SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Fixed Antenna Base Screw	10 N.m	89 lb in
Fixed Antenna Mast	10 N.m	89 lb in
Front Door Speaker Screw	1.2 N.m	9 lb in
Radio Retaining Screw	2.5 N.m	22 lb in
Rear Speaker Screw	2.3 N.m	18 lb in

SCHEMATIC AND ROUTING DIAGRAMS

ENTERTAINMENT SCHEMATIC ICONS

Entertainment Schematic Icons

Icon	Icon Definition
	IMPORTANT: Twisted-pair wires provide an effective "shield" that helps protect sensitive electronic components from electrical interference. In order to prevent electrical interference from degrading the performance of the connected components, you must maintain the proper specification when making any repairs to the twisted-pair wires shown : • The wires must be twisted a minimum of 9 turns per 31 cm (12 in) as measured anywhere along the length of the wires. • The outside diameter of the twisted wires must not exceed 6.0 mm (0.2 in).

RADIO/AUDIO SYSTEM SCHEMATICS

Refer to System Wiring Diagrams .

COMPONENT LOCATOR

ENTERTAINMENT COMPONENT VIEWS

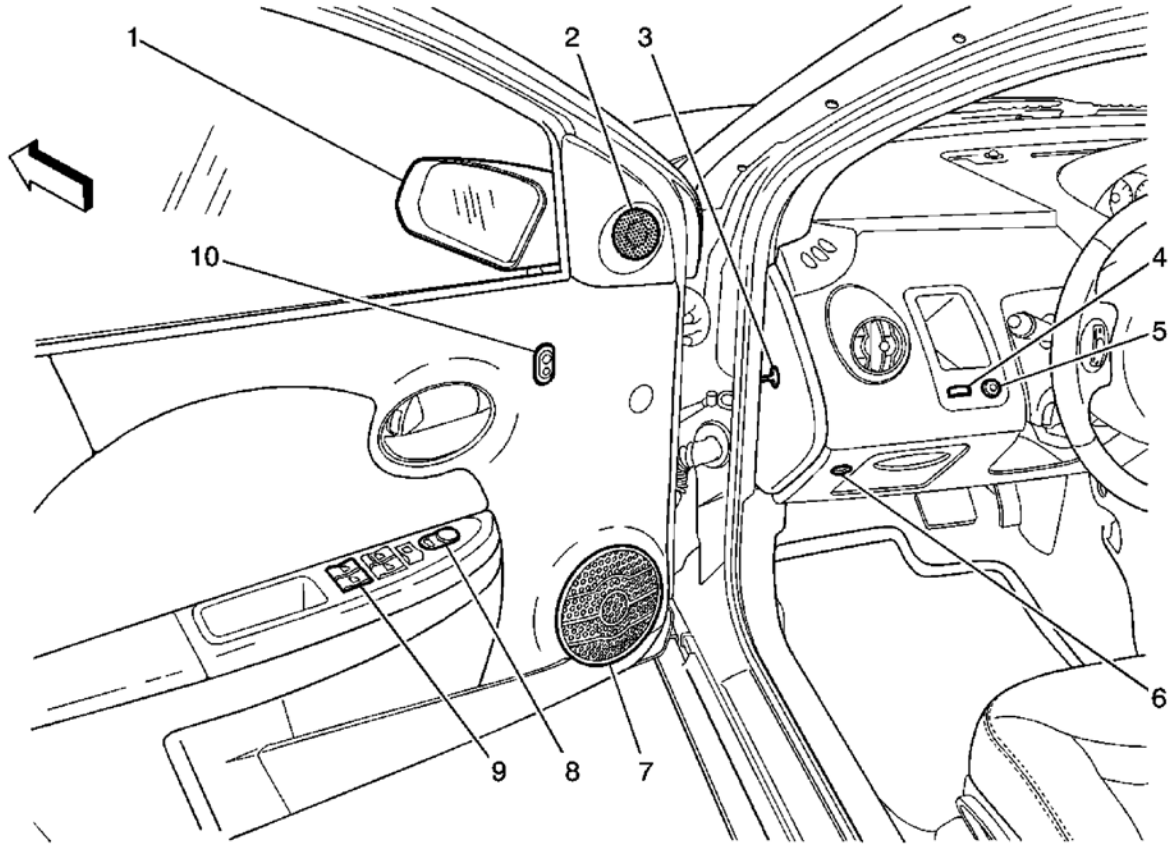


Fig. 1: Driver Door Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Driver Outside Rearview Mirror
2	LF Door Tweeter Speaker (UZ6)
3	Driver Door Jamb Switch
4	Instrument Panel (I/P) Dimmer Switch
5	Fog Lamp Switch (T37)
6	Rear Compartment Lid Release Switch
7	LF Door Speaker
8	Outside Rearview Mirror Switch (DG7)
9	Window Switch - Driver (A31)
10	Door Lock Switch - Driver (AU3)

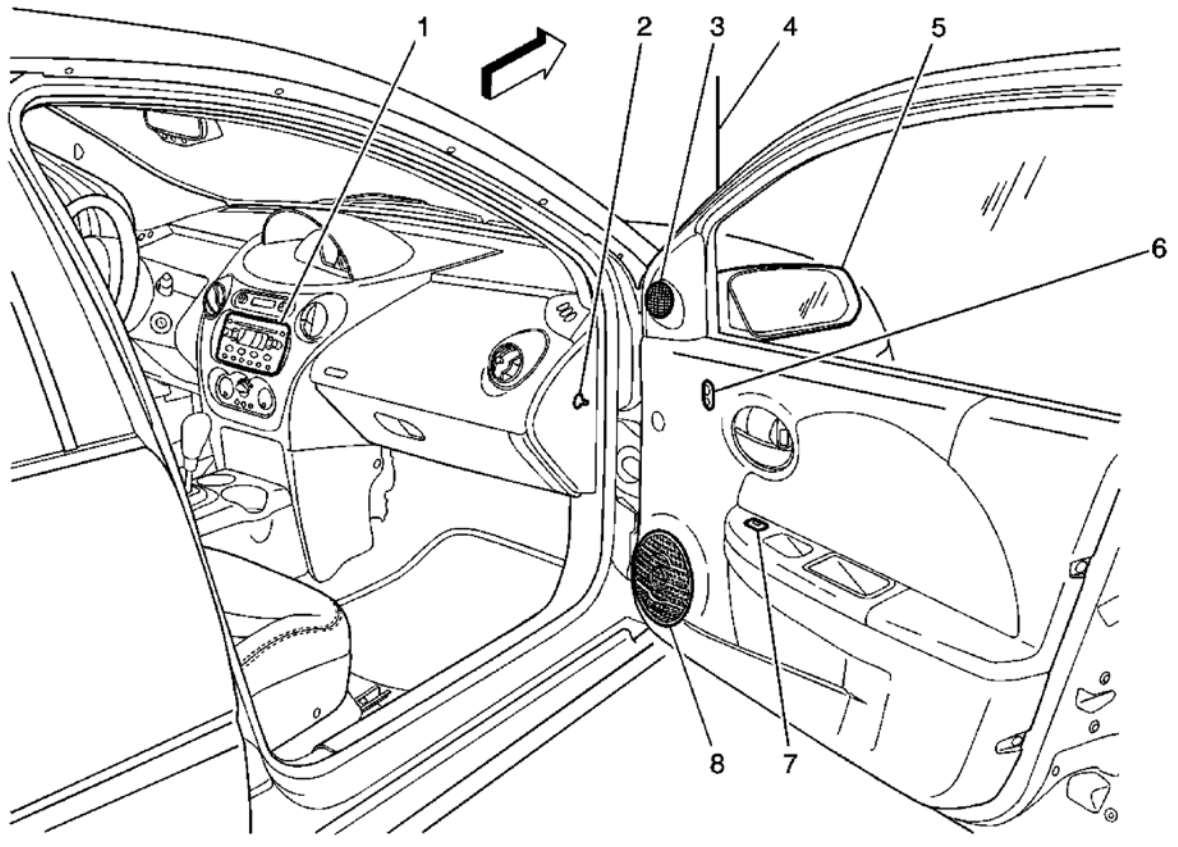


Fig. 2: Front Passenger Door Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Radio
2	Passenger Door Jamb Switch
3	RF Door Tweeter Speaker (UZ6)
4	Radio Antenna
5	Passenger Outside Rearview Mirror
6	Front Passenger Door Lock Switch (AU3)
7	Front Passenger Window Switch (A31)
8	RF Door Speaker

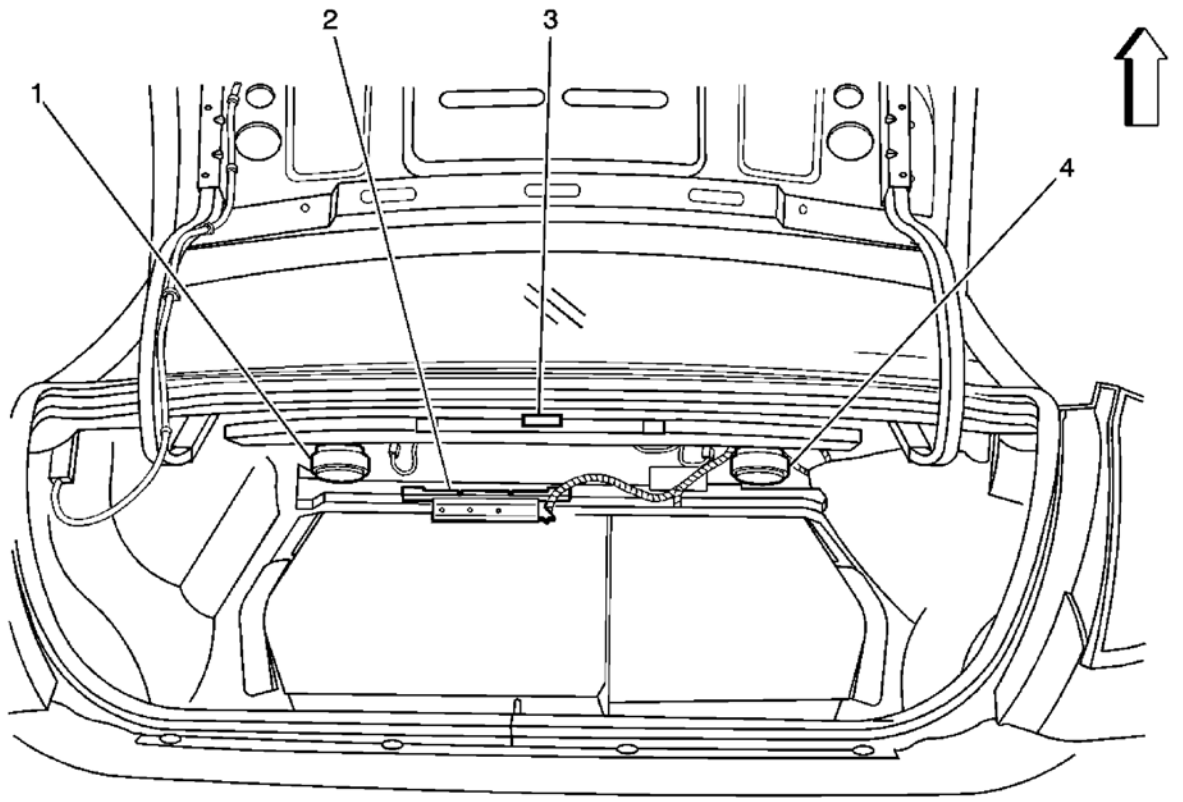


Fig. 3: Luggage Compartment Component View

Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	LR Speaker
2	Audio Amplifier (UZ6)
3	Rear Compartment Courtesy Lamp
4	RR Speaker

