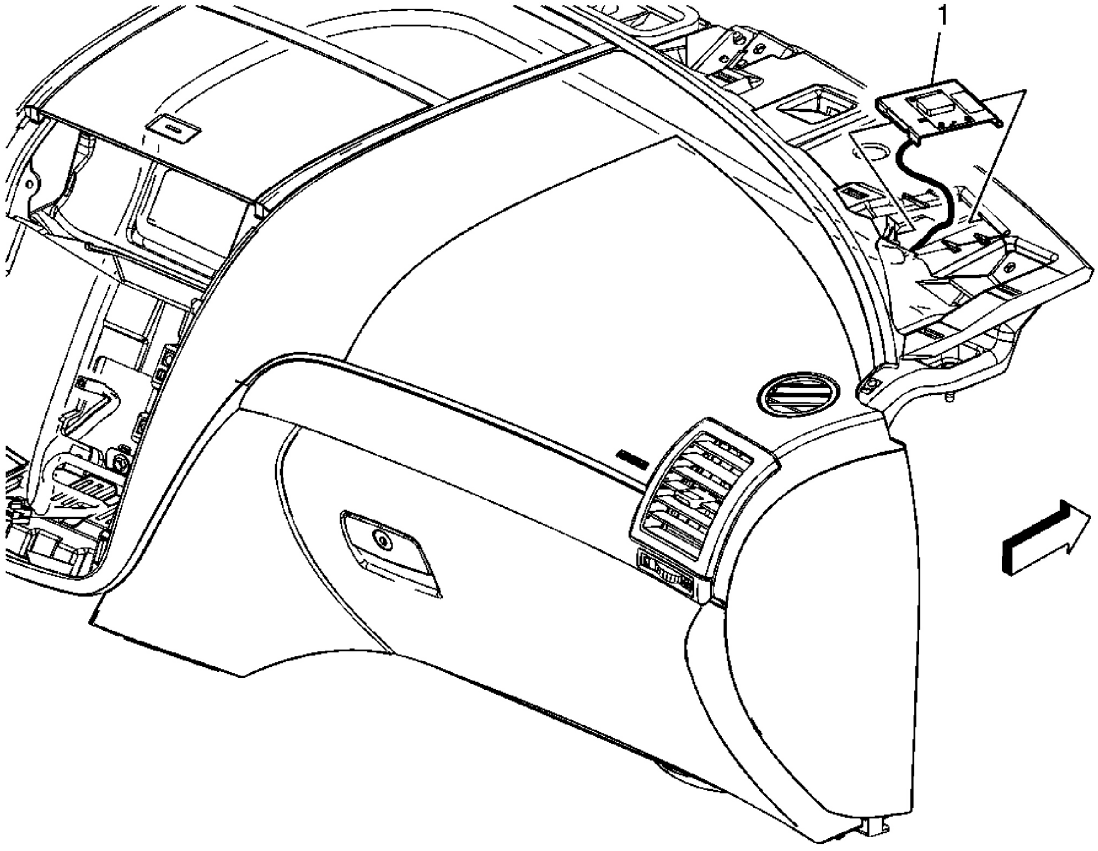


Fig. 112: View Of Global Positioning System (GPS) Antenna
Courtesy of GENERAL MOTORS CORP.

Global Positioning System (GPS) Antenna Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the instrument panel upper trim panel. Refer to **Instrument Panel Upper Trim Panel with Windshield Defroster Nozzle Grille Replacement** . 2. Remove the radio. Refer to **Radio Replacement**.	
	Navigation Antenna Assembly **Procedure**

1	1. Disconnect the navigation antenna from the radio. 2. Pull the tab back to release the navigation antenna from the I/P upper trim pad.

DIGITAL RADIO ANTENNA CABLE REPLACEMENT

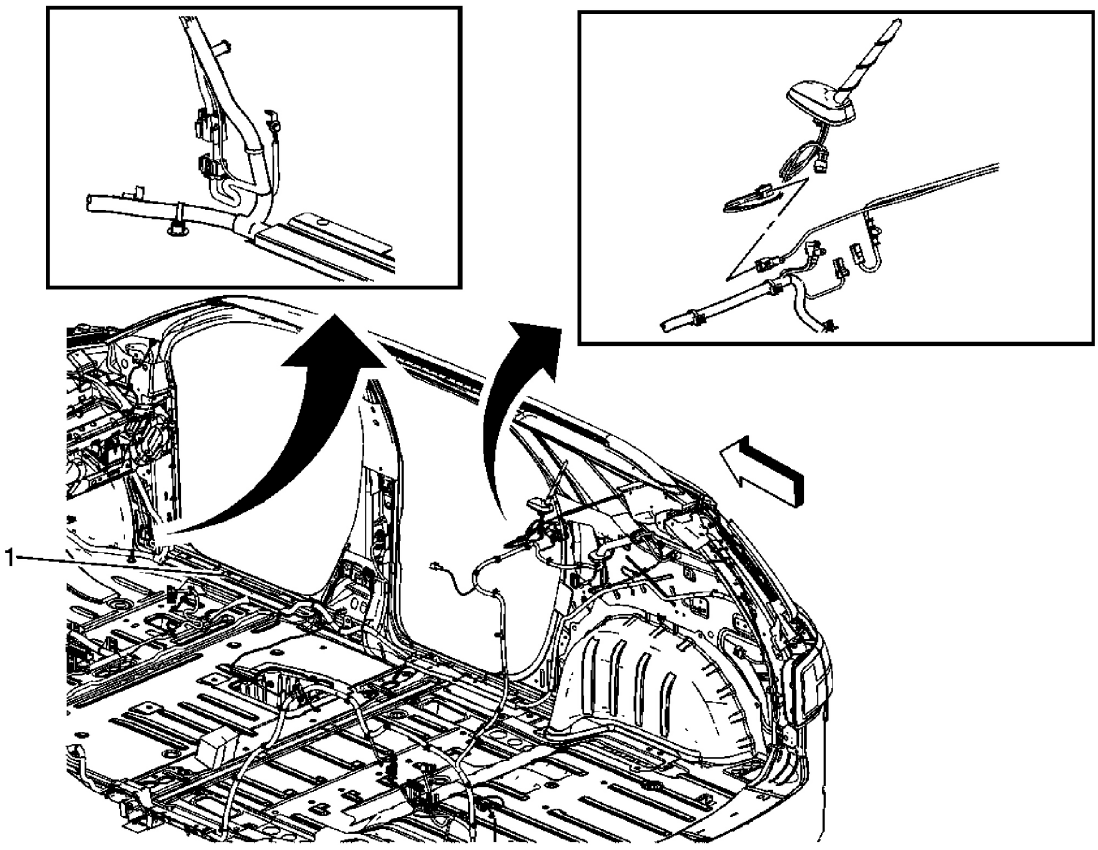


Fig. 113: Identifying Digital Radio Antenna Cable
Courtesy of GENERAL MOTORS CORP.

Digital Radio Antenna Cable Replacement

Callout	Component Name
Preliminary Procedures	
1. Remove the right rear quarter lower trim panel. Refer to **Rear Quarter Lower Trim Panel Replacement (without RPO E61)** or **Rear Quarter Lower Trim Panel Replacement (with RPO E61)** . 2. Remove the right center pillar lower garnish molding. Refer to **Center Pillar Lower**	

	Garnish Molding Replacement . 3. Remove the right front carpet retainer. Refer to **Front Carpet Retainer Replacement** . 4. Remove the right front floor panel carpet as needed. Refer to **Front Floor Panel Carpet Replacement - Right Side** . 5. Lower the rear of the headliner as needed. Refer to **Headlining Trim Panel Replacement** . 6. Remove the I/P compartment. Refer to **Instrument Panel Compartment Replacement** . 7. Remove the radio. Refer to **Radio Replacement**.
1	Digital 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.

ANTENNA CABLE REPLACEMENT

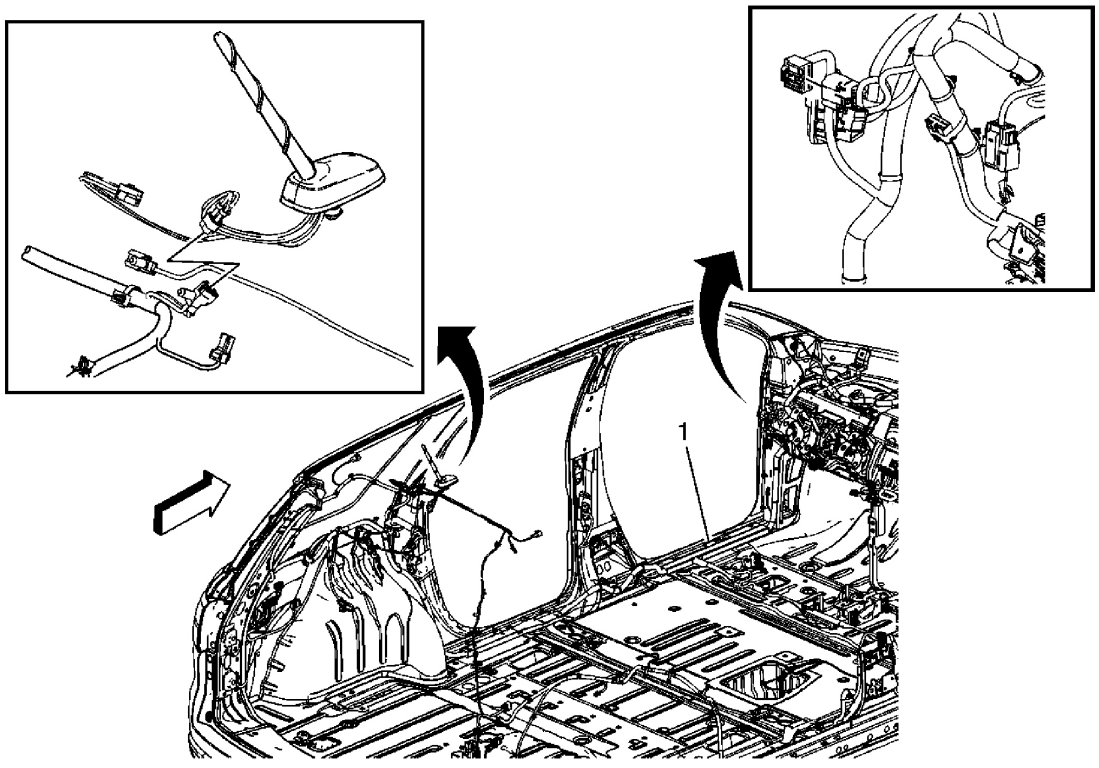


Fig. 114: View Of Antenna Cable
Courtesy of GENERAL MOTORS CORP.

Antenna Cable Replacement

Callout	Component Name

Preliminary Procedures

1. Remove the left rear quarter lower trim panel. Refer to **Rear Quarter Lower Trim Panel Replacement (without RPO E61)** or **Rear Quarter Lower Trim Panel Replacement (with RPO E61)** .
2. Remove the left center pillar lower garnish molding. Refer to **Center Pillar Lower Garnish Molding Replacement** .
3. Remove the front carpet retainer. Refer to **Front Carpet Retainer Replacement** .
4. Remove the front floor panel carpet as needed. Refer to **Front Floor Panel Carpet Replacement - Left Side** or **Front Floor Panel Carpet Replacement - Right Side** .
5. Lower the rear of the headliner as needed. Refer to **Headlining Trim Panel Replacement** .

6. Remove the left IP outer trim cover. Refer to **Instrument Panel Outer Trim Cover Replacement** . 7. Remove the radio. Refer to **Radio Replacement**.	
1	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.