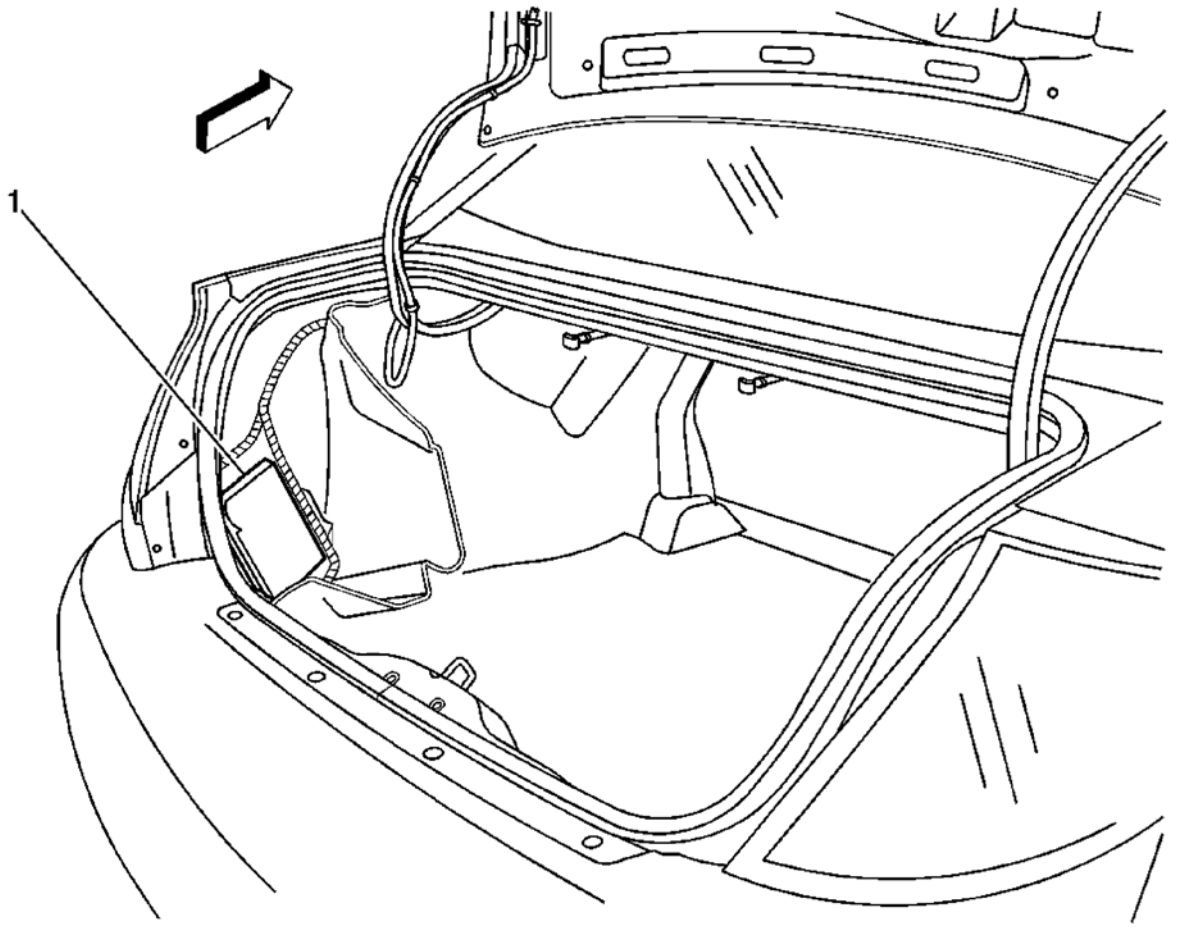


Fig. 4: Left Side Of Luggage Compartment Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

Callout	Component Name
1	Digital Radio Receiver (U2K)

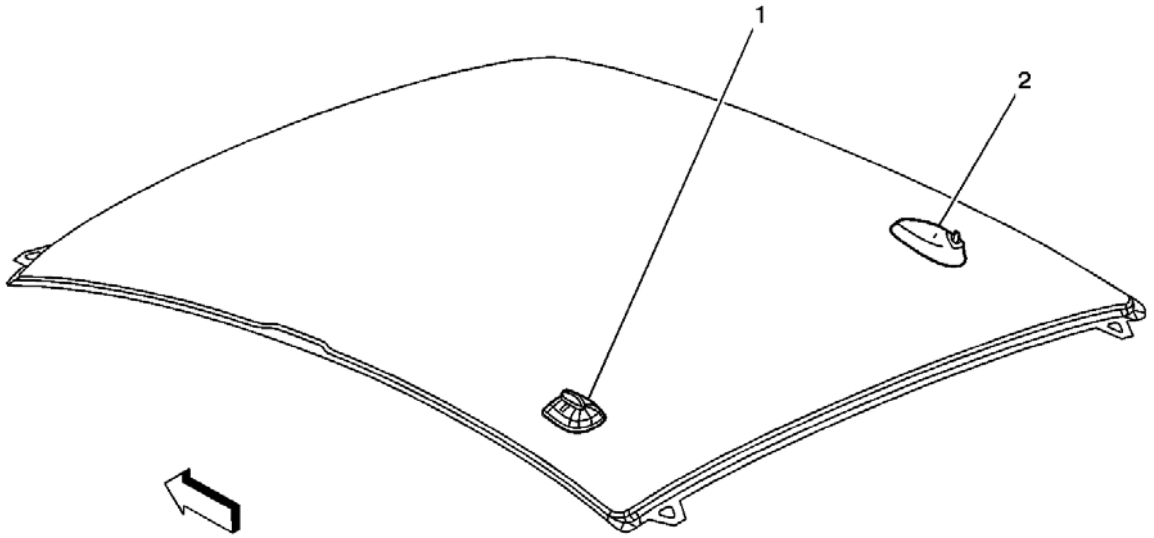


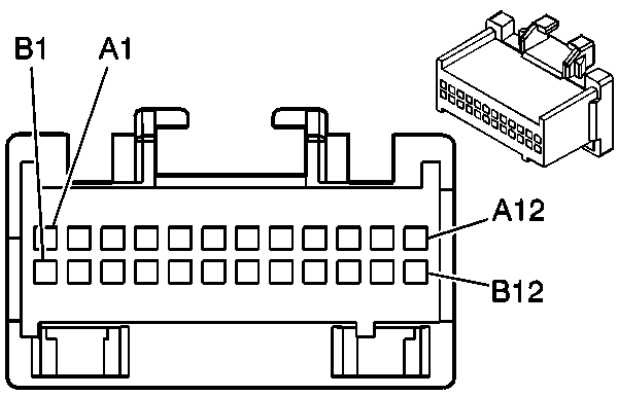
Fig. 5: Roof Component View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 5

Callout	Component Name
1	Digital Radio Antenna (U2K)
2	Cellular/Navigation Antenna (UE1)

ENTERTAINMENT CONNECTOR END VIEWS

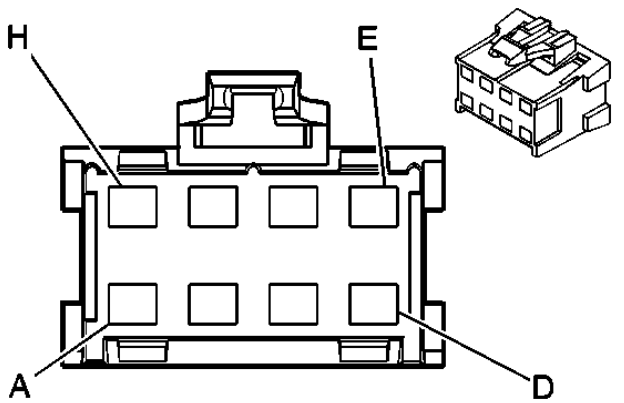
Audio Amplifier C1 (UZ6) Terminal Identification



Connector Part Information	• 12110088 • 24-Way F Micro-Pack 100 Series (GY)		
Pin	**Wire Color**	**Circuit No.**	**Function**
A1	D-GN	1953	Right Front Speaker Output (+)

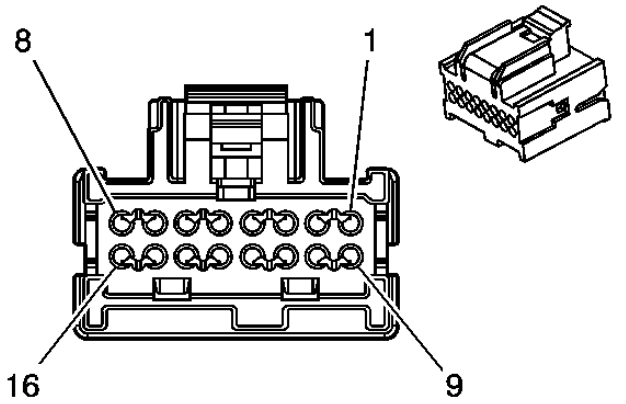
A2	OG	1853	Right Front Speaker Output (-)
A3	L-BU/BK	315	Right Subwoofer Speaker Output (-)
A4	D-GN	1995	Right Subwoofer Speaker Output (+)
A5	PK	314	Radio On Signal
A6-A8	-	-	Not Used
A9	L-GN	200	Right Front Speaker Output (+)
A10	D-GN	117	Right Front Speaker Output (-)
A11	D-BU	46	Right Rear Speaker Output (+)
A12	L-BU	115	Right Rear Speaker Output (-)
B1	L-BU	1957	Left Front Speaker Output (+)
B2	D-BU	1857	Left Front Speaker Output (-)
B3	L-GN/BK	1794	Left Subwoofer Speaker Output (-)
B4	D-BU/WH	346	Left Subwoofer Speaker Output (+)
B5-B8	-	-	Not Used
B9	TN	201	Left Front Speaker Output (+)
B10	GY	118	Left Front Speaker Output (-)
B11	BN	199	Left Rear Speaker Output (+)
B12	YE	116	Left Rear Speaker Output (-)

Audio Amplifier C2 (UZ6) Terminal Identification



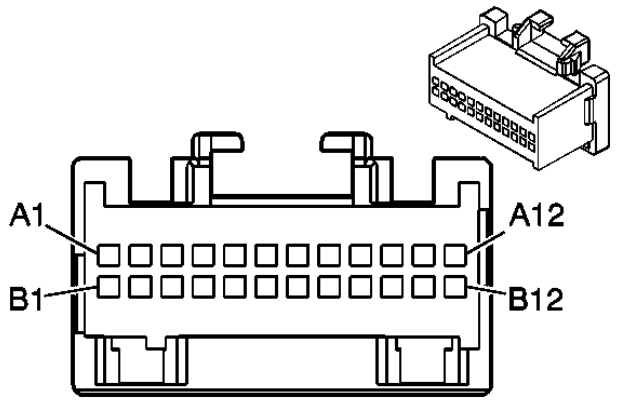
Connector Part Information		• **12110626** • **8-Way F Metri-Pack 280 Series Flexlock (GY)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A-B	-	-	Not Used
C	BK	750	Ground
D	RD/WH	1240	Battery Positive Voltage
E-H	-	-	Not Used

Digital Radio Receiver (U2K) Terminal Identification



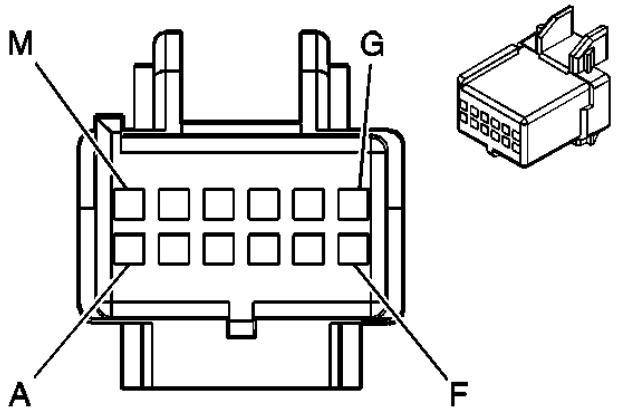
Connector Part Information	• **15394150** • **16-Way F Metri-Pack 150 Series (BK)**		
Pin	**Wire Color**	**Circuit No.**	**Function**
1	-	-	Not Used
2	BN/WH	367	Left Audio Signal (+)
3	D-GN/WH	368	Right Audio Signal (+)
4	-	-	Not Used
5	D-GN	5060	Low Speed GM LAN Serial Data
6-8	-	-	Not Used
9	BK/WH	751	Ground
10	BK/WH	372	Audio Common
11	BARE	814	Drain Wire
12-15	-	-	Not Used
16	OG	1340	Battery Positive Voltage

Radio C1 Terminal Identification



Connector Part Information		• **12110206** • **24-Way F Micro-Pack 100 Series (L-BU)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A1	GY	118	Left Front Speaker Output (-)
A2	TN	201	Left Front Speaker Output (+)
A3	L-BU	115	Right Rear Speaker Output (-)
A4	D-BU	46	Right Rear Speaker Output (+)
A5	BN	199	Left Rear Speaker Output (+)
A6	YE	116	Left Rear Speaker Output (-)
A7	L-GN	200	Right Front Speaker Output (+)
A8	D-GN	117	Right Front Speaker Output (-)
A9-A10	-	-	Not Used
A11	BK/WH	151	Ground
A12	BK/WH	151	Ground
B1	OG	1140	Battery Positive Voltage
B2	OG	1140	Battery Positive Voltage
B3-B5	-	-	Not Used
B6	PK	314	Radio On Signal
B7	GY	8	Instrument Panel Lamp Supply Voltage
B8	BN	9	Park Lamp Supply Voltage
B9	-	-	Not Used
B10	D-GN	5060	Low Speed GMLAN Serial Data
B11	YE	343	Accessory Voltage
B12	-	-	Not Used

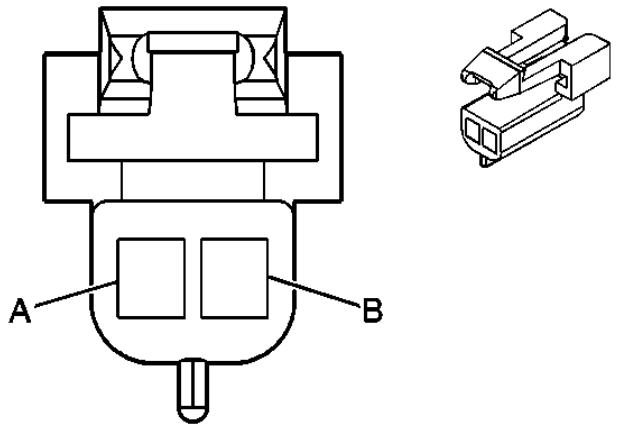
Radio C2 (UE1/U2K) Terminal Identification



Connector Part Information	• **12064799** • **12-Way F Micro-Pack 100 Series (BK)**

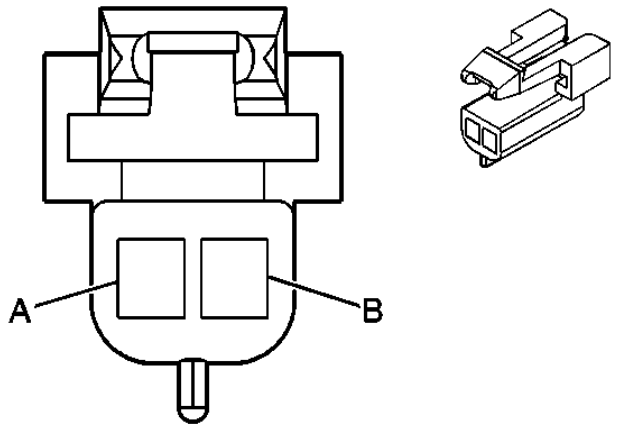
Pin	Wire Color	Circuit No.	Function
A	YE/BK	693	Cellular Telephone Mute Signal (UE1)
B	D-GN	5060	Low Speed GMLAN Serial Data
C-G	-	-	Not Used
H	D-GN/WH	368	Remote Radio Right Audio Signal
J	BN/WH	367	Remote Radio Left Audio Signal
K	BK/WH	372	Remote Radio Audio Output (-)
L	OG/BK	2061	Cellular Telephone Voice Low Reference (UE1)
M	PK/BK	2062	Cellular Telephone Voice Signal (UE1)

Speaker Terminal Identification - LF Door (U79/UX7)



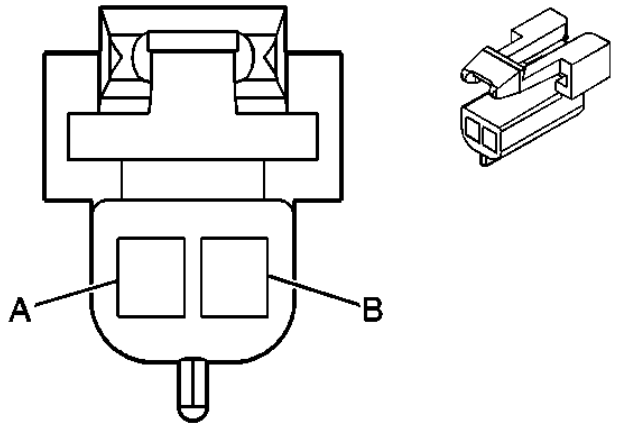
Connector Part Information		• 12052832 • 2-Way F Metri-Pack 150 Series (BK)	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	L-BU	1957	Left Front Speaker Output (+)
B	D-BU	1857	Left Front Speaker Output (-)

Speaker Terminal Identification - LF Door (UZ6)



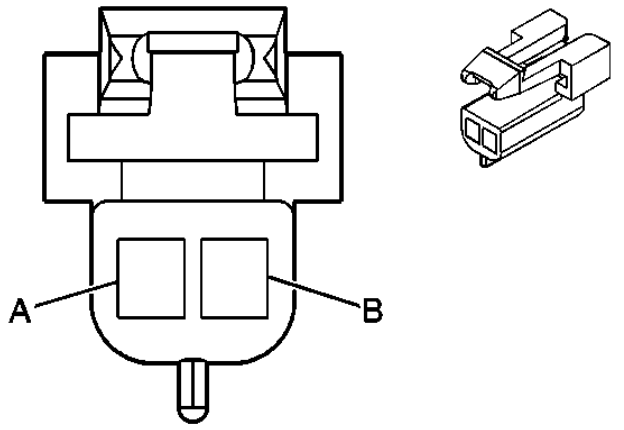
Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	D-BU	1857	Left Front Speaker Output (-)
B	L-BU	1957	Left Front Speaker Output (+)

Speaker Terminal Identification - LF Door Tweeter (UZ6)



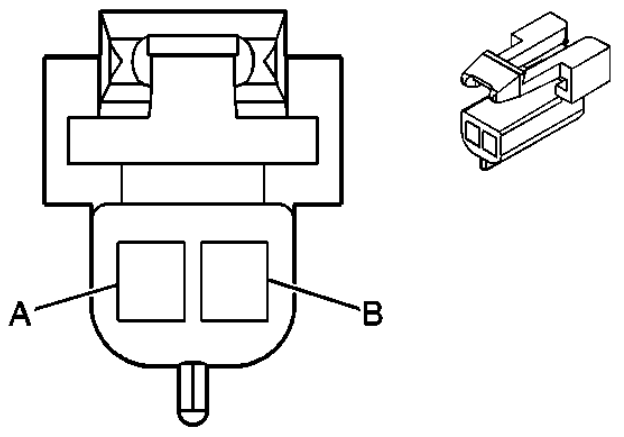
Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	L-BU	1957	Left Front Speaker Output (+)
B	D-BU	1857	Left Front Speaker Output (-)

Speaker Terminal Identification - LR (U79/UX7)



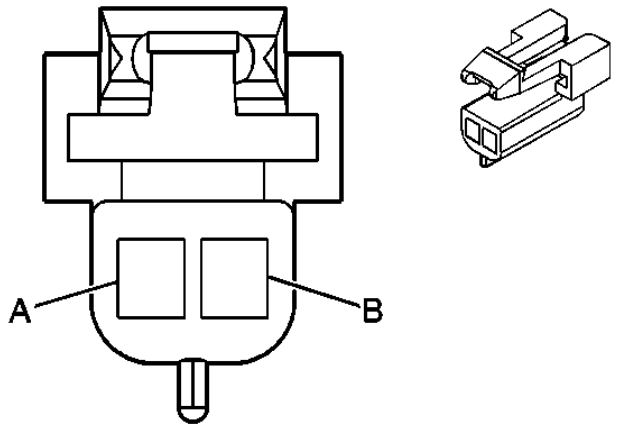
Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	BN	199	Left Rear Speaker Output (+)
B	YE	116	Left Rear Speaker Output (-)