AUDIO SYSTEM TRANSCEIVER MODULE REPLACEMENT (U42)

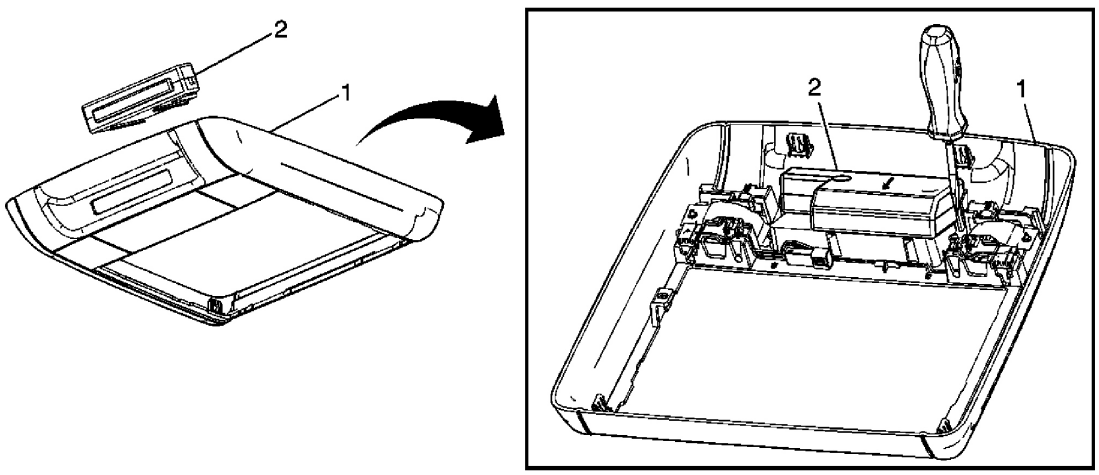


Fig. 115: View Of Audio System Transceiver Module
Courtesy of GENERAL MOTORS CORP.

Audio System Transceiver Module Replacement (U42)

Callout	Component Name
Preliminary Procedure: Remove the video display assembly. Refer to **Video Display Replacement (U42)** or **Video Display Replacement (U42/C3U)**.	
1	Roof Console Assembly Refer to **Roof Rear Console Replacement** .
	Audio System Transceiver Module Assembly

2	**Procedure** 1. Disconnect the electrical connector. 2. Use a flat bladed tool to release the tabs that secure the module to the roof console on each side of the module. 3. Slide forward and up to release from the roof console.

AUDIO SYSTEM TRANSCEIVER MODULE REPLACEMENT (U42/C3U)

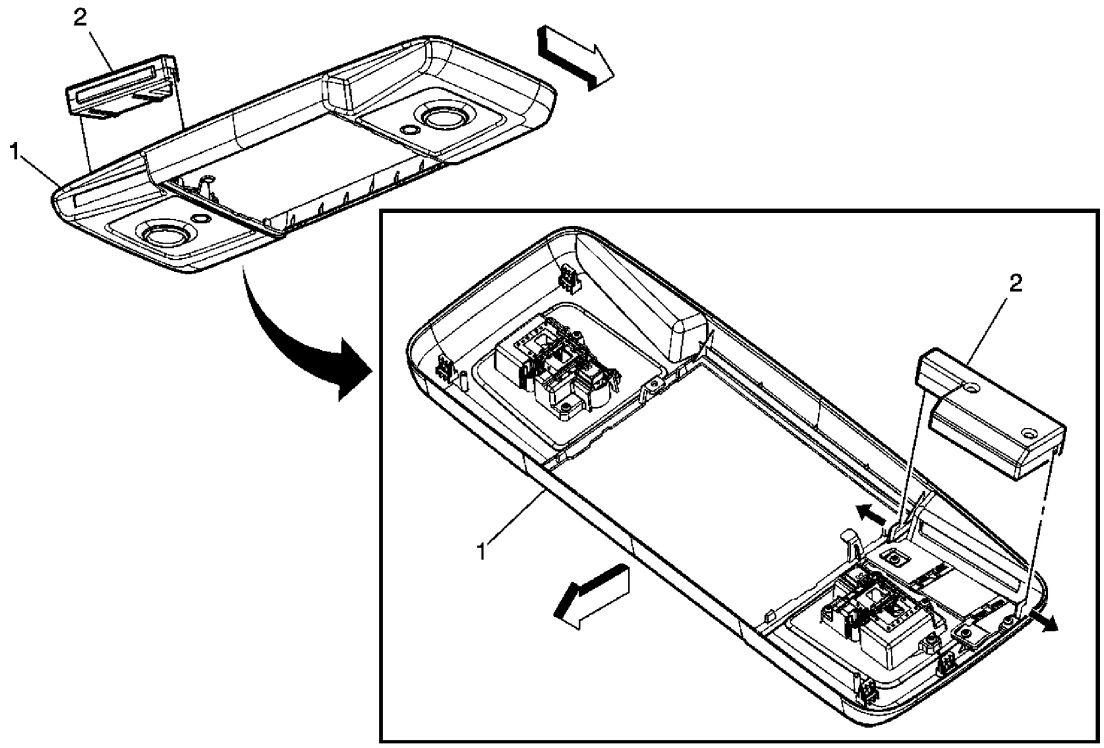


Fig. 116: Identifying Audio System Transceiver Module (U42/C3U)
Courtesy of GENERAL MOTORS CORP.

Audio System Transceiver Module Replacement (U42/C3U)

Callout	Component Name
Preliminary Procedure: Remove the video display assembly. Refer to **Video Display Replacement (U42)** or **Video Display Replacement (U42/C3U)**.	
1	Roof Console Assembly Refer to **Roof Rear Console Replacement** .

2	Audio System Transceiver Module Assembly **Procedure** 1. Disconnect the electrical connector. 2. Use a flat bladed tool to release the tabs that secure the module to the roof console on each side of the module. 3. Slide forward and up to release from the roof console.

VIDEO DISPLAY REPLACEMENT (U42)

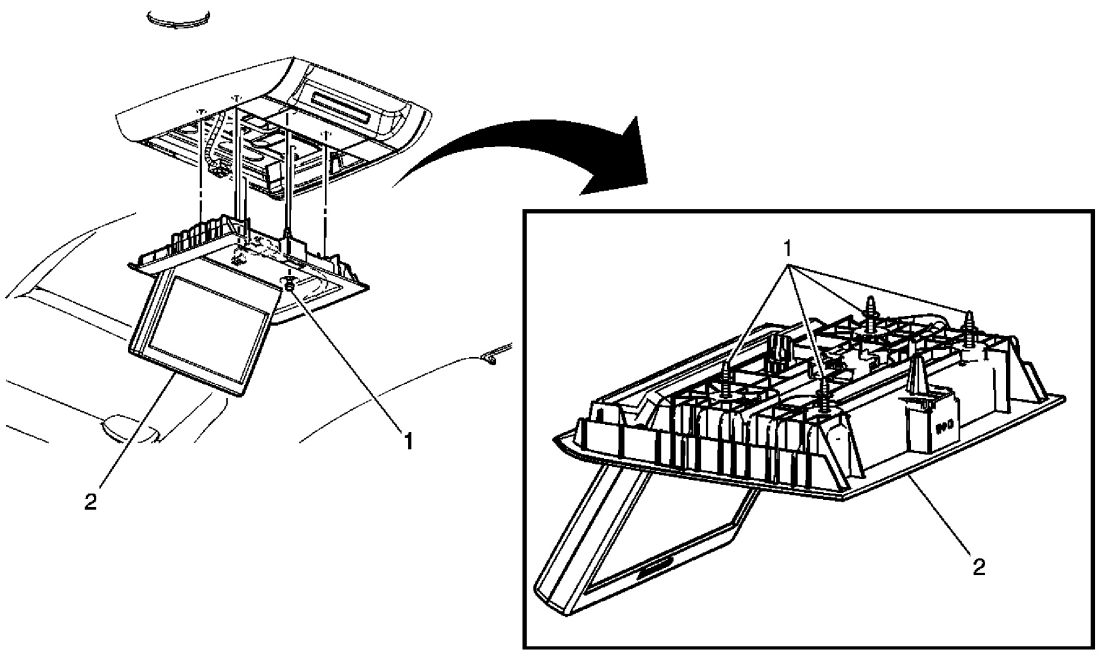


Fig. 117: View Of Video Display & Screws
Courtesy of GENERAL MOTORS CORP.

Video Display Replacement (U42)

Callout	Component Name
	Video Display Assembly Screw (Qty: 4) **NOTE:** **Refer to Fastener Notice .**

1	**Procedure:** Make sure that all 4 washers on the 4 mounting screws are accounted for. If any washers are off the screw and loose, discard to prevent a rattle. The washers were required only for assembly plant installation and can be used if still on the screw or they can be discarded. **Tighten:** 2 N.m (18 lb in)
2	Video Display Assembly **Procedure** 1. Pull down to disengage the retainer clip and remove from the vehicle. 2. Disconnect the electrical connector.

VIDEO DISPLAY REPLACEMENT (U42/C3U)

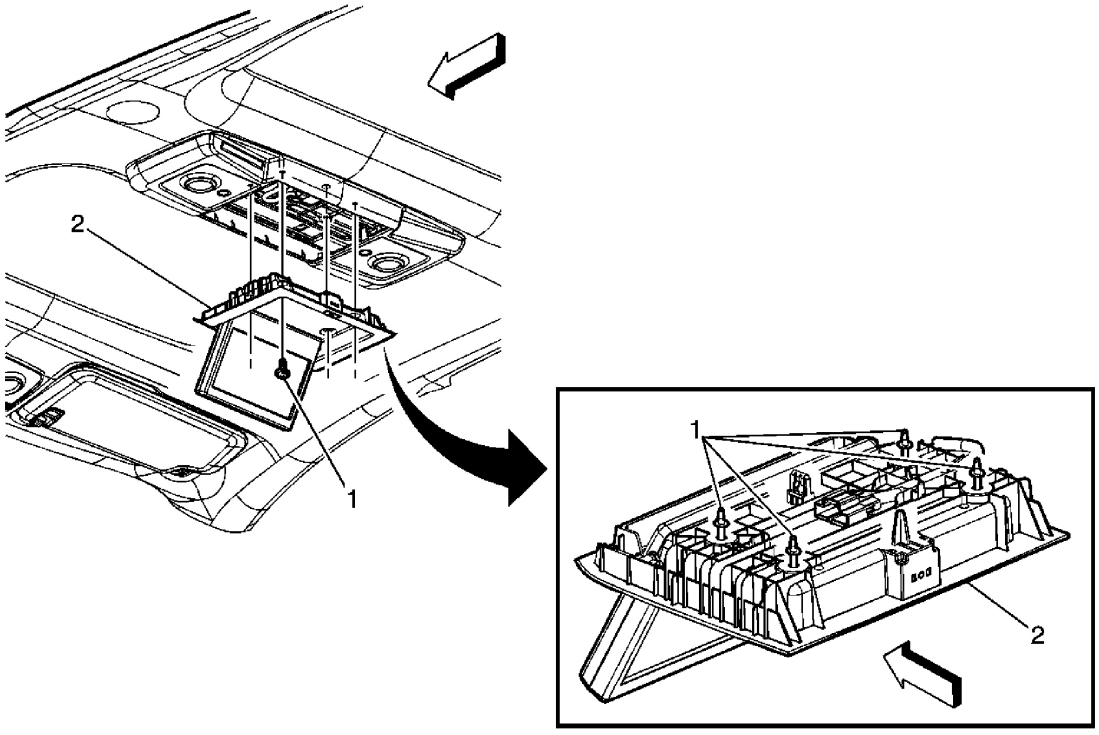


Fig. 118: Identifying Video Display
Courtesy of GENERAL MOTORS CORP.

Video Display Replacement (U42/C3U)

Callout	Component Name

1	Video Display Assembly Screw (Qty: 4) **NOTE:** **Refer to Fastener Notice .** **Procedure:** Make sure that all 4 washers on the 4 mounting screws are accounted for. If any washers are off the screw and loose, discard to prevent a rattle. The washers were required only for assembly plant installation and can be used if still on the screw or they can be discarded. **Tighten:** 2 N.m (18 lb in)
2	Video Display Assembly **Procedure** 1. Pull down to disengage the retainer clip and remove from the vehicle. 2. Disconnect the electrical connector.