Speaker Terminal Identification - LR (UZ6)



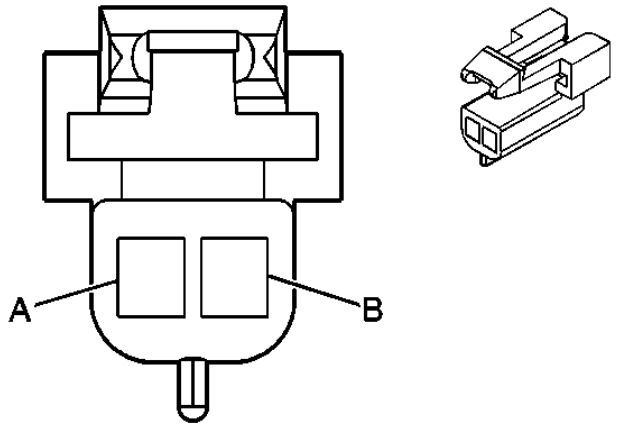
Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	L-GN/BK	1794	Left Subwoofer Speaker Output (-)
B	D-BU/WH	346	Left or Rear Subwoofer Speaker Output (+)

Speaker Terminal Identification - RF Door (U79/UX7)



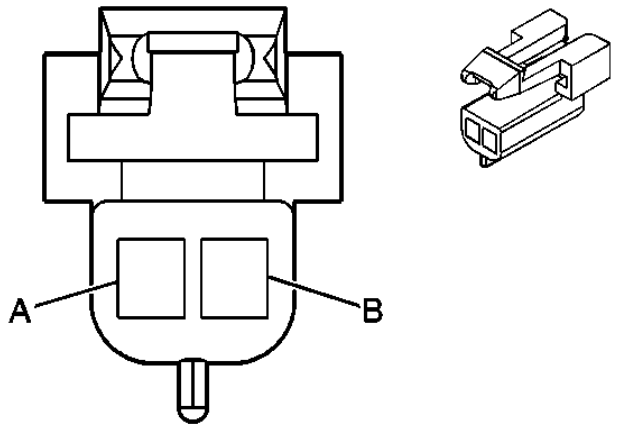
Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	D-GN	117	Right Front Speaker Output (-)
B	L-GN	200	Right Front Speaker Output (+)

Speaker Terminal Identification - RF Door (UZ6)



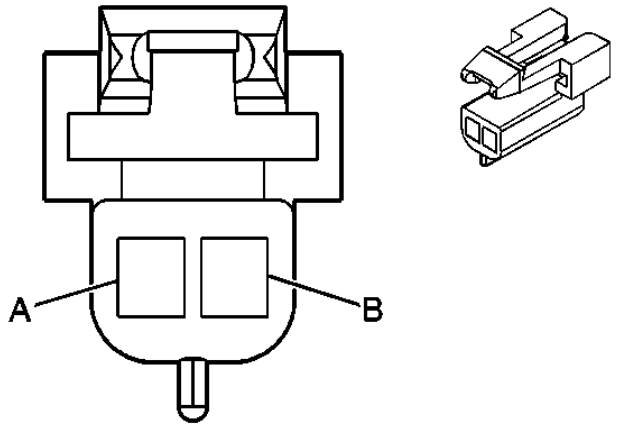
Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	D-GN	1953	Right Front Speaker Output (+)
B	OG	1853	Right Front Speaker Output (-)

Speaker Terminal Identification - RF Door Tweeter (UZ6)



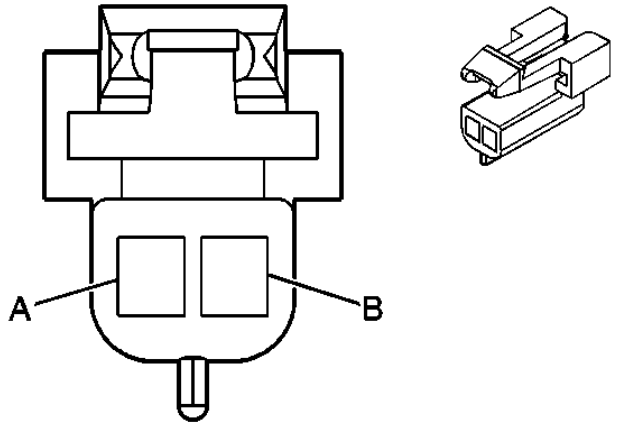
Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	D-GN	1953	Right Front Speaker Output (+)
B	OG	1853	Right Front Speaker Output (-)

Speaker Terminal Identification - RR (U79/UX7)



Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	D-BU	46	Right Rear Speaker Output (+)
B	L-BU	115	Right Rear Speaker Output (-)

Speaker Terminal Identification - RR (UZ6)



Connector Part Information		• **12052832** • **2-Way F Metri-Pack 150 Series (BK)**	
Pin	**Wire Color**	**Circuit No.**	**Function**
A	L-BU/BK	315	Right Subwoofer Speaker Output (-)
B	D-GN	1795	Right Subwoofer Speaker Output (+)

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - ENTERTAINMENT

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

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

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

DIAGNOSTIC SYSTEM CHECK - RADIO/AUDIO SYSTEM

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the GM LAN serial data circuit or due to a total malfunction of the GM LAN serial data circuit. The specified procedure will determine the particular condition.

4: The symptom list in Symptoms will determine the correct diagnostic procedure to use.

5: The presence of DTCs which begin with U indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed.

Diagnostic System Check - Radio/Audio System

Step	Action	Yes	No
1	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. Does the scan tool power up?	Go to **Step 2**	Go to **Scan Tool Does Not Power Up** in Data Link Communications
2	Attempt to establish communication with the following: • Radio • Digital Radio Receiver (U2K) Does the scan tool communicate with all devices present?	Go to **Step 3**	Go to **Scan Tool Does Not Communicate with High Speed GMLAN Device** in Data Link Communications
3	IMPORTANT: The engine may start during the following step. Turn OFF the engine as soon as you have observed the Crank power mode. 1. Access the GM LAN Power Mode in the Diagnostic Circuit Check on the scan tool. 2. Rotate the ignition switch through all positions while observing the Ignition Switch Power Mode parameter. Does the Ignition Switch parameter reading match the ignition switch position for all switch positions?	Go to **Step 4**	Go to **Power Mode Mismatch** in Body Control System
4	Select the following display DTC functions on the scan tool: • Radio • Digital Radio Receiver (U2K) Does the scan tool display any DTCs?	Go to **Step 5**	Go to **Symptoms - Entertainment**
5	Does the scan tool display any DTCs which begin with a U?	Go to **Scan Tool Does Not Communicate with High Speed GMLAN Device** in Data Link Communications	Go to **Step 6**
6	Does the scan tool display DTC B1000?	Go to **Diagnostic Trouble Code (DTC) List** in Body Control System	Go to **Step 7**
7	Does the scan tool display DTC B1325?	Go to **Diagnostic Trouble Code (DTC) List** in Engine Electrical	Go to **Diagnostic Trouble Code (DTC) List**

SCAN TOOL OUTPUT CONTROLS

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
Display(s) Test	-	Commanding the Display(s) test ON will illuminate all elements in the radio display. Commanding the Display(s) test OFF will turn off all elements in the radio display.
Left Front Speaker	Front Speakers	Commanding the speaker ON turns off all speakers except this one. Commanding the speaker OFF turns off all speakers.

Scan Tool Output Control	Additional Menu Selection(s)	Description
Left Rear Speaker	Rear Speakers	Commanding the speaker ON turns off all speakers except this one. Commanding the speaker OFF turns off all speakers.
Right Front Speaker	Front Speakers	Commanding the speaker ON turns off all speakers except this one. Commanding the speaker OFF turns off all speakers.
Right Rear Speaker	Rear Speakers	Commanding the speaker ON turns off all speakers except this one. Commanding the speaker OFF turns off all speakers.

SCAN TOOL DATA LIST

Radio Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Radio ON/CD Playing			
8-Digit GM Part Number	Module Information	Numeric	Varies
Amplifier Present	System Configuration	Yes/No	Varies
EQ Setting	System Configuration	VUE, VUE w/amp, ION Cpe, ION Cpe w/wamp, ION Sed, ION Sed w/amp	Varies
VIN	System Configuration	Alpha Numeric	Varies
Band	Playback Information	FM1, FM2, AM, XM1, XM2	Varies
Preset	Playback Information	Preset #, Not a Preset	Varies
Volume Control	Playback Information	Numeric Percent	Varies
Bass Control	Playback Information	Percent	Varies
Source Status	Playback Information	Off/Tuner/CD/RDS/OnStar/Remote Dig Aud Broadcast Receiver	CD
Total Radio Hours	Playback Information	Hrs	Varies
Total CD Hours	Playback Information	Hrs	Varies
Treble Control	Playback Information	Percent	Varies
Fade Control Front	Playback Information	Percent	Varies
Fade Control Rear	Playback Information	Percent	Varies
Balance Control Left	Playback Information	Percent	Varies
Balance Control Right	Playback Information	Percent	Varies
Received RDS Program Info	Playback Information	Alpha Numeric	Varies
Current RDS Program Info	Playback Information	Alpha Numeric	Varies
User Selected CAT	Playback Information	POP/EASY/TALK/CNTRY/CLASS/JAZZ	Varies
Received CAT	Playback Information	-	Varies
CAT Mode	Playback Information	Off/On	Varies
Traf Announce	Playback Information	Disable/Enable	Varies
CAT Interrupt	Playback Information	Disable/Enable	Varies
TRAF Interrupt Cancel	Playback Information	Yes/No	Varies
CAT Interrupt Cancel	Playback Information	Yes/No	Varies
Signal Status	Playback Information	Numeric	Varies

Radio Input Keys Scan Tool Data List

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

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/ Radio ON			
Fast Forward Button	Input Keys	On/Off	Varies
Reverse Button	Input Keys	On/Off	Varies
Repeat Button	Input Keys	On/Off	Varies
Random Button	Input Keys	On/Off	Varies
Seek Up Button	Input Keys	On/Off	Varies
Seek Down Button	Input Keys	On/Off	Varies
No. 1 Preset Button	Input Keys	On/Off	Varies
No. 2 Preset Button	Input Keys	On/Off	Varies
No. 3 Preset Button	Input Keys	On/Off	Varies
No. 4 Preset Button	Input Keys	On/Off	Varies
No. 5 Preset Button	Input Keys	On/Off	Varies
No. 6 Preset Button	Input Keys	On/Off	Varies
Recall Button	Input Keys	On/Off	Varies
AM/FM button	Input Keys	On/Off	Varies
Auto Tone Up Button	Input Keys	On/Off	Varies
Auto Tone Down Button	Input Keys	On/Off	Varies
POWER button	Input Keys	On/Off	Varies
TUNE button	Input Keys	On/Off	Varies
Category Up Button	Input Keys	On/Off	Varies
Category Down Button	Input Keys	On/Off	Varies
RDS Button	Input Keys	On/Off	Varies
CD Eject Button	Input Keys	On/Off	Varies
CD Load Button	Input Keys	On/Off	Varies
Mute Status	Input Keys	On/Off	Varies
Information Button	Input Keys	On/Off	Varies
Aux. Button	Input Keys	On/Off	Varies

Digital Radio Receiver Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Radio ON			
8-Digit GM Part Number	ID Information/Module Information	Numeric	Varies
Battery Voltage	Data	Volts	Varies
Component Serial Number	ID Information/Module Information	Numeric	Varies
Day	ID Information/DSP Software Version ID	Numeric	Varies
Day	ID Information/XM Software Version ID	Numeric	Varies
Digital Radio Antenna	Data	Millivolts or Milliamps	Varies
Ignition Counter	Data	Numeric	Varies

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Radio ON			
Month	ID Information/DSP Software Version ID	Numeric	Varies
Month	ID Information/XM Software Version ID	Numeric	Varies
Power Mode	Data	Alphanumeric	Run
Radio ID	ID Information/Module Information	Numeric	Varies
Software Version	ID Information/DSP Software Version ID	Numeric	Varies
Software Version	ID Information/XM Software Version ID	Numeric	Varies
Year	ID Information/DSP Software Version ID	Numeric	Varies
Year	ID Information/XM Software Version ID	Numeric	Varies

SCAN TOOL DATA DEFINITIONS

8-Digit GM Part Number

The scan tool displays an 8-digit numeric number. The part number of the module.

AM/FM Button

The scan tool displays On or Off. The scan tool will display On if the AM/FM button is pressed.

Amplifier Present

The scan tool displays Yes or No. The scan tool will display Yes if the radio has been programmed for a vehicle equipped with an amplifier. The scan tool will display No if the radio has been programmed for a vehicle that is not equipped with an amplifier.

Antenna Connected

The scan tool displays Yes or No. The scan tool will display Yes if the digital radio receiver antenna is properly connected.

Auto Tone Up Button

The scan tool will display On or Off. The scan tool will display On if the left side of the AUTO EQ rocker button is pressed.

Auto Tone Down Button

The scan tool will display On or Off. The scan tool will display ON if the right side of the AUTO EQ rocker button is pressed.

AUX

The scan tool will display On or Off. The scan tool will display ON if the AUX button is pressed.

Balance Control Left

The scan tool will display a numeric percent. This percent reflects the position of the balance setting. If the balance is adjusted all the way to the left, the scan tool will display 100%. If the balance is adjusted all the way to the right, the scan tool will display 0%.

Balance Control Right

The scan tool will display a numeric percent. This percent reflects the position of the balance setting. If the balance is adjusted all the way to the right, the scan tool will display 100%. If the balance is adjusted all the way to the left, the scan tool will display 0%.

Band

The scan tool displays FM1, FM2, AM, XM1, or XM2. The scan tool displays the band to which the radio is currently tuned.

Bass Control

The scan tool displays a numeric percent. If the bass is adjusted to maximum level, the scan tool will display 100%. If the bass is adjusted to a minimum level, the scan tool will display 0%.

Battery Voltage

The scan tool will display 0-25.5 volts. The scan tool will display the voltage as measured from the modules battery positive voltage circuit to the modules ground circuit.

Calibration ID

The scan tool will display 0-9999. The number designates what calibration is contained within the module.

Category Down Button

The scan tool will display On or Off. The scan tool will display On when the right side of the Category rocker button is pressed.

Category Up Button

The scan tool will display On or Off. The scan tool will display On when the left side of the Category rocker button is pressed.

Category Interrupt

The scan tool will display Disable or Enable. The scan tool will display Enable when the Category interrupt function is enabled.

Category Interrupt Cancel

The scan tool will display Yes or No. The scan tool will display Yes if the category interrupt function has been cancelled.

Category Mode

The scan tool will display On or Off. The scan tool will display On when the category mode is enabled.

CD Deck Hardware Level

The scan tool will display a numeric number. The number designates the modules CD deck hardware level.

CD Deck Software Level

The scan tool will display a numeric number. The number designates the modules CD deck software level.

CD Eject Button

The scan tool will display On or Off. The scan tool will display On when the CD Eject button is pressed.

CD Load Button

The scan tool will display On or Off. The scan tool will display On when the CD Load button is pressed.

Component Serial Number

The scan tool displays the serial number of the module.

Current RDS Program Info

The scan tool will display the RDS program information being currently received.

Digital Radio Antenna

This parameter indicates the amount of current being used by the digital radio antenna by measuring the voltage drop across an internal resistor. Early modules support the mV reading, while later modules support the mA reading.

DSP Software Version

The scan tool will display a numeric number. The scan tool will display the current DSP software version number.

EQ Setting

The scan tool will display VUE; VUE w/amp; ION cpe; ION cpe w/amp; ION sed; or ION sed w'/amp. The scan tool will display the current configuration of the radio, which was programmed during the radio setup.

Fade Control Front

The scan tool will display a numeric percent. This percent reflects the position of the fade setting. If the fade is adjusted all the way to the front, the scan tool will display 100%. If the fade is adjusted all the way to the rear, the scan tool will display 0%.

Fade Control Rear

The scan tool will display a numeric percent. This percent reflects the position of the fade setting. If the fade is adjusted all the way to the rear, the scan tool will display 100%. If the fade is adjusted all the way to the front, the scan tool will display 0%.

Fast Forward Button

The scan tool will display On or Off. The scan tool will display On when the FFWD button is pressed.

Information Button

The scan will display On or Off. The scan tool will display On when the INFO button is pressed.

Mute Status

The scan tool will display On or Off. The scan tool will display On when the OnStar system is activated and provides a ground to the discrete mute circuit on the radio.

POWER button

The scan tool will display On or Off. The scan tool will display on when the POWER button is pressed.

Power Mode

The scan tool will display Off- Asleep/ Off-Awake/Accessory/Run/Crank/RAP. The scan tool will display the current power mode.

Preset

The scan tool will display a Preset #/ Not a Preset. The scan tool will display the current Preset number to which the radio is tuned, or display Not a Preset if the station is not stored in the preset memory of the radio.

No. 1 Preset Button

The scan tool will display On or Off. The scan tool will display On when the Preset 1 button is pressed.

No. 2 Preset Button

The scan tool will display On or Off. The scan tool will display On when the Preset 2 button is pressed.

No. 3 Preset Button

The scan tool will display On or Off. The scan tool will display On when the Preset 3 button is pressed.

No. 4 Preset Button

The scan tool will display On or Off. The scan tool will display On when the Preset 4 button is pressed.

No. 5 Preset Button

The scan tool will display On or Off. The scan tool will display On when the Preset 5 button is pressed.

No. 6 Preset Button

The scan tool will display On or Off. The scan tool will display On when the Preset 6 button is pressed.

Prom ID

The scan tool displays 0-999. The number is the identification number of the module's internal PROM.

Radio Signal Strength

The scan tool will display No Signal/ Weak Signal/Marginal Signal/Good Signal.

Source Status

The scan tool will display Off/Tuner/ CD/RDS Interrupt/DRR Tuner/OnStar. The display will depend on the current source of the audio signal.

Recall Button

The scan tool will display On/Off. The scan tool will display On when the RCL button is pressed.

Random Button

The scan tool will display On/Off. The scan tool will display On when the RDM button is pressed.

RDS Button

The scan tool will display On/Off. The scan tool will display On when the RDS button is pressed.

Received Category

The scan tool will display the program category that is received from the broadcasting station, if available.

Received RDS Program Info

The scan tool will display the RDS program information received from the broadcasting station, if available.

Reverse Button

The scan tool will display On/Off. The scan tool will display On when the REV button is pressed.

Repeat Button

The scan tool will display On/Off. The scan tool will display On when the RPT button is pressed.

Seek Down Button

The scan tool will display On/Off. The scan tool will display On when the right side of the SEEK rocker button is pressed.

Seek Up Button

The scan tool will display On/Off. The scan tool will display On when the left side of the SEEK rocker button is pressed.

Signal Status

The scan tool will display a numeric representation of the radio signal status.

Software Version

The scan tool displays the release version of the software contained in the Digital Radio Receiver.

Theft Active

The scan tool will display Yes/No. The scan tool will display Yes if the radio is locked as a result of the theft deterrent feature.

Total CD Hours of Operation

The scan tool will display the number of hours which the CD player has operated.

Total Radio Hours of Operation

The scan tool will display the number of hours which the radio has operated.

Traf Announce

The scan tool will display Enable/Disable. The scan tool will display Enable if the traffic announcement feature has been enabled.

Traf Interrupt Cancel

The scan tool will display Yes/No. The scan tool will display Yes if the traffic interrupt feature has been cancelled.

Treble Control

The scan tool displays a numeric percent. If the treble is adjusted to maximum level, the scan tool will display 100%. If the treble is adjusted to a minimum level, the scan tool will display 0%.

TUNE button

The scan tool will display On or Off. The scan tool will display On if the TUNE button is pressed.

User Selected Category

The scan tool will display POP/EASY/TALK/CNTRY/CLASS/JAZZ. The scan tool will display the user selected RDS category.

VIN

The scan tool will display the vehicle's identification number.

VIN Learned

The scan tool will display Yes or No. The scan tool will display Yes if the radio has been programmed with the VIN.

Volume Control

The scan tool displays a numeric percent. If the volume is adjusted to maximum level, the scan tool will display 100%. If the volume is adjusted to a minimum level, the scan tool will display 0%.