REAR SEAT AUDIO CONTROL REPLACEMENT

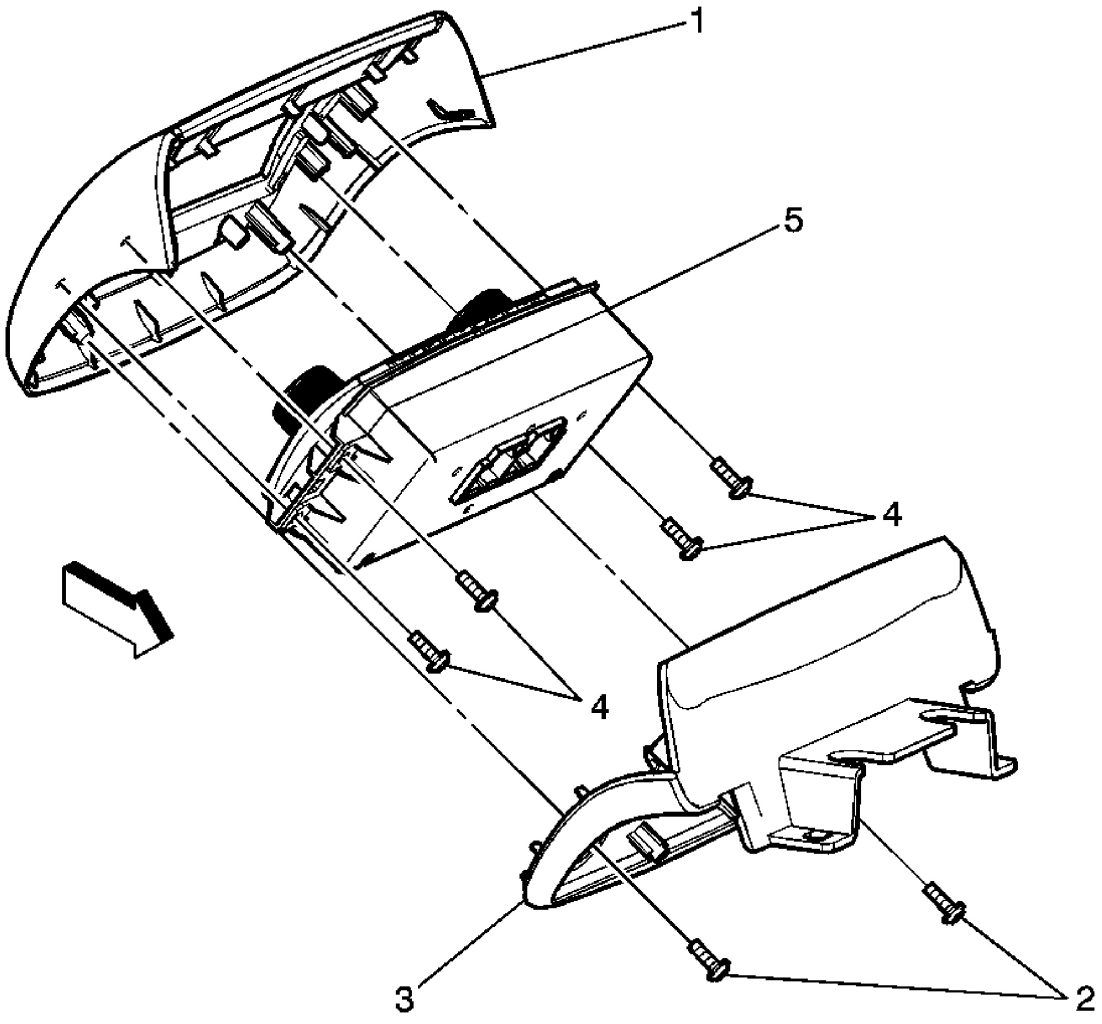


Fig. 119: Identifying Rear Seat Audio Control
Courtesy of GENERAL MOTORS CORP.

Rear Seat Audio Control Replacement

Callout	Component Name
1	Front Floor Console Extension Accessory Upper Bezel Refer to **Front Floor Console Extension Accessory Upper Bezel Replacement** .
2	Front Floor Console Extension Accessory Upper Bezel Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2 N.m (18 lb in)

3	Front Floor Console Extension Accessory Upper Bezel Closeout
4	Heater and A/C and Radio Control Module Screw (Qty: 4) **Tighten:** 2 N.m (18 lb in)
5	Heater and A/C and Radio Control Module Assembly

AUDIO/VIDEO DISC PLAYER ADAPTER REPLACEMENT

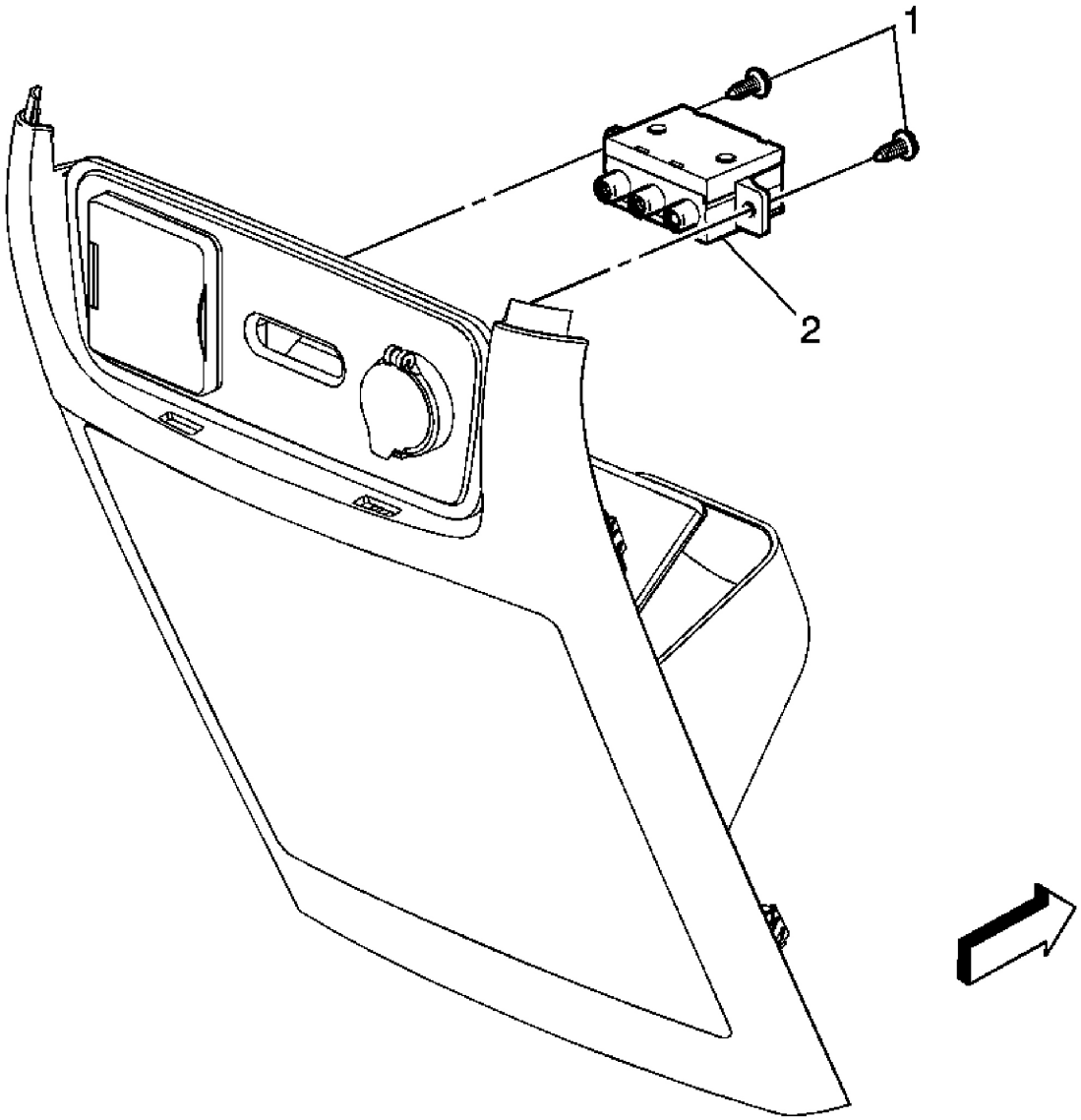


Fig. 120: View Of Audio/Video Disc Player Adapter
Courtesy of GENERAL MOTORS CORP.

Audio/Video Disc Player Adapter Replacement

Callout	Component Name
Preliminary Procedure: Remove the console rear trim plate. Refer to **Console Rear Trim Plate Replacement** .	
1	Audio/Video Disc Player Adapter Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 2 N.m (18 lb in)
2	Audio/Video Disc Player Adapter Assembly

RADIO REAR SPEAKER GRILLE REPLACEMENT

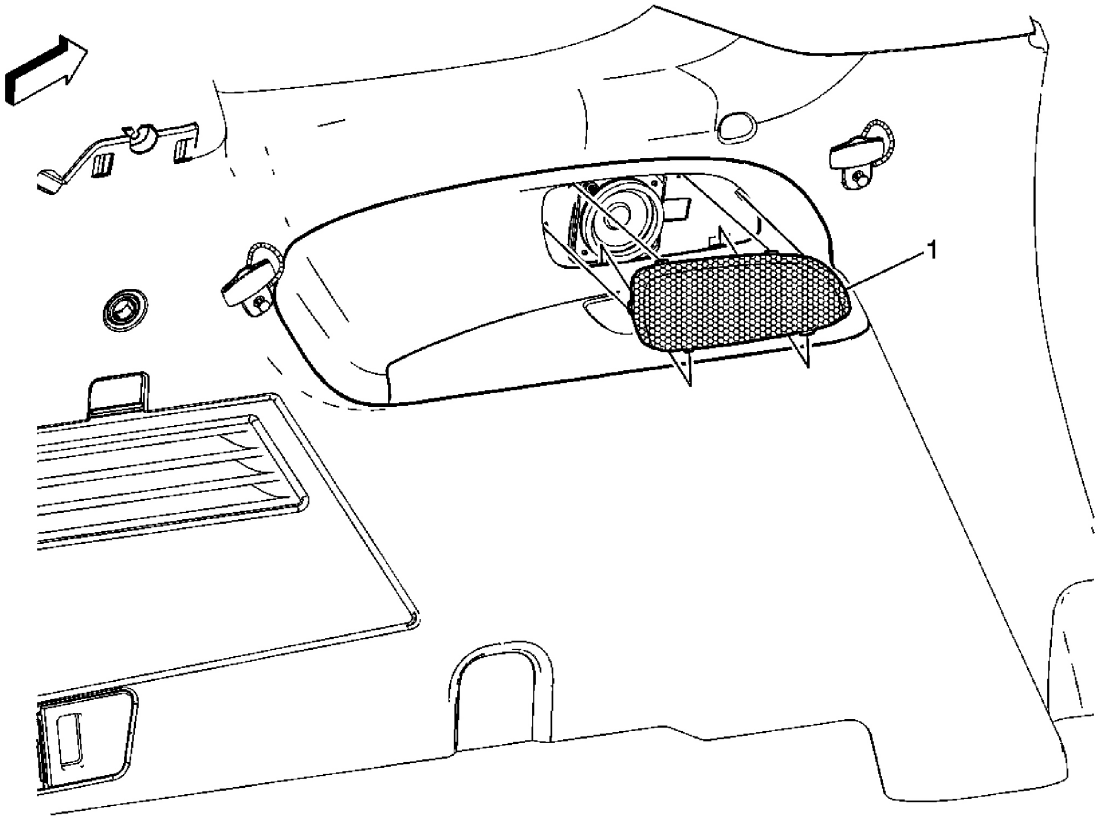


Fig. 121: Identifying Radio Rear Speaker Grille
Courtesy of GENERAL MOTORS CORP.