DIAGNOSTIC TROUBLE CODE (DTC) LIST

Diagnostic Trouble Code (DTC) List

DTC	Diagnostic Procedure	Module(s)
B1025, B1035, B1045, or B1055	**DTC B1025, B1035, B1045, or B1055 (without RPO UZ6 (No amplifier))** or **DTC B1025, B1035, B1045, or B1055 (with RPO UZ6 (Amplifier))**	Radio
B1030, B1040, B1050, or B1060	**DTC B1030, B1040, B1050, or B1060 (without RPO UZ6 (No amplifier))** or **DTC B1030, B1040, B1050, or B1060 (with RPO UZ6 (Amplifier))**	Radio
B1259	**DTC B1259**	Digital Radio Receiver

DTC B1025, B1035, B1045, OR B1055 (WITHOUT RPO UZ6 (NO AMPLIFIER))

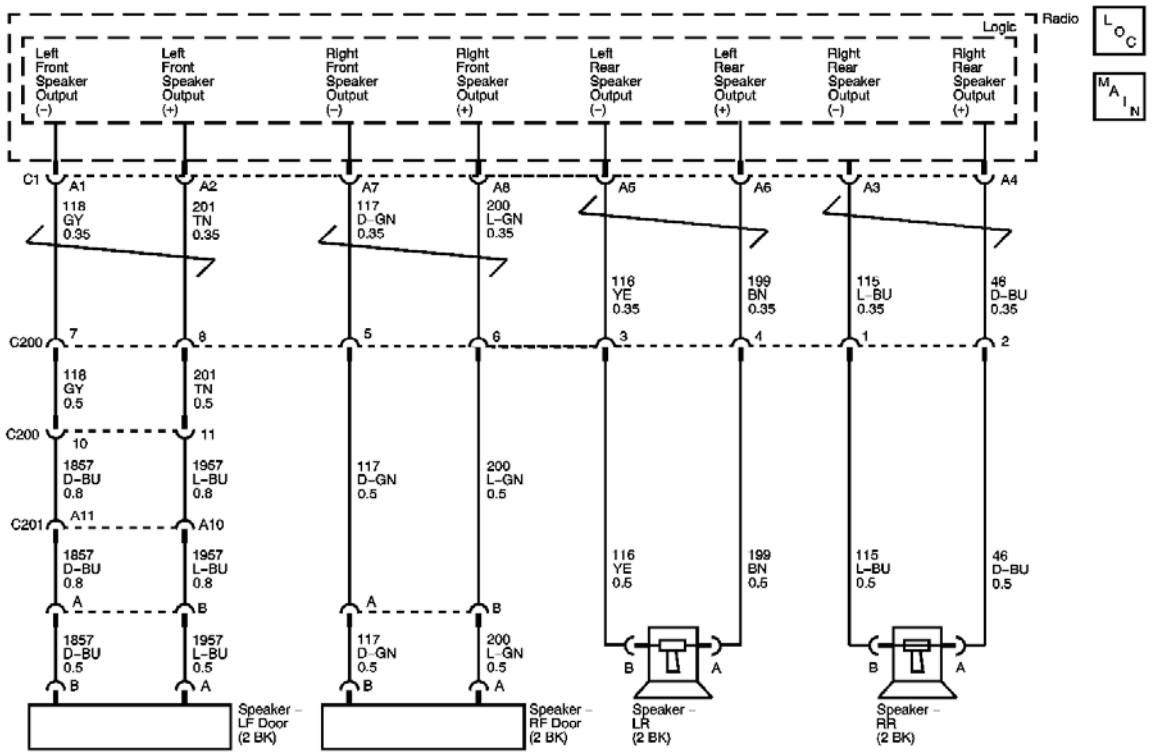


Fig. 6: Speaker Circuit (Without RPO UZ6, No Amplifier)

Courtesy of GENERAL MOTORS CORP.

Circuit Description

When the radio is set at minimum volume, the plus (+) and minus (-) speaker outputs are approximately 5-6 volts measured to vehicle ground. As the volume increases, the plus and minus change to create a voltage difference between each other. This drives the voice coil of the speaker producing sound.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

- DTC B1025 LF Audio Output (+) Circuit
- DTC B1035 RF Audio Output (+) Circuit
- DTC B1045 LR Audio Output (+) Circuit
- DTC B1055 RR Audio Output (+) Circuit

This Vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1025, B1035, B1045, or B1055 (without RPO UZ6 (No amplifier))

DTC Symptom	DTC Symptom Descriptor
01	Short to Battery
02	Short to Ground
04	Open Circuit

Conditions for Running the DTC

B1025 - B1055 01, 02, and 04

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

- The vehicle power mode is ACCESSORY, RUN, or RAP.
- The system voltage is at least 9 volts and no more than 16 volts.
- All the above conditions are present for greater than 250 milliseconds.

Conditions for Setting the DTC

The following conditions are present for 250 milliseconds or longer:

B1025 - B1055 01

One of the speaker positive output circuits is shorted to battery.

B1025 - B1055 02

The speaker positive output circuit is shorted to ground.

B1025 - B1055 04

The speaker positive output circuit is open.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The conditions for setting the DTC are no longer present.
- A history DTC clears after 100 malfunction-free ignition cycles.
- The radio receives the clear code command from the scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step verifies that the DTC is still present.

3: This step isolates the fault condition.

DTC B1025, B1035, B1045, or B1055 (without RPO UZ6 (No amplifier))

Step	Action	Yes	No
Schematic Reference: Radio/Audio System Schematics **Connector End View Reference: Entertainment Connector End Views**			
1	Did you review the Description and Operation?	Go to **Step 2**	Go to **Radio/Audio System Description and Operation**

Step	Action	Yes	No
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, monitor the DTC Information for DTC B1025, B1035, B1045, or B1055. Does the scan tool indicate that DTC B1025, B1035, B1045, or B1055 is current?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
3	Test the affected speaker output channel from the radio to the speaker for a short to ground, short to voltage or an open circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 4**
4	Inspect for poor connections at the harness connector of the radio. Refer to**Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 5**
5	IMPORTANT: Perform the radio setup procedure for the radio. Replace the radio. Refer to **Radio Replacement** and to **Radio Setup**.Did you complete the replacement?	Go to **Step 6**	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DTC B1025, B1035, B1045, OR B1055 (WITH RPO UZ6 (AMPLIFIER))

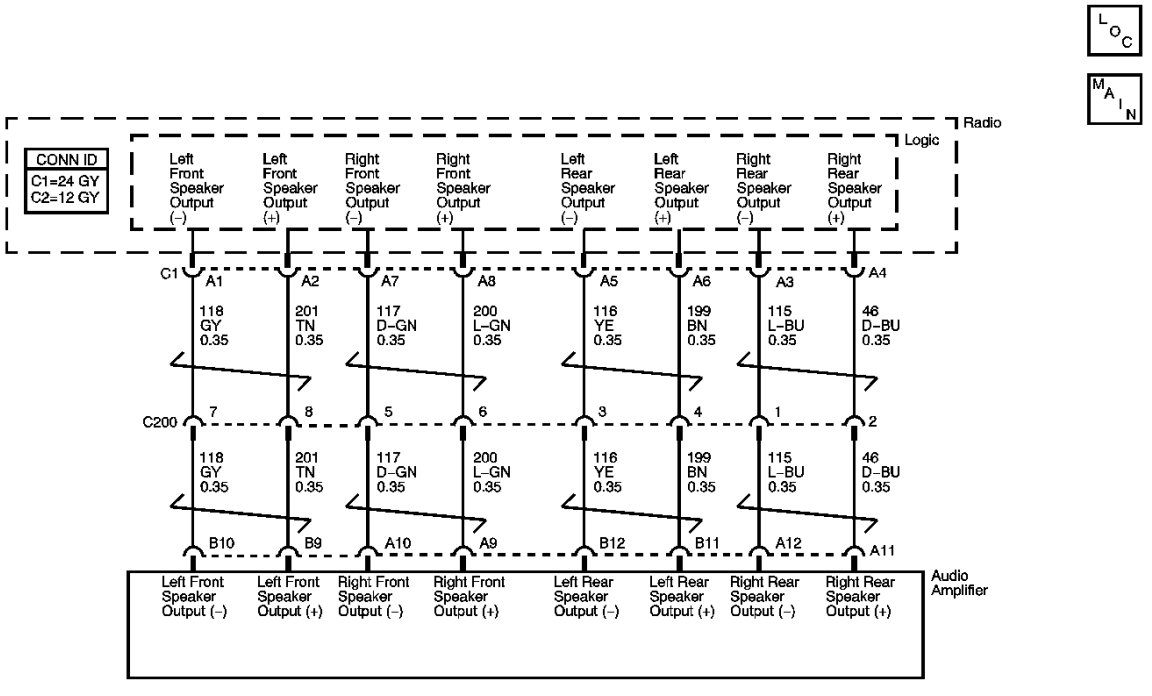


Fig. 7: Speaker Circuit (With RPO UZ6 & Amplifier)

Courtesy of GENERAL MOTORS CORP.

Circuit Description

When the radio is set at minimum volume, the plus (+) and minus (-) speaker outputs are approximately 5-6 volts measured to vehicle ground. As the volume increases, the plus and minus change to create a voltage difference between each other. This drives the voice coil of the speaker producing sound.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

- DTC B1025 LF Audio Output (+) Circuit
- DTC B1035 RF Audio Output (+) Circuit
- DTC B1045 LR Audio Output (+) Circuit
- DTC B1055 RR Audio Output (+) Circuit

This Vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1025, B1035, B1045, or B1055 (with RPO UZ6 (Amplifier))

DTC Symptom	DTC Symptom Descriptor
01	Short to Battery
02	Short to Ground
04	Open Circuit

Conditions for Running the DTC

B1025 - B1055 01, 02, and 04

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

- The vehicle power mode is ACCESSORY, RUN, or RAP.
- The system voltage is at least 9 volts and no more than 16 volts.
- All the above conditions are present for greater than 250 milliseconds.

Conditions for Setting the DTC

The following conditions are present for 250 milliseconds or longer:

B1025 - B1055 01

One of the speaker positive output circuits is shorted to battery.

B1025 - B1055 02

The speaker positive output circuit is shorted to ground.

B1025 - B1055 04

The speaker positive output circuit is open.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The conditions for setting the DTC are no longer present.
- A history DTC clears after 100 malfunction free ignition cycles.
- The radio receives the clear code command from the scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step verifies that the DTC is still present.

3: This step isolates the fault condition.

DTC B1025, B1035, B1045, or B1055 (with RPO UZ6 (Amplifier))

Step	Action	Yes	No
Schematic Reference: Radio/Audio System Schematics **Connector End View Reference: Entertainment Connector End Views**			
1	Did you review the Description and Operation?	Go to **Step 2**	Go to **Radio/Audio System Description and Operation**
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, monitor the DTC Information for DTC B1025, B1035, B1045, or B1055. Does the scan tool indicate that DTC B1025, B1035, B1045, or B1055 is current?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
3	Test the affected speaker output channel from the radio to the amplifier for a short to ground, short to voltage or an open circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 4**
4	Inspect for poor connections at the harness connector of the radio. Refer to**Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 5**
5	IMPORTANT: Perform the radio setup procedure for the radio. Replace the radio. Refer to **Radio Replacement** and to **Radio Setup**.Did you complete the replacement?	Go to **Step 6**	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DTC B1030, B1040, B1050, OR B1060 (WITHOUT RPO UZ6 (NO AMPLIFIER))

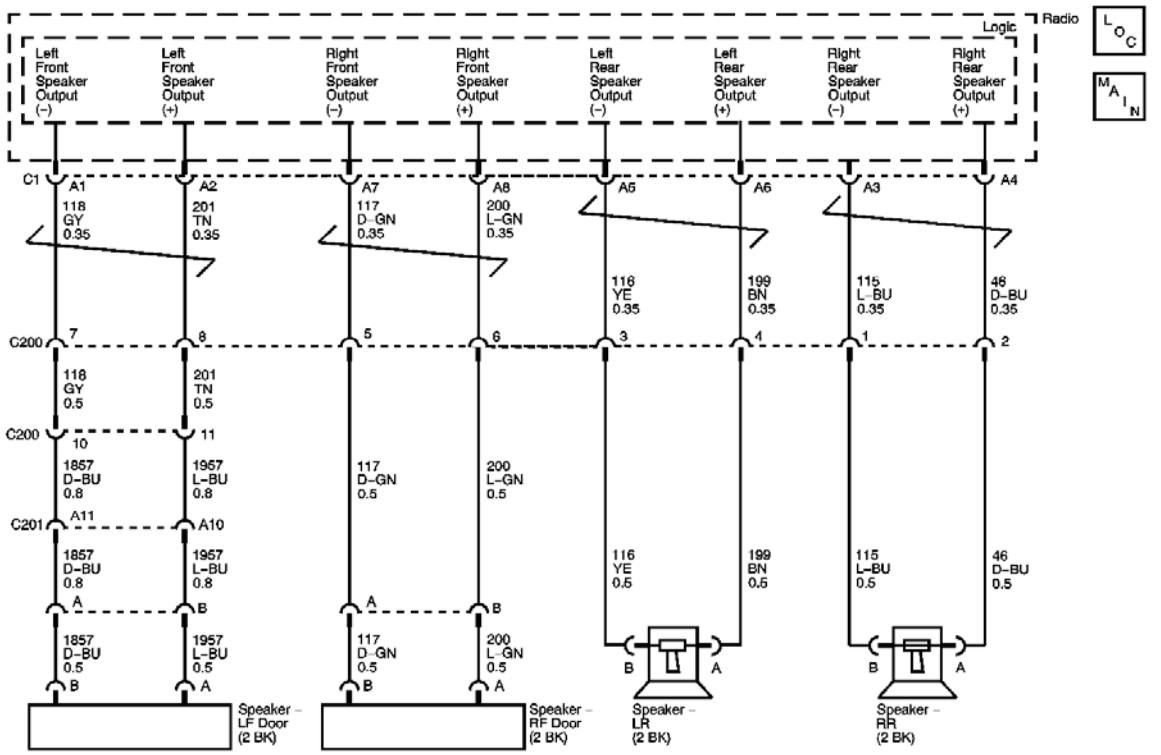


Fig. 8: Speaker Circuit (Without RPO UZ6, No Amplifier)

Courtesy of GENERAL MOTORS CORP.

Circuit Description

When the radio is set at minimum volume, the plus (+) and minus (-) speaker outputs are approximately 5-6 volts measured to vehicle ground. As the volume increases, the plus and minus change to create a voltage difference between each other. This drives the voice coil of the speaker producing sound.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

- DTC B1025 LF Audio Output (-) Circuit
- DTC B1035 RF Audio Output (-) Circuit
- DTC B1045 LR Audio Output (-) Circuit
- DTC B1055 RR Audio Output (-) Circuit

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1030, B1040, B1050, or B1060 (without RPO UZ6 (No amplifier))

DTC Symptom	DTC Symptom Descriptor
01	Short to Battery
02	Short to Ground
04	Open Circuit

Conditions for Running the DTC

B1025 - B1055 01, 02, and 04

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

- The vehicle power mode is ACCESSORY, RUN, or RAP.
- The system voltage is at least 9 volts and no more than 16 volts.
- All the above conditions are present for greater than 250 milliseconds.

Conditions for Setting the DTC

The following conditions are present for 250 milliseconds or longer:

B1030 - B1060 01

One of the speaker negative output circuits is shorted to battery.

B1030 - B1060 02

The speaker negative output circuit is shorted to ground.

B1030 - B1060 04

The speaker negative output circuit is open.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The conditions for setting the DTC are no longer present.
- A history DTC clears after 100 malfunction-free ignition cycles.
- The radio receives the clear code command from the scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step verifies that the DTC is still present.

3: This step isolates the fault condition.

DTC B1030, B1040, B1050, or B1060 (without RPO UZ6 (No amplifier))

Step	Action	Yes	No
Schematic Reference: Radio/Audio System Schematics **Connector End View Reference: Entertainment Connector End Views**			
1	Did you review the Description and Operation?	Go to **Step 2**	Go to **Radio/Audio System Description and Operation**

Step	Action	Yes	No
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, monitor the DTC Information for DTC B1030, B1040, B1050, or B1060. Does the scan tool indicate that DTC B1030, B1040, B1050, or B1060 is current?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
3	Test the affected speaker output channel from the radio to the speaker for a short to ground, short to voltage or open circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 4**
4	Inspect for poor connections at the harness connector of the radio. Refer to**Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 5**
5	IMPORTANT: Perform the radio setup procedure for the radio. Replace the radio. Refer to **Radio Replacement** and to **Radio Setup**.Did you complete the replacement?	Go to **Step 6**	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DTC B1030, B1040, B1050, OR B1060 (WITH RPO UZ6 (AMPLIFIER))

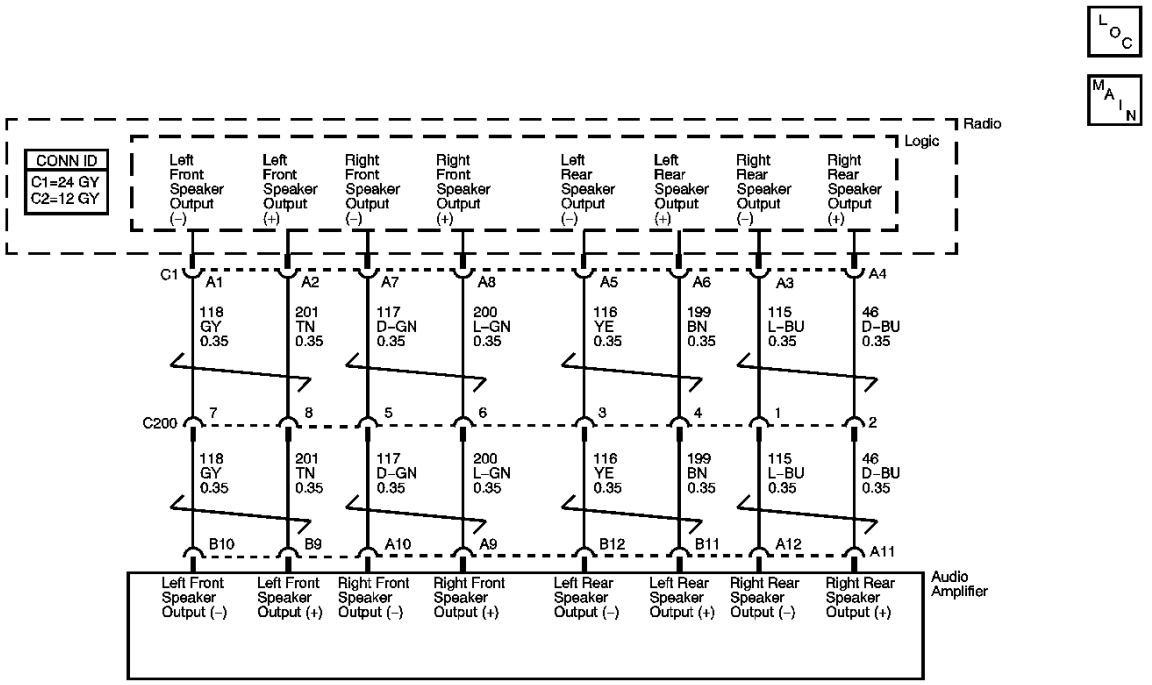


Fig. 9: Speaker Circuit (With RPO UZ6 & Amplifier)

Courtesy of GENERAL MOTORS CORP.

Circuit Description

When the radio is set at minimum volume, the plus (+) and minus (-) speaker outputs are approximately 5-6 volts measured to vehicle ground. As the volume increases, the plus and minus change to create a voltage difference between each other. This drives the voice coil of the speaker producing sound.

DTC Descriptors

This diagnostic procedure supports the following DTCs:

- DTC B1025 LF Audio Output (-) Circuit
- DTC B1035 RF Audio Output (-) Circuit
- DTC B1045 LR Audio Output (-) Circuit
- DTC B1055 RR Audio Output (-) Circuit

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to **DTC Symptom Description** in Vehicle DTC Information.

DTC B1030, B1040, B1050, or B1060 (with RPO UZ6 (Amplifier))

DTC Symptom	DTC Symptom Descriptor
01	Short to Battery
02	Short to Ground
04	Open Circuit

Conditions for Running the DTC

B1025 - B1055 01, 02, and 04

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

- The vehicle power mode is ACCESSORY, RUN, or RAP.
- The system voltage is at least 9 volts and no more than 16 volts.
- All the above conditions are present for greater than 250 milliseconds.

Conditions for Setting the DTC

The following conditions are present for 250 milliseconds or longer:

B1030 - B1060 01

One of the speaker negative output circuits is shorted to battery.

B1030 - B1060 02

The speaker negative output circuit is shorted to ground.

B1030 - B1060 04

The speaker negative output circuit is open.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

- The conditions for setting the DTC are no longer present.
- A history DTC clears after 100 malfunction-free ignition cycles.
- The radio receives the clear code command from the scan tool.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step verifies that the DTC is still present.

3: This step isolates the fault condition.