Radio Rear Speaker Grille Replacement

Callout	Component Name
Preliminary Procedure: Remove the rear quarter lower trim panel. Refer to **Rear Quarter Lower Trim Panel Replacement (without RPO E61)** or **Rear Quarter Lower Trim Panel Replacement (with RPO E61)** .	
1	Radio Rear Quarter Trim Panel Speaker Grille

RADIO FRONT SPEAKER REPLACEMENT

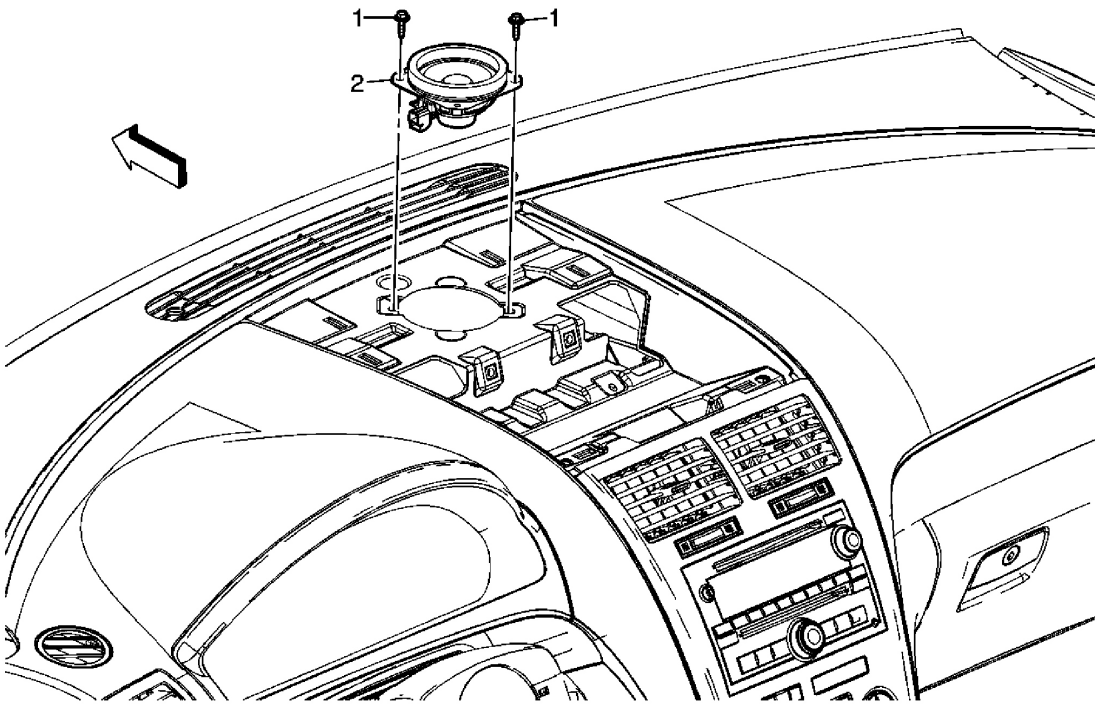


Fig. 122: View Of Radio Front Speaker
Courtesy of GENERAL MOTORS CORP.

Radio Front Speaker Replacement

Callout	Component Name
Preliminary Procedure: Remove the instrument panel center compartment. Refer to **Instrument Panel Center Compartment Replacement** .	
1	Radio Front Speaker Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .**

	Tighten: 2.5 N.m (22 lb in)
2	Radio Front Speaker Assembly **Procedure:** Disconnect the electrical connector.

RADIO FRONT SIDE DOOR SPEAKER REPLACEMENT

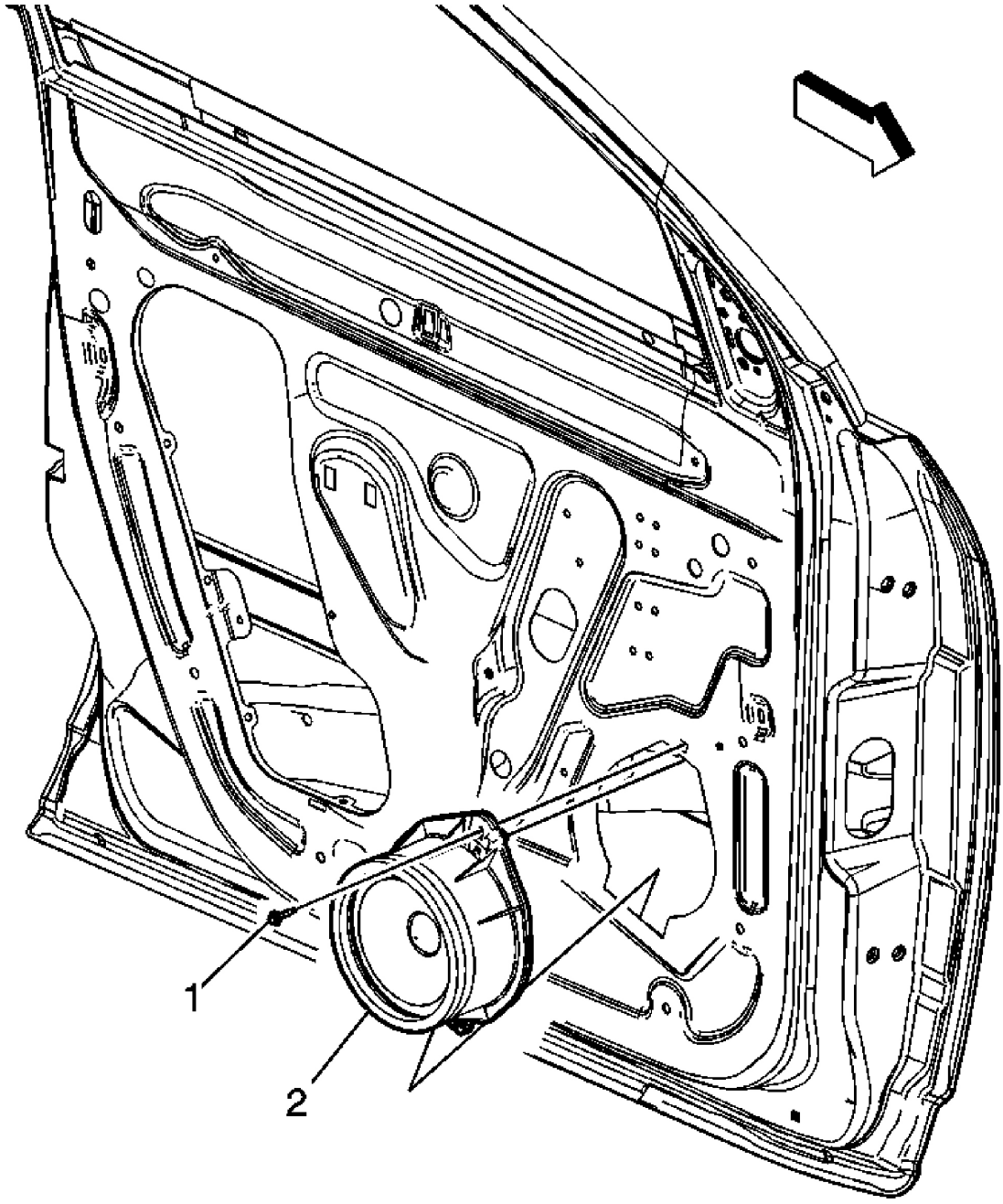


Fig. 123: Identifying Radio Front Side Door Speaker
Courtesy of GENERAL MOTORS CORP.

Radio Front Side Door Speaker Replacement

Callout	Component Name
Preliminary Procedure: Remove the front side door trim panel. Refer to **Front Side Door Trim Panel**	

Replacement - Left Side or **Front Side Door Trim Panel Replacement - Right Side** .	
1	Front Side Door Speaker Screw **NOTE:** **Refer to Fastener Notice .** **Tighten:** 3 N.m (25 lb in)
2	Front Side Door Speaker **Procedure:** Disconnect the electrical connectors.

RADIO FRONT FLOOR CONSOLE SPEAKER REPLACEMENT

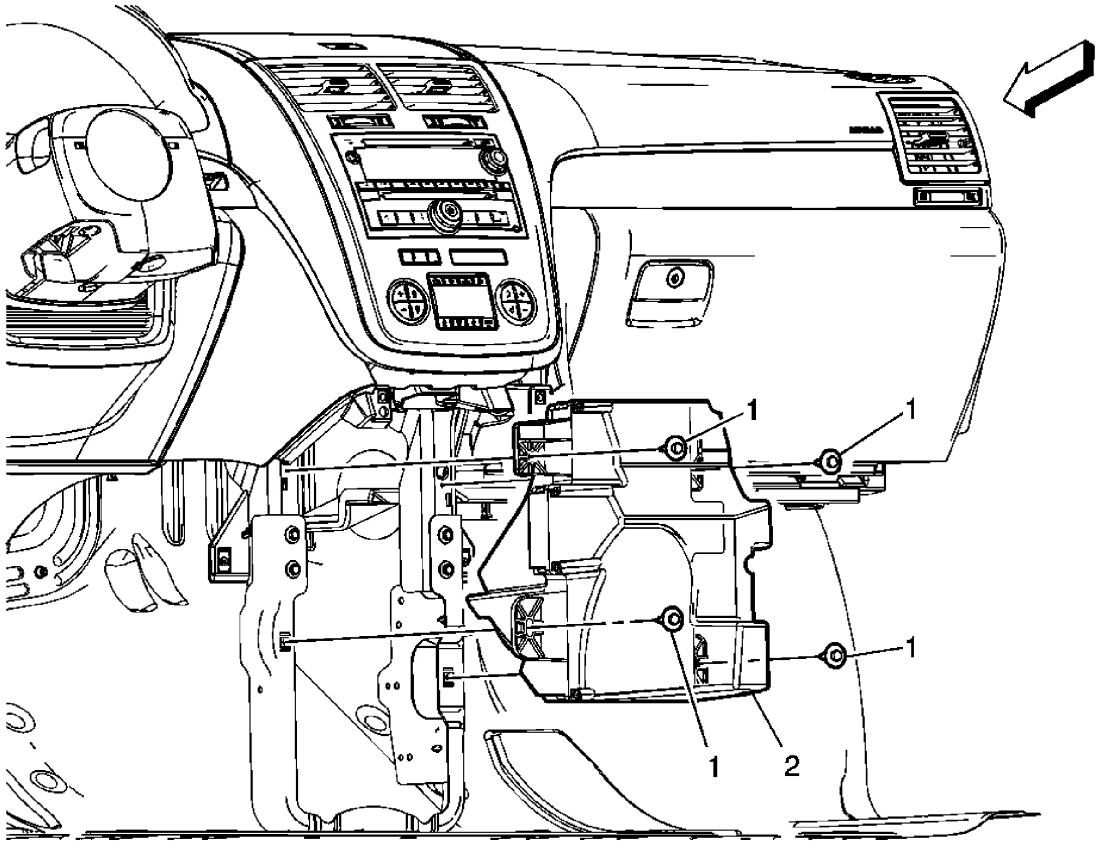


Fig. 124: Locating Radio Front Floor Console Speaker
Courtesy of GENERAL MOTORS CORP.

Radio Front Floor Console Speaker Replacement

Callout	Component Name

Preliminary Procedure: Remove the front floor console assembly. Refer to **Front Floor Console Replacement** .	
1	Radio Front Floor Console Speaker Screws (Qty: 4) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 9 N.m (80 lb in)
2	Radio Front Floor Console Speaker Assembly **Procedure:** Disconnect the electrical connector.

FRONT UPPER SPEAKER REPLACEMENT

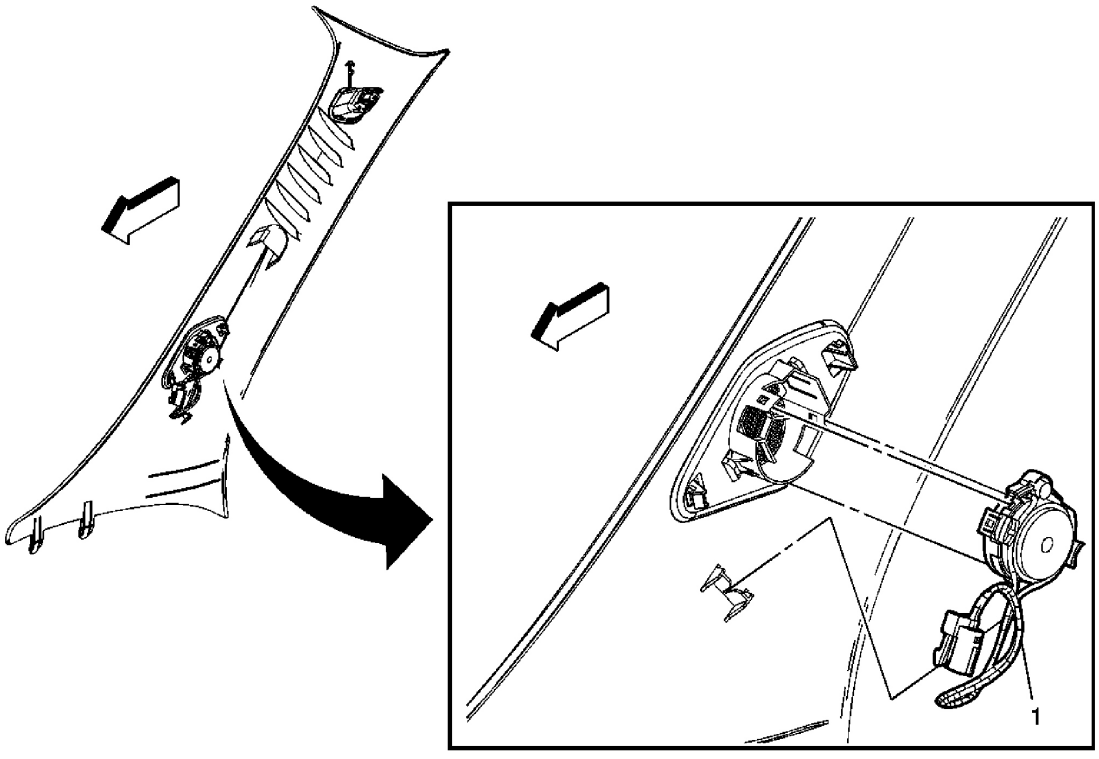


Fig. 125: View Of Front Upper Speaker
Courtesy of GENERAL MOTORS CORP.

Front Upper Speaker Replacement

Callout	Component Name
Preliminary Procedure:	

Remove the windshield pillar garnish molding. Refer to **Windshield Garnish Molding Replacement - Left Side** and **Windshield Garnish Molding Replacement - Right Side** .	
1	Radio Windshield Side Garnish Molding Speaker Assembly **Tip:** Press in the tabs on the speaker to release from the windshield pillar.

RADIO REAR SPEAKER REPLACEMENT

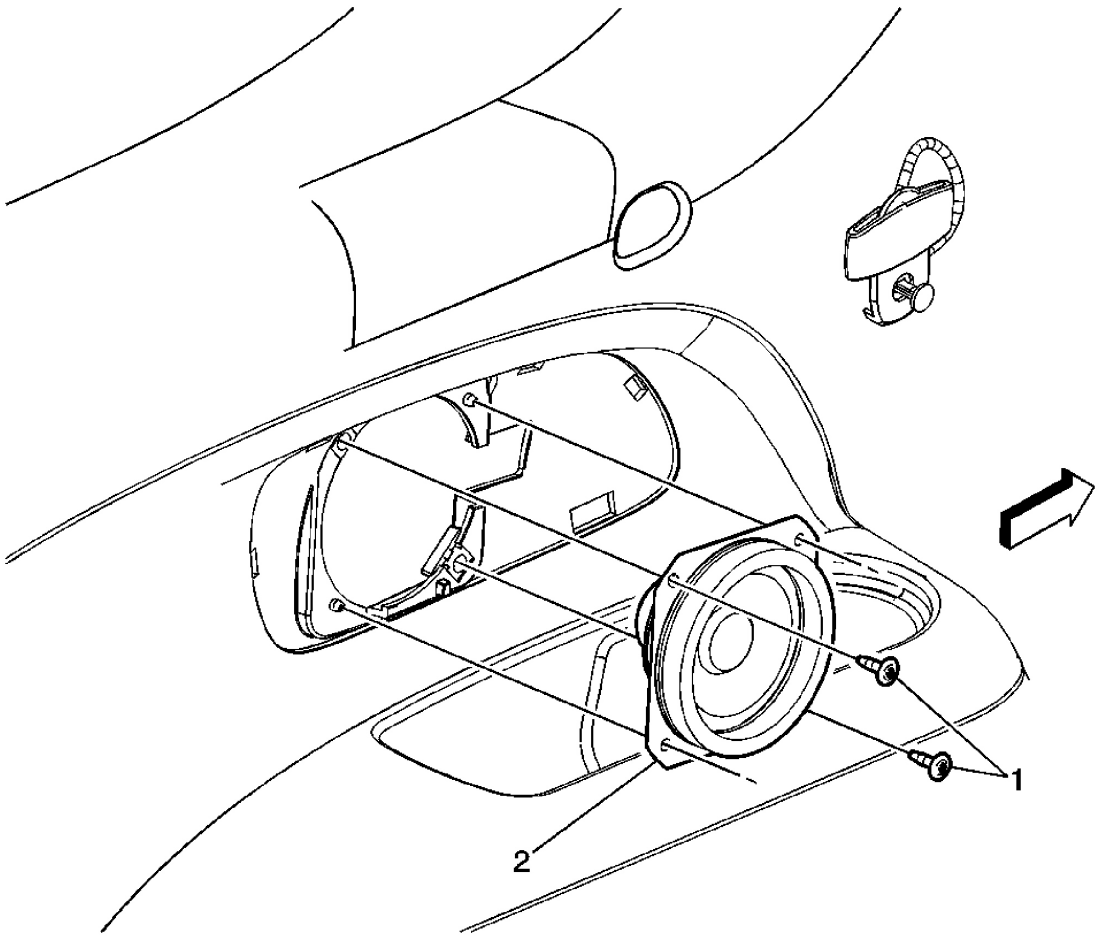


Fig. 126: View Of Radio Rear Speaker
Courtesy of GENERAL MOTORS CORP.

Radio Rear Speaker Replacement

Callout	Component Name
Preliminary Procedure: Remove the rear speaker grille. Refer to **Radio Rear Speaker Grille Replacement**.	

1	Radio Rear Quarter Trim Speaker Assembly Screw (Qty: 2) **NOTE:** **Refer to Fastener Notice .** **Tighten:** 3 N.m (25 lb in)
2	Radio Rear Quarter Trim Speaker Assembly **Procedure:** Disconnect electrical connector.

RADIO REAR SIDE DOOR SPEAKER REPLACEMENT

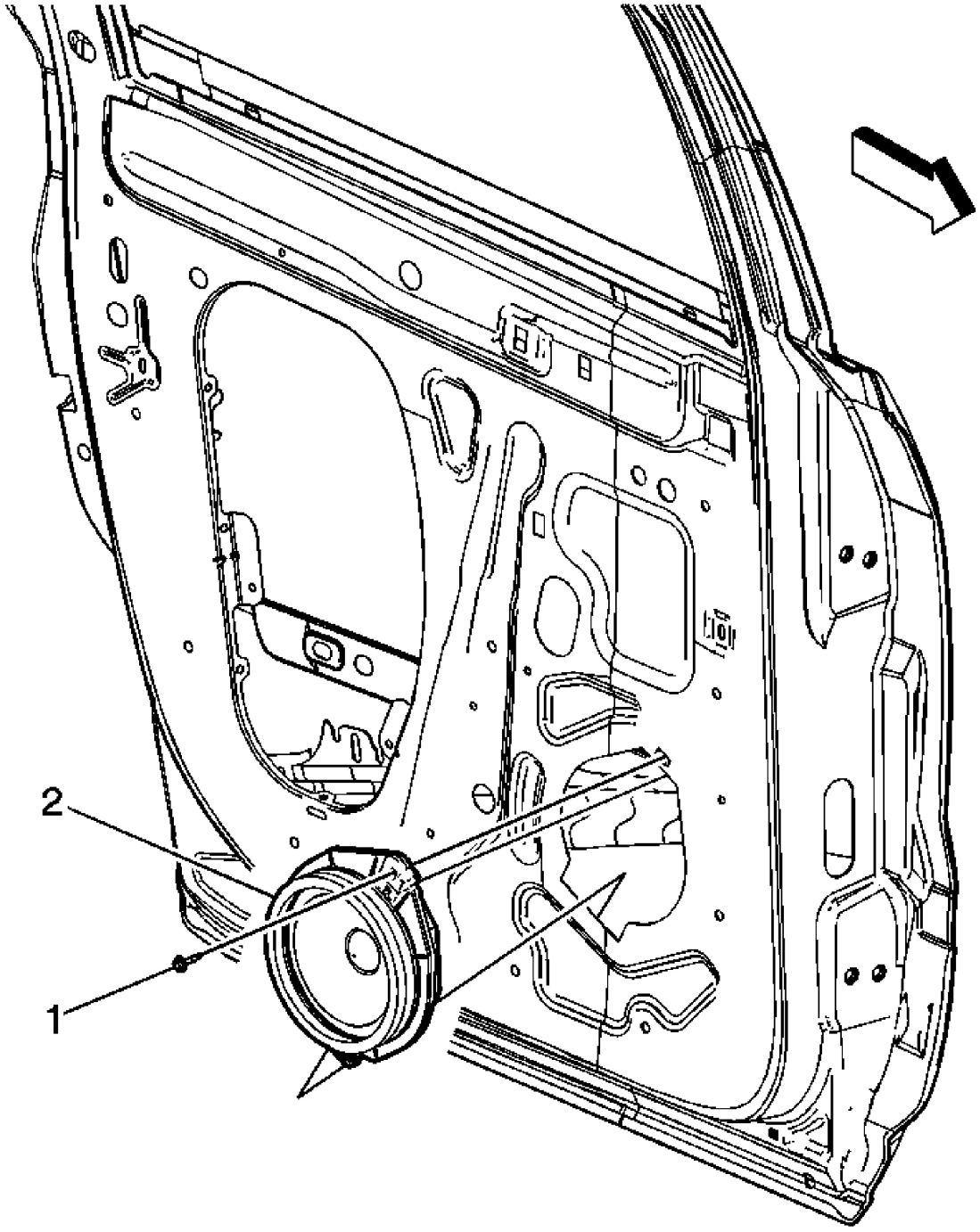


Fig. 127: Identifying Radio Rear Side Door Speaker
Courtesy of GENERAL MOTORS CORP.

Radio Rear Side Door Speaker Replacement

Callout	Component Name

Preliminary Procedure: Remove the rear door inner trim panel. Refer to **Rear Side Door Trim Panel Replacement** .	
1	Rear Side Door Speaker Screw **NOTE:** **Refer to Fastener Notice .** **Tighten:** 3 N.m (25 lb in)
2	Rear Side Door Speaker **Procedure:** Disconnect the electrical connectors.

DESCRIPTION AND OPERATION

NAVIGATION SYSTEM DESCRIPTION AND OPERATION

Operator Controls

Band	Changes between AM/FM1/FM2/WX
Config	Press to change system settings
Eject	Press to eject the map DVD
Map	Press to enter map mode
Repeat	Press to repeat the last voice guidance
Source	Changes between the different
Tilt	Press to tilt the position of the display screen
Tune/Seek	Allows the system to tune to the next preprogrammed station or to seek stations in the area

Navigation System Components

The navigation system contains the following components:

- Navigation radio
- Global positioning system (GPS) antenna
- Auxiliary RCA video jacks

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. The navigation radio provides the following:

- A display screen-All navigation, audio and TV functions are displayed on this screen
- Soft key buttons on the display to allow selection from menus and to operate the navigation system and the audio system.
- The navigation system map with routing information displayed on the navigation radio screen
- Provides verbal guidance to the operator

Global Positioning System (GPS) Antenna

The global positioning system (GPS) antenna is located in the upper center of the I/P. The GPS antenna is powered through the same coaxial cable used to send the signals to the NAV.

Auxiliary RCA Video Jacks

The auxiliary RCA video jacks are used to attach a remote video device. These connections may be used to provide audio and video input from a video player or camera to the rear seat entertainment system.

Voice Recognition

The Navigation System's 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 vehicle uses the Generation 6.1 version of the OnStar® system. This system consists of the following components:

- Vehicle communication interface module (VCIM)
- OnStar® button assembly
- Microphone
- Cellular antenna

- Navigation antenna

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

Vehicle Communication Interface Module (VCIM)

The vehicle communication interface module (VCIM) is a 3-watt cellular device that allows the user to communicate data and voice signals over the national cellular network. It is powered by a fused, battery positive, voltage circuit connected through the vehicle wiring to the 3-button assembly and the radio and attached by means of coax cables to the cellular and navigation antennas. Ground for the module is accomplished by means of dedicated circuits that are routed with body wiring systems to chassis ground points. The module houses 2 modems, one to process global positioning system (GPS) data and the other for cellular information. Satellites orbiting earth are constantly transmitting signals of their current location, from which the OnStar® system is able to pinpoint its own location. The navigation antenna receives these GPS signals and provides the data to the VCIM to be processed. The VCIM communicates with the rest of the vehicle over the class 2 or GMLAN serial data bus, depending upon the serial data architecture of the vehicle. The ignition state is determined by the VCIM through class 2 or GMLAN messaging. The module also has the capability of commanding the horn, initiating door lock/unlock and operating the exterior lamps using the serial data circuits. When an OnStar® keypress 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 system is muted, the OnStar® signals are transmitted to the audio system on the cellular telephone voice signal circuit and returned to the module on the cellular telephone voice low reference circuit. The cellular modem connects the OnStar® 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 antenna and cellular antenna coax.

OnStar® Button Assembly

The OnStar® button assembly may be part of the rearview mirror on some vehicles or a separate unit on others. 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 the personal calling feature, if equipped.
- 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 OnStar® button assembly receives 10 volts on the keypad supply voltage circuit. When pressed, each button completes a circuit across a resister allowing a specific voltage to be returned to the vehicle communication interface module (VCIM) on the keypad signal circuit. Depending upon the voltage range returned, the VCIM is able to identify which button has been pressed.

The OnStar® status LED is located to the right of the emergency button on a mirror-mounted assembly and to the left of the answer/end call button when the assembly is mounted on the dash or overhead console. 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. The OnStar® LED is controlled by the VCIM over the keypad red LED signal circuit and the keypad green LED signal circuit.

OnStar® Microphone

The OnStar® or cellular microphone can be part of the rearview mirror assembly or on some vehicle lines, can be a separate, stand alone unit. In either case, the microphone is supplied voltage on the cellular microphone signal circuit, while voice data from the user is sent back to the vehicle communication interface module (VCIM) by means of either a cellular microphone low reference circuit or a drain wire.

Cellular and Navigation Antennas

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

- Separate, stand-alone cellular and navigation antennas
- A combination cellular and navigation antenna, which brings the functions of both into a single part
- A cellular, navigation and digital radio antenna, which also incorporates the functionality of the digital radio receiver satellite and terrestrial antennas (XM)

The cellular antenna is the component that allows the OnStar® system to send and receive data over airwaves by means of cellular technology. This antenna is connected at the base to a coax cable that plugs directly into the vehicle communication interface module (VCIM). The navigation antenna is used to collect the constant signals of the orbiting satellites. Within the antenna, is housed a low noise amplifier that allows for a more broad and precise reception of this data. The current global positioning system (GPS) location is collected by the module every time a keypress is made. The OnStar® Call Center also has the capability of pinging the vehicle during an OnStar® call, which commands the module 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. In the event the VCP loses or is removed from power, this history location is used by the OnStar® Call Center as a default. Actual GPS location may take up to 10 minutes to register in the event of a loss of power. This antenna requires a clear and unobstructed path to the satellites in the sky. Window tinting on vehicles may interfere with the GPS sensor functions, depending upon the location of the GPS antenna and the amount of darkening and/or metallic particles that are embedded in the film of the tinting material.

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. This cycle enables the vehicle communication interface module (VCIM) to perform remote functions, such as door unlock, as commanded over the air by the OnStar® Call Center, when requested by the customer and to continue to maintain an acceptable level of battery electrical drain.

The Generation 6.1 version of OnStar® 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

When in an analog cellular market, the high power state is in effect whenever the ignition is in the ON or RUN position and enables the OnStar® system to send and receive cellular calls and perform all remote functions. The low power state is entered once the vehicle ignition is placed in the OFF position and the retained accessory power (RAP) function has been turned OFF or times out. This state will last for 1 minute and allows incoming cellular calls to be received. After the 1 minute window, the OnStar® system moves to the sleep state. This state will not recognize or receive incoming cellular calls. At a predetermined time recorded within the VCIM, up to 9 minutes, 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. After these 9 minutes, the system will again enter the low state of power and listen for any incoming calls that the OnStar® Call Center may be sending. In the event a call is being sent, 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 permanently enter the sleep state until the ignition is once again turned to the ON or RUN position.

In a digital cellular service market the high power state is in effect whenever the ignition is in the ON or RUN position and also enables the OnStar® system to send and receive cellular calls and perform all remote functions. The digital standby power state is in effect after the vehicle has been shut off and the RAP has timed out. 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 8 hours. After 8 hours, the OnStar module will follow the standard sleep state as though in an analog cellular market (9 minutes OFF, 1 minute of digital standby, based on the time of the global positioning system (GPS) signals).

In the event the OnStar® system loses or is temporarily removed from battery power, the system will remain in the sleep state while the key in the OFF position. It will not begin to cycle until the vehicle passes into an open outside area with the ignition ON, where a GPS signal can be acquired, providing a reference for time. The OnStar® Call Center is able to maintain a record of exactly what time each vehicle will enter the 1 minute low power state by synchronizing their clocks with those of the vehicle, based on GPS signals.

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 vehicle has been successfully deactivated, customers will experience the following when attempting to contact OnStar® from their vehicle:

- During an OnStar® Call Center button press, the customer will be connected to 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.
- During an emergency button press, a demo message will be played indicating the service has been deactivated.
- OnStar® Personal Calling (OPC) 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.

It is of particular note, that when an OnStar® system is successfully deactivated, it 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.

Certain vehicles that have never had an active OnStar® account, 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.

OnStar® Reconfiguration Procedure

Within the vehicle communication interface module (VCIM) are a set of unique numbers that identify the OnStar® customer and the specific vehicle the module resides in. These numbers, the station identification number (STID) and the electronic serial number (ESN) are transmitted over the cellular network when an OnStar® keypress is made and are essential for proper identification and connection to the OnStar® Call Center. In the event the VCIM requires replacement, the OnStar® reconfiguration procedure must be performed. This procedure allows for the new STID and ESN within the replacement module to overwrite the old numbers and update customer and vehicle information at the OnStar® Call Center. The reconfiguration process is explained within the VCIM replacement procedure or the OnStar® Reconfiguration Procedure found in the Cellular Communication diagnostic information and procedures section.

The default language for the new VCIM is English. Refer to Module Setup screen on the scan tool, within the Cellular Information section, if the customer requests French or Spanish Voice Recognition.

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 global positioning system (GPS).

The cellular operation of the OnStar® system may be inhibited by factors such as the user's range from an analog or digital cellular tower, the state of the cellular carriers' equipment and the location where the call is placed. Making an OnStar® keypress 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 (STID) and electronic serial number (ESN), are not recognized by the cellular carriers local signal receiving towers. OnStar® cellular connection issues such as these require the assistance of the General Motors Technical Assistance Center OnStar® Group, which coordinates with cellular carriers to resolve connection issues.

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.

OnStar® Personal Calling

The hands free, OnStar® personal calling (OPC) cellular phone feature is an additional option to the OnStar® system. This feature is already embedded within the vehicle communication interface module (VCIM), however, it must be activated by an OnStar® advisor. This is done most often during the initial OnStar® configuration, if the home location of the vehicle is in a geographic area where OnStar® personal calling is available. In the event this feature is not enabled, customers may connect to the OnStar® Call Center by pressing the blue OnStar® button and asking an advisor if OPC is available in their area. Users of the Generation 6.1 OnStar® system can verify the system has been configured for OnStar® Personal Calling by pressing the answer/end call button, waiting for the system to respond "OnStar Ready" then speaking the word "dial." If the system responds with a failure message, the system has not been configured for OPC. All other responses confirm that OPC has been enabled.

Operation of the Hands Free Cellular Phone

Onstar® Personal Calling (OPC) 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 OPC, the customer must also purchase units as outlined in the owner's guide provided with the OnStar® system. When the customer purchases minutes, an OnStar® advisor loads these minutes into the vehicle communication interface module (VCIM) over the airwaves at the time of the request or through a discrete cellular call to the vehicle at a later time. Once loaded into the module, the units may be used for non-international, outbound cellular phone calls and connection with the OnStar® virtual advisor. 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 also have an expiration date, depending upon the type of units purchased. This date is established when the download is performed and any remaining units

expire when the date within the VCIM, which is based on current date and the time transmitted by global positioning system (GPS) satellites, has passed. At any time, the user can press the answer/end call button, say "Units" and verify the number of units remaining.

During a hands free call, the microphone and audio system operate the same way as a standard OnStar® call. When the answer/end call button is pressed, the audio system will mute; the OnStar® system will then return the prompt "OnStar Ready." At this point there are specific commands set to initiate a cellular call. If the vehicle receives a call when the radio is ON, the audio system will mute and an audible ring will be heard though the speakers. The call will be answered when the answer/end call button is pressed.

The VCIM interprets all of the voice-activated commands. A complete list of these commands is supplied in the information provided to the customer. If the information is not available to reference, at any command prompt the caller can say "HELP" and the VCIM will return an audible list of available commands. If the customer concern is not being understood or not being heard by the OnStar® system, the user should place a call to the OnStar® call center to verify proper operation of the microphone. Following this description is an example of the commands and the OnStar® system responses. A complete list of commands is supplied in the information provided to the customer with the OnStar® system.

OnStar® Steering Wheel Controls

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 (OPC) feature is in use. If the Talk or Mute button, depending upon the vehicle, on the steering wheel controls are depressed during an OPC call, the vehicle communication module (VCIM) receives the message on the class 2 serial data bus from either the radio, the driver information module or the body control module (BCM). This message is interpreted as a request to turn any spoken numbers into dual tone multi-frequency (DTMF) 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, driver information module or BCM.

OPC Features

The following is an abbreviated list of features that may have an impact for the technician when servicing or diagnosing an OnStar® system. For a full list of OnStar® personal calling (OPC) features, consult the owner's guide provided to the customer with the OnStar® system.

Voice Feedback

The OnStar® personal calling (OPC) system has the capability of responding to the user with either an automated voice response or with a tone or beep. These 2 types of responses can be switched back and forth by pressing the answer/end call button, waiting for the system to respond "OnStar Ready" and speaking the phrase "voice feedback." The system will then respond, "voice feedback is now ON/OFF."

OPC Security/System Lock

Customers have the capability to lock their OnStar® personal calling (OPC) system by pressing the answer/end call button, speaking "security" and entering a 4-digit code. Once this process is complete, the user must enter the code before OnStar® personal calling is available. In the event the customer cannot remember their code and is unable to use their system, they can press the blue OnStar button and speak to an advisor to unlock the system by means of a discrete cellular call to the vehicle.

Nametags

Customers have the ability to store telephone numbers within the module, referenced by a nametag for the convenience of frequently dialed numbers. This process is initiated by pressing the answer/end call button, waiting for the system response, then speaking the response "store". The system will respond with "number please" at which time the user should enter the number desired to be stored. Once complete, saying the word "store" again lets the system know you are finished entering the number. At this time, the system will elicit the user to assign a nametag to that number. From this point forward, the user can dial this number by initiating the OnStar® personal calling (OPC) feature, speaking the word "call," and repeating the nametag assigned. To delete a nametag, the user should initiate OPC, say "delete" then speak the nametag to be removed. In the event a nametag cannot be deleted in spite of repeated attempts from several speakers, the OnStar® module will require replacement.

Mobile Identification Number and Mobile Directory Number

The Generation 6.1 vehicle communication interface module (VCIM) utilizes 2 numbers for cellular device identification, call routing and connection, a mobile identification number (MIN) and a mobile directory number (MDN). The MIN represents the number used by the cellular carrier for call routing purposes while the MDN represents the number dialed to reach the cellular devise. Although technicians have the capability to change these numbers by means of the

scan tool, this should ONLY be done at the direction of and with explicit instruction from General Motors Technical Assistance Center (GM TAC).

Placing a Call

To Dial a Number

What You Do	What You Hear
Press the white dot button	"OnStar Ready"
Say "Dial"	"Phone number to dial, please"
Say the entire phone number you wish to dial with no pauses	OnStar will repeat the number, then ask "Yes or No"
Say "Yes" if the phone number was correct or "No" to try again	"Dialing," and your call will be connected

After 3 unsuccessful tries or if you simply like it better, you can use the "Digit Dial" command to input digits one at a time. Digit Dial is set up to dial phone numbers like previous OnStar Personal Calling Systems.

To Dial a Number Using Digit Dial

What You Do	What You Hear
Press the white dot button	"OnStar Ready"
Say "Digit Dial"	"First digit to dial, please"
Say the number to be dialed, one digit at a time	OnStar will confirm each digit by repeating it back to you
When finished, say "Dial" again	"Dialing," and your call will be connected

To Place a Call Using a Stored Nametag

What You Do	What You Hear
Press the white dot button	"OnStar Ready"
Say "Call"	"Nametag, please"
Say (stored name)	"Calling"

To Place a Call Using the "Redial" Command

What You Do	What You Hear
Press the white dot button	"OnStar Ready"
Say "Redial"	"Redialing"

Operation of the OnStar® Speech Recognition Systems

OnStar® Generation 6.1 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 dot 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 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. • 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, it will tell you "Slower, please." Try pausing for a half second before speaking. • 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".

Personal Calling Commands

Command	Tip for Better Result
'add'	Emphasize the 'd' at the end of the word.
'call'	Emphasize the 'l' at the end of the word.

'cancel'	Emphasize the 'l' at the end of the word. If you are speaking the 'can' syllable very quickly, try to lengthen it a little.
'clear'	Emphasize the 'r' at the end of the word.
'delete'	Emphasize the 't' at the end of the word. Do not swallow the 'd' at the start of the word.
'dial'	Emphasize the 'l' at the end of the word.
'digit dial' (Gen 6)	Combine the words smoothly and emphasize each syllable.
'directory'	Speak all 4 syllables clearly. Do not swallow the last part of the word.
'help'	Emphasize the 'h' sound at the start of the word. Emphasize the 'p' sound at the end of the word.
'my number'	Emphasize all 3 syllables.
'no'	Speak loudly and slowly. Emphasize the 'n' sound at the start of the word. Draw out the 'o' sound at the end of the word.
'redial'	Try to emphasize and lengthen the first syllable: reee-dial
'security'	Speak 4 syllables clearly. Do not swallow the 'i' sound in the middle of the word.
'store'	Emphasize the 'o' sound in the middle of the word in order to distinguish from 'star'. Emphasize the 'st' sound at the start of the word in order to distinguish from 'four'.
'units'	Speak loudly and clearly.
'verify'	Speak 3 syllables clearly. Do not swallow the 'i' sound in the middle of the word.
'Virtual Advisor'	Emphasize both words.
'voice feedback'	Emphasize both words.
'yes'	Emphasize the 'y' sound at the start of the word. Emphasize the 's' sound at the end of the word.
'zero', 'oh'	If the system does not understand 'oh', try 'zero' or vice versa.
'one'	Emphasize the 'n' at the end of the word.
'two'	Round your lips for the 'ooo' part of the word. If you are clipping the 'ooo' very short, try to lengthen it, but do not draw it out excessively. Speak in a low pitch. Do not use a rising tone like asking a question; a falling tone like giving an answer is better.
'three'	End the word 'three' in a smile, to draw back your lips. Lengthen the 'eee' sound if you are clipping it very short.
'four'	Emphasize the 'r' at the end of the word.

'five'	Emphasize the 'v' sound.
'six'	Emphasize the 'ks' sound at the end of the word.
'seven'	Emphasize the 'n' at the end of the word. Lengthen the 'sev' syllable.
'eight'	Emphasize the 't' at the end of the word. Lengthen the 'eee' sound at the start of the word.
'nine'	Emphasize the 'n' sounds to distinguish from 'five'.
'star'	Emphasize the 'r' at the end of the word. Emphasize the 'ah' sound in order to distinguish from 'store'.
'pound'	Emphasize the 'p' at the start of the word. Emphasize the 'd' at the end of the word.

RADIO/AUDIO SYSTEM DESCRIPTION AND OPERATION

Contents

- RPO options
- Circuit description
- Component description
- Theft deterrent feature
- Customer tips

RPO Options

The entertainment system on this vehicle is configured with either a base or uplevel audio system. Both the base and uplevel audio systems contain a radio, antenna and speakers. The following shows the Entertainment RPOs that are available for this vehicle:

- (US8) AM/FM Stereo, CD, MP3, RDS, EQ
- (US9) AM/FM Stereo, 6-Disc CD, MP3, RDS, EQ
- (UVA) AM/FM Stereo, CD, DVD, MP3, RSE Video
- (U3R+Z41 or UZR+Z41) Navigation
- (U2K) Digital Radio

Circuit Operation

Radio Power

The main radio power is supplied by a 15A fuse located in the under hood fuse block. The radio

does not require a discrete ignition feed circuit for power moding. The power moding is accomplished using a structure of Virtual Networks (VN). The Power Mode Master (PMM) transmits the GMLAN power mode signals.

The radio supports the following signals:

- System Power Mode
- Infotainment Operation Allowed

The radio also supports the following GMLAN Vehicle Power Modes:

- OFF
- ACCESSORY
- RUN
- CRANK REQUEST

Radio Ground

A wire in the main radio connector that is connected to battery negative at all times provides the main radio ground. Resistance between the ground pin and the vehicle battery negative terminal must not exceed 0.05 ohms.

Radio Speaker Outputs

At low volume, the plus (+) and minus (-) speaker outputs circuits measure approximately 7-8 volts. If a plus or minus circuit for any speaker output is shorted to ground or voltage, the radio disables the circuit for component protection and sets a diagnostic trouble code (DTC). The radio sets the speaker circuit DTC on non-amplified systems only. As the radio volume increases the voltage on the plus and minus circuits change to create a voltage difference between each other. The difference in voltage is what drives the voice coil of the speaker producing sound.

Radio Head Unit Dimming

GMLAN signal data received by the radio determines the radio dimming and backlighting levels. The radio sets the backlight and VF display dimming to the value indicated by the interior dimming level and interior dimming display level signals in the GMLAN dimming information frame. The radio provides faceplate and control/graphics backlighting in the OFF (RAP inactive) when the exterior lighting virtual network (VN) is activated. The radio display is consistent then with the surrounding devices that use analog PWM dimming to backlight their control/graphics when the power mode is OFF and the park lights are ON.

Amplifier Interface UQ3 (Non-GMLAN)

The main amplifier power is provided by a 20A fuse located in the body control module (BCM). A discrete switched 12 volt output 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. However, when the amplifier is asleep it still must allow chime functionality. The internal amplifier bridges are fully powered and unmuted when the amplifier receives the switched 12-volt input.

The radio provides a remote amp mute output circuit to control overall muting of remote non-GMLAN amplifiers with rear seat audio (RSA) applications. The amplifier receives PWM signals on the circuit at varying duty cycle percentages for controlling the muted and unmuted functions of the amplifier. The RSA Enable circuit in the radio enables the rear seat channel muting of the amplifier. A Diag Sense circuit internal to the radio monitors the remote amp mute circuit for faults and sets the appropriate DTC when detected.

The function table below shows the four possible amplifier mute functions.

Radio/Audio System Description and Operation

% Duty Cycle Out	Function
0% (Vlow Vdc)	FOUR_CHANNEL_UNMUTE
50%	REAR_MUTE (input must be 2-channel)
75%	SIX_CHANNEL_UNMUTE
100% (Vhigh Vdc)	ALL_MUTE

Amplifier Interface UQA (GMLAN)

The main amplifier power is provided by a 30A fuse located in the under hood fuse block. For vehicles equipped with UQA, the radio commands the amplifier to perform the following functions through serial data (GMLAN) communication. The radio controls both the overall muting and the rear seat muting via serial data (GMLAN) messaging.

- Volume
- Balance
- Fade
- Bass
- Midrange
- Treble
- DSP Modes

- Volume Compensation
- Chime Output

Amplifier Radio Speaker Inputs

The low-level audio signals (LF, RF, LR and RR) from the radio are the inputs to the amplifier. The amplifier boosts these inputs and outputs them to the vehicle speakers. If one speaker plus or minus low level audio signal circuit is open between the radio and the amplifier, the input to the amplifier is approximately half. The speakers for that channel then operate at approximately half the normal volume or in some cases no volume.

The low level audio signals from the radio to the amplifier typically measure in the 4-5 volts range.

Amplifier Speaker Outputs

At a low volume, the plus (+) and minus (-) speaker outputs circuits measure approximately 2-7 V AC or 7-8 V DC at the speaker connector when testing a normal working system. If a plus or minus for any speaker output is shorted to ground or voltage, the amplifier circuitry will turn OFF the front outputs or rear outputs for component protection.

Repeat speaker failure can be caused by a damaged amplifier. Test for a damaged quad bridge output in the amplifier if the wiring between the amplifier and speaker test negative for a short to voltage. Prolonged exposure to DC voltage can cause a speaker coil to short. An early indication of a shorted speaker coil is distortion/noise and eventual failure.

Remote Radio Audio Signal Inputs (UE1 only)

Audio output from the OnStar® communications module connects to the remote audio signal inputs of the radio. When the cellular telephone mute signal goes to 0 volts, the radio over-rides any other audio signal and uses these inputs as the source for the output to the speakers.

Cellular Telephone Mute (UE1 only)

The OnStar® communications module uses the cellular telephone mute signal circuit to over-ride the radio for OnStar® communication. When cellular telephone mute is not active, this circuit is held at 1-volt by the radio. When the cellular telephone mute signal is pulled to ground, the radio over-rides any other audio signal and uses the remote audio signals as the source for output to the speakers. If the radio was OFF when this circuit is pulled low, the radio will turn ON. Additionally, the radio fades the speakers to full front, adjusts the volume to an initial audible level and sets an Auto Tone designed for optimal use with OnStar®. When the mute signal is no longer pulled to ground, the radio returns to the mode it was in previously.

Component Description

Antenna System

The antenna system receives broadcast AM or FM stereo signals from free space and sends the signals to the radio receiver for processing via a coaxial antenna cable. Good antenna grounding is important for good radio reception.

Radio

The operator interfaces with the radio system through the radio display and controls. Through these controls the operator is able to control system power, volume, fade, balance, bass and treble equalizations. Control on the integrated CD, MP3 or XM Satellite Radio system is also available when equipped with these options. A VFD (vacuum florescent display) provides system feedback to the operator.

The radio processes the AM and FM signals from the antenna system or the information from the CD media, amplifies that information and sends the output to the speaker system.

The radio is located in the instrument panel center stack area and is fastened to the instrument panel by fasteners. A rear bullet type guide pin is provided to aid in aligning the radio. An electrical connection to the radio is a 30-way connector that is part of the I/P harness, antenna lead connector and an additional 16-way harness connector is present on OnStar® equipped vehicles. Additional service length is provided in the radio harnesses to allow connection prior to radio installation.

Radio amplifier outputs to the speakers are protected from damage should speaker leads become shorted to ground or shorted to vehicle power. The radio will sense these conditions and shut down the amplifier outputs in a non-destructive manner. After the short condition is removed, the radio will return to normal operation.

UVA Radio

The UVA radio is a dual play radio that supports the playback of CDR, CDR/W and CDROM media with software decoders for MP3 format.

Speakers

The base model speaker system consists of six speakers. Four 6-inch speakers are mounted in each of the doors. Two 1-inch tweeter speakers are mounted in the A-pillars. The uplevel speaker system adds two 1-inch tweeter speakers are mounted in the D-pillars, subwoofer and an amplifier.

Auxiliary Jack Socket

The AM/FM Stereo CD radio shall provide a 3.5 mm Auxiliary stereo jack that will allow playback of audio signals from remote devices (e.g., portable tape player, portable CD player or MP3 playback device, etc.).

OnStar®

OnStar® equipped (RPO UE1) vehicles use the radio amplifier and speaker system for voice communication from the OnStar® operator to the vehicle. Voice communication from the vehicle to the OnStar® operator is through the OnStar® microphone and module, which is not a part of the radio system.

When OnStar® begins operation, the radio volume is set to a preset level, auto tone preset for OnStar® becomes active and the fade control is adjusted to the full front speakers. The radio volume control can then be used to adjust the volume to a desired level.

The radio system and OnStar® system are connected through the 16-way connector at the back of the radio. Left and right channel OnStar® audio, mute control of radio functions by OnStar® and the audio signal ground are the circuits provided in the 16-way connector. Disconnecting the 16-way connector from the radio will isolate the radio system from the OnStar® system.

Voice communication from the vehicle to the OnStar® operator could be possible under this condition. However, the vehicle occupant will not be able to hear the OnStar® operator.

For more information regarding radio operation problems, refer to **Symptoms - Entertainment**

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 VIN information received by the radio does not match the VIN information that has been learned by the radio. A VIN sequence is the last 6 digits of the VIN. The radio receives this information in a GMLAN frame form.

The radio shall provide 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 6 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.

Customer Tips

Radio Reception FM

- The Best FM fidelity will be obtained from stations within 16-64 km (10-40 mile) range. Noise or distortion may become apparent when attempting to receive stations at distances greater than this range. Suggestion: Reduce treble response when attempting to receive fringe stations.
- Tall buildings or hills may cause a degraded or lost signal. FM signals tend to travel "line of sight". Suggestion: Reduce treble response around tall buildings.
- Although receiver circuits are among the most advanced type available, there are instances where one radio station can interfere with another station. Suggestion: Select another station or switch to a cassette or CD.

Radio Reception AM

AM reception is sensitive to storm disturbances such as lightning. Suggestion: Reduce treble response or switch to FM.

Care of Compact Discs

- Handle compact discs (CDs) carefully. Touch only the outer edges of the CD or the edge of the hole in the center of the CD. Never touch the glossy side of the CD. Fingerprints and scratches will interrupt the "reading" of the information on the disc.
- Store CDs in their protective cases. Store CDs away from sunlight, dirt, dust and debris.
- Do not attach a label or tape to a CD.
- Always check for scratches and signs of wear on both sides of the CD.
- Never place any marks on the CD with a marker.
- If a CD becomes contaminated, clean it with a clean, damp, soft, lint-free cloth and mild detergent. Wipe the CD in a straight line from the center hole outward. Do not use cleaning solutions which may damage the CD, such as chemically treated cleaning cloths, benzene or paint thinners.

Compact Discs Not Appropriate to Use

These CD players were designed to be compatible with round digital audio CDs with the

"Compact Disc Digital Audio" label. Other CDs may be incompatible, causing a no-play condition, excessive skips and "ERR" shown on the radio display or a jam in the loading mechanism. Some incompatible CD types are:

- Special-shaped CDs (any that are not round)
- Re-Writeable CDs (CD-RW type are incompatible
- Recordable CDs (CD-R type are incompatible, except with US8 or US9 radios
- Library CDs (with thick bar code labels)
- CD with User-applied labels

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 or 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
- Which 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 or skip, off of the ionosphere

The AM frequencies have longer range due to the ground wave. The ground wave follows the curvature of the earth and is affected 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 mi).

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 mi). 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

XM Reception

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.

XM Satellite Radio

XM is a national satellite radio service that offers up to 100 coast to coast channels including music, news, sports, talk and children's programming. XM provides digital quality audio and text information, including song title and artist name. A service fee is required in order to receive the XM service. For more information, contact XM at www.xmradio.com or call 1-800-852-9696.

Digital Radio Receiver

The radio controls communicate with the digital radio receiver via the serial data communication circuit. The digital radio receiver sends remote radio audio signals to the radio.

Viewing Messages

Press the DISP or RCL button while in XM mode to view various pieces of information related to the current song or channel. By pressing and releasing the DISP or RCL button, you may view four different categories of information: Artist Name/Feature, Song/Program Title, Channel Category and other Additional Information that may be broadcast on that channel. Additional Information messages may not always be available. If an Additional Information message is being broadcast on the tuned channel, the INFO icon will appear on the display. Each of the four

information types may have multiple pages of text. To reach a category, press and release the DISP or RCL button consecutively until the desired type is displayed. If there are multiple pages of text for the selected information type, the radio will automatically display all the pages for that type at a rate of approximately one page every three seconds before timing out and returning to the default display. You may override this feature by pressing the DISP or RCL button to review all of the pages at your own pace.

Radio/Audio System Description and Operation

XM Advisory Messages	Condition
Updating	Updating encryption code
No Signal	Loss of signal
Loading XM	Acquiring channel audio (after 4 second delay
CH Off Air	Channel not in service
CH Unavail	Channel no longer available
No Info	Artist Name/Feature not available
No Info	Song/Program Title not available
No Info	Category name not available
Not Found	No channel available for the chosen category
No Info	No text/informational message available
XM Locked	Theft Lock active
Radio ID	Electronic serial number (ESN) channel 0
Unknown	Radio ID not known (should only be if hardware failure
Chk XMRcvr	Hardware failure

Technical Information for the MP3/CD Radios (US8, US9 and UVA)

The US8 and US9 radios will play both standard audio CDs and CD-Rs or CD-RWs. The CD-R/RWs may contain either standard audio (*.cda) or compressed audio (*.mp3). Customers who record their own music CD-R/RWs should be aware of the following:

- The files can be recorded on a CD-R/RW disc with a maximum capacity of 700 MB.
- The radio will play only compressed audio files recorded in the *.mp3 format. It also supports playlists that can be made and saved with popular MP3 software (in the *.m3u format). A playlist name must be no more than 32 characters in length. If the name of a playlist is longer than 32 characters, the radio will ignore the playlist.
- The radio will only play audio from a CD-R/RW, it cannot record audio.
- The radio will play a mixed mode CD-R/RW (one recorded with both *.cda and *.mp3

files). If a mixed mode CD is inserted in the radio, the radio will assign the standard CD audio to a directory which is listed as ROM audio directory.

- The radio supports multi-session discs, but only the files from the last session will be played.
- There are a total of 20 directories (folders) allowed on a disc. The file structure can be 0-4 directories deep (a folder within a folder, within a folder, etc). Anything more than 20 directories will be ignored. Each directory may have up to 99 files contained within it. Files not having the *.mp3 extension will not be played, but still count toward the maximum. Anything more than the first 99 files within a directory will be ignored. A single disc may have up to 254 files and directories. Anything beyond the 254 limit will be ignored.
- MP3 files must be written to a CD-R/RW in one of the following industry-standard formats:
  - ISO 9660 Level 1
  - ISO 9660 Level 2
  - Joliet
  - Romeo
- ID3 tag information is displayed by the radio, if available. The ID3 tag information can either be version 1 or 2. The radio will display the filename, song name, artist name, album name, directory name and playlist name, etc.

If the customer does not follow these guidelines when recording a CD-R/RW, the disc may not play in the US8 or US9 radio.

VIDEO ENTERTAINMENT SYSTEM DESCRIPTION AND OPERATION

Display Screen

The rear display screen shows video from either DVD movies or an AUX input device, such as a video game console or camera. Each video screen has a dedicated video signal circuit to the radio.

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 rear of the center console. 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. Turn on the rear seat audio (RSA), press the SOURCE key repeatedly until AUX is selected or touch the AUX screen button. An auxiliary device must be connected for the AUX screen button to appear as an option to select on the radio.

Rear Seat Audio (RSA)

The rear seat audio (RSA) is integrated into the rear HVAC control module. Audio, video source are controlled by the radio through serial data communication. The rear speaker channels pass through the RSA. The rear seat audio can be muted by the RSA when in use. The rear seat entertainment (RSE) system includes a radio with a DVD player, a video display screen, 2 wireless headphones and a remote control. Vehicles equipped with a third row video display will include 3 wireless headphones.

Wireless Headphones

Wireless headphones are optional and allow for rear seat passengers to use the rear seat entertainment (RSE) or rear seat audio (RSA) functions 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.

The wireless headphones include 2 channels. This allows rear seat passengers to utilize both RSE and RSA functions without disturbing one another. The toggle switch on the right side headphone earpiece switches between channel one and channel 2. RSE is broadcast on channel one and RSA on channel 2.

To use wireless headphones, turn them on using the power button on the left side headphone earpiece. Adjust volume using the rotary dial on the right side headphone earpiece.

Wired Headphone Jacks

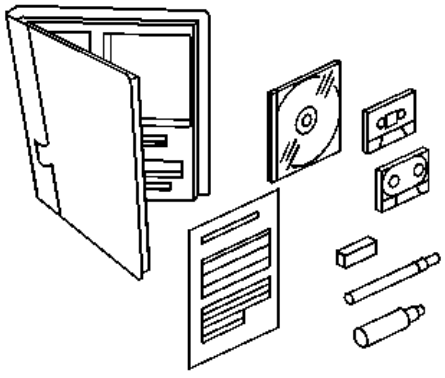
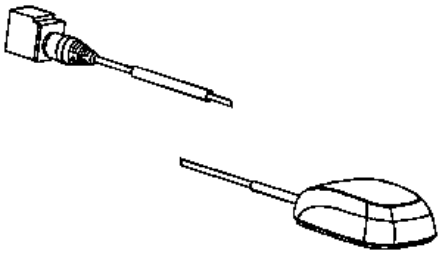
The overhead console is equipped with two 2.5 mm jacks for wired headphones. The headphones can be used to listen to either the rear seat entertainment (RSE) or rear seat audio (RSA) functions. If both RSE and RSA are used at the same time, the wired headphones receive only RSA audio.

To use the wired headphones, plug the headphones into the jacks. Adjust the volume by pressing the headphone button on the left or right side of the RSA face and then using the FWD or REV buttons to adjust the volume up or down. Visual indicators on the RSA display will indicate volume level. The left headphone button selects the left headphone jack for adjustment and the right headphone button selects the right headphone for volume adjustment.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
	J 39916-A CD and Cassette Diagnostic Audio Kit
	EL-48028 Digital Radio Test Antenna