DTC B1030, B1040, B1050, or B1060 (with RPO UZ6 (Amplifier))

Step	Action	Yes	No
Schematic Reference: Radio/Audio System Schematics **Connector End View Reference: Entertainment Connector End Views**			
1	Did you review the Description and Operation?	Go to **Step 2**	Go to **Radio/Audio System Description and Operation**
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With the scan tool, monitor the DTC Information for DTC B1030, B1040, B1050, or B1060. Does the scan tool indicate that DTC B1030, B1040, B1050, or B1060 is current?	Go to **Step 3**	Go to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems
3	Test the affected speaker output channel from the radio to the amplifier for a short to ground, short to voltage or open circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 4**
4	Inspect for poor connections at the harness connector of the radio. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	Go to **Step 6**	Go to **Step 5**
5	IMPORTANT: Perform the radio setup procedure for the radio. Replace the radio. Refer to **Radio Replacement** and to **Radio Setup**.Did you complete the replacement?	Go to **Step 6**	-
6	Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to **Step 2**

DTC B1259

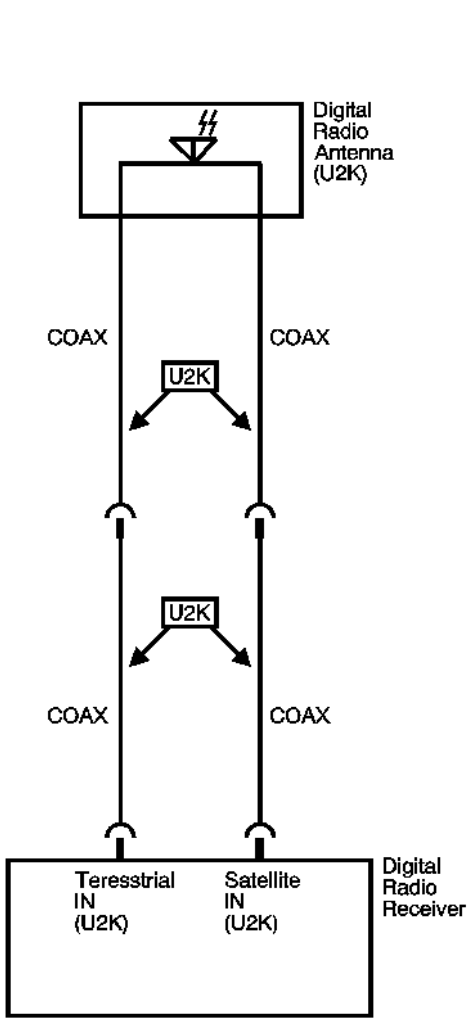


Fig. 10: Digital Radio Antenna Circuit
Courtesy of GENERAL MOTORS CORP.

Circuit Description

The digital radio antenna is connected to the digital radio receiver by 2 coax cables. One coax carries the satellite signal, the other coax carries the terrestrial signal. The antenna cable for the satellite antenna also provides a path for DTC current for powering the antenna.

Conditions for Running the DTC

This test is run every 300 milliseconds.

Conditions for Setting the DTC

The digital radio receiver detects an antenna fault.

Action Taken When the DTC Sets

The radio displays, No XM Signal.

Conditions for Clearing the DTC

The condition must be corrected.

Test Description

The number below refers to the step number on the diagnostic table.

3: Due to current limiting capabilities in the module, an antenna cable shorted to ground could still show 1200-1800 mV.

DTC B1259

Step	Action	Values	Yes	No
Schematic Reference: Radio/Audio System Schematics **Connector End Views Reference: Entertainment Connector End Views**				
1	Did you perform the Radio/Audio System Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Radio/Audio System**
2	With a scan tool, observe the digital radio antenna in the digital radio receiver data list. Does the scan tool indicate that the digital radio antenna is within the specified range?	1200-1800 mV	Go to **Step 3**	Go to **Step 4**
3	Test the antenna cables for a short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
4	1. Disconnect the antenna cables from the digital radio receiver. 2. Measure the voltage from the center conductor of the inboard antenna connector on the digital radio receiver to one of the case screws. Does the voltage measure within the specified range?	4.5-5.5 V	Go to **Step 5**	Go to **Step 6**
5	Test the antenna cables for an open, or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 8**
6	Inspect for poor connections at the digital radio receiver. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 7**
7	IMPORTANT: Always perform the setup procedure for the digital radio receiver. Refer to **Digital Radio Receiver Setup**. Replace the digital radio receiver. Refer to**Receiver Replacement - Digital Radio**.Did you complete the replacement?	-	Go to **Step 10**	-
8	Inspect for poor connections at the digital radio antenna. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 10**	Go to **Step 9**

Step	Action	Values	Yes	No
9	Replace the digital radio antenna. Refer to **Antenna Replacement - Digital Radio**. Did you complete the replacement?	-	Go to **Step 10**	-
10	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC as specified in the supporting text. Does the DTC reset?	-	Go to **Step 2**	System OK

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** in Wiring Systems.
- 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** in Wiring Systems.

Symptom List

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

- **Audio System Troubleshooting Hints**
- **Radio Poor Reception**
- **Digital Radio Poor or No Reception**
- **Audio Distortion - One or More Speakers**
- **Reduced Volume - One or More Speakers**
- **Speakers Inoperative - One or More**
- **Speakers Inoperative - All**

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 on-board diagnostics test tone feature or using the SA9412G .
  - Inspect the speaker connections to ensure they are clean and tight. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
  - 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.
- 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 to 108 FM then 550 to 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. Try variations of the following repairs:
    - Try adding 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, including those not related to the audio system, 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 3906145- 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
  - 21 in braided ground strap GM P/N 8910791
  - 19 in braided ground strap GM P/N 6286800
  - 10.5 in braided ground strap GM P/N 6287160
  - 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. Refer to **Diagnostic System Check - Engine Electrical** in Engine Electrical.
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 of all of the vehicle systems, including those not related to the audio system, for proper operation and function.

RADIO POOR RECEPTION

Diagnostic System Check - Entertainment System

Always perform the Radio/Audio System Diagnostic System Check before proceeding with these diagnostic procedures. Refer to **Diagnostic System Check - Radio/Audio System**.

Using a Test Antenna

Use a test mast antenna to quickly check for poor vehicle antenna operation. Unplug antenna lead-in connector from radio receiver and plug a test antenna into radio. Make sure the test antenna base is grounded to the vehicle chassis and keep hands off the mast. Check radio reception in an area away from electrical interferences. Tune to several weak and strong AM and FM stations. If the radio reception improved, the problem exists with the vehicle antenna and/or lead-in cable. If the reception is still poor, refer to **Audio System Troubleshooting Hints**.

Antenna Ground Test

IMPORTANT: Always zero out the DMM before taking a resistance measurement in order to ensure an accurate reading.

1. Disconnect the negative battery cable.
2. Disconnect the antenna lead-in connector from the radio receiver.
3. Measure the resistance from the negative battery cable to the coaxial cable, outer conductor, connector.
4. The resistance measured should be 0.20 ohms or less.
5. Test the following when the resistance is greater than 0.20 ohms.
    - Base of the antenna for a poor connection to body ground.
    - The coaxial cable interconnects for a poor connection or corrosion.
    - Test for an open or high resistance from the battery negative cable to the body. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
6. After finding and correcting the condition, operate the system in order to verify the repair.

Antenna Coaxial Cable Testing

Use the appropriate chart and diagram to test the antenna coaxial cable resistances for the antenna system on the vehicle. Refer to the table when testing the antenna and/or lead-in cable.

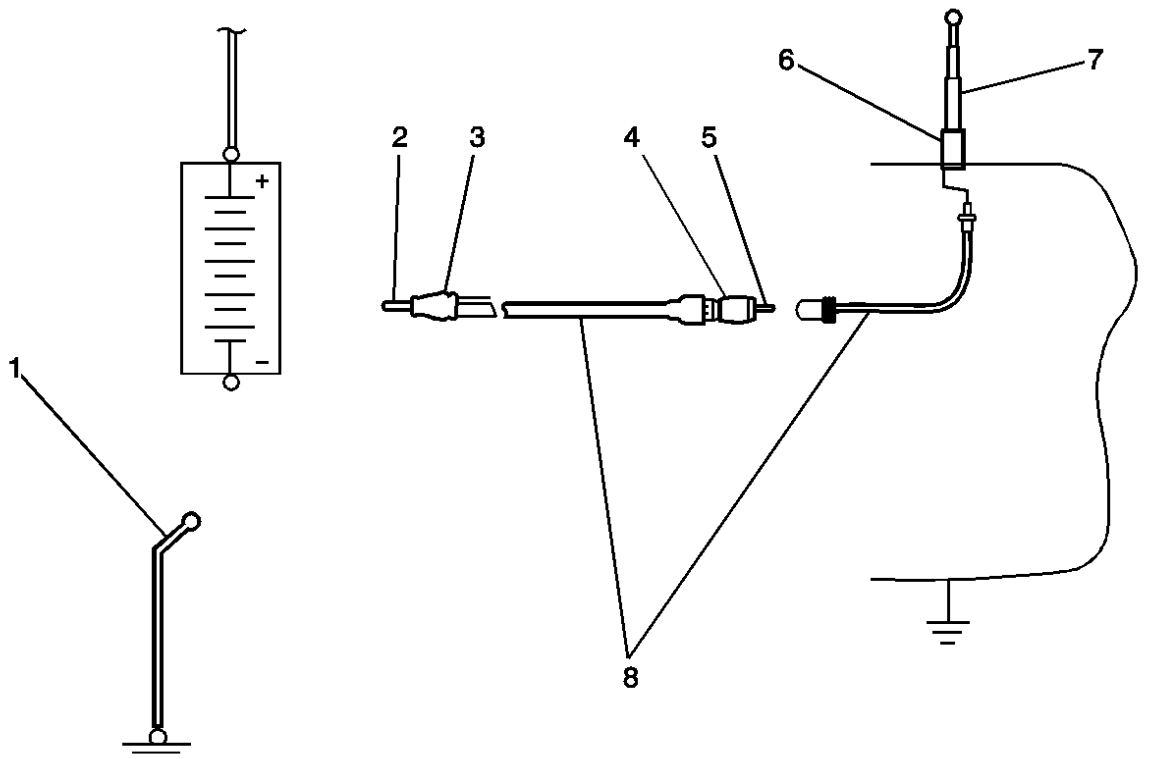


Fig. 11: Identifying Mast Antenna System Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 11

Callout	Component Name
1	Negative Battery Cable

Callout	Component Name
2	Coaxial Cable Conductor - Radio End
3	Coaxial Cable Metal Outer Shield - Radio End
4	Coaxial Cable Metal Outer Shield - Antenna End
5	Coaxial Cable Conductor - Antenna End
6	Antenna Base
7	Antenna Mast
8	Antenna Coaxial Cable

Radio Poor Reception

Ohmmeter Probes At Points	Resistance Measured In Ohms
1 and 3	Less than 0.2
1 and 4	Less than 0.2
1 and 6	Less than 0.2
1 and 2	Infinite
1 and 5	Infinite
1 and 7	Infinite
2 and 3	Infinite
2 and 4	Infinite
2 and 6	Infinite
3 and 4	Less than 0.2
3 and 6	Less than 0.2
3 and 5	Infinite
3 and 7	Infinite

IMPORTANT: Always zero out the DMM before taking a resistance measurement in order to ensure an accurate reading.

1. Measure the resistance from the coax center conductor to antenna mast, ohmmeter probes at points 2 and 7.
2. Total resistance from end to end of center conductor-ohmmeter probes at points 2 and 5:
   - RG-58/RG-59 type cable - less than 0.20 ohms per foot
   - RG-62/RG-62M type cable - less than 3.5 ohms per foot
3. When checking the resistance, cautiously wiggle the lead-in tip and cable. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems.
4. Replace the antenna and/or lead-in cable when the above readings are not obtained. Refer to **Fixed Antenna Replacement** or **Antenna Cable Replacement** for service procedure.

Power Type Antennas

The following chart and diagram show ohmmeter readings which should be obtained.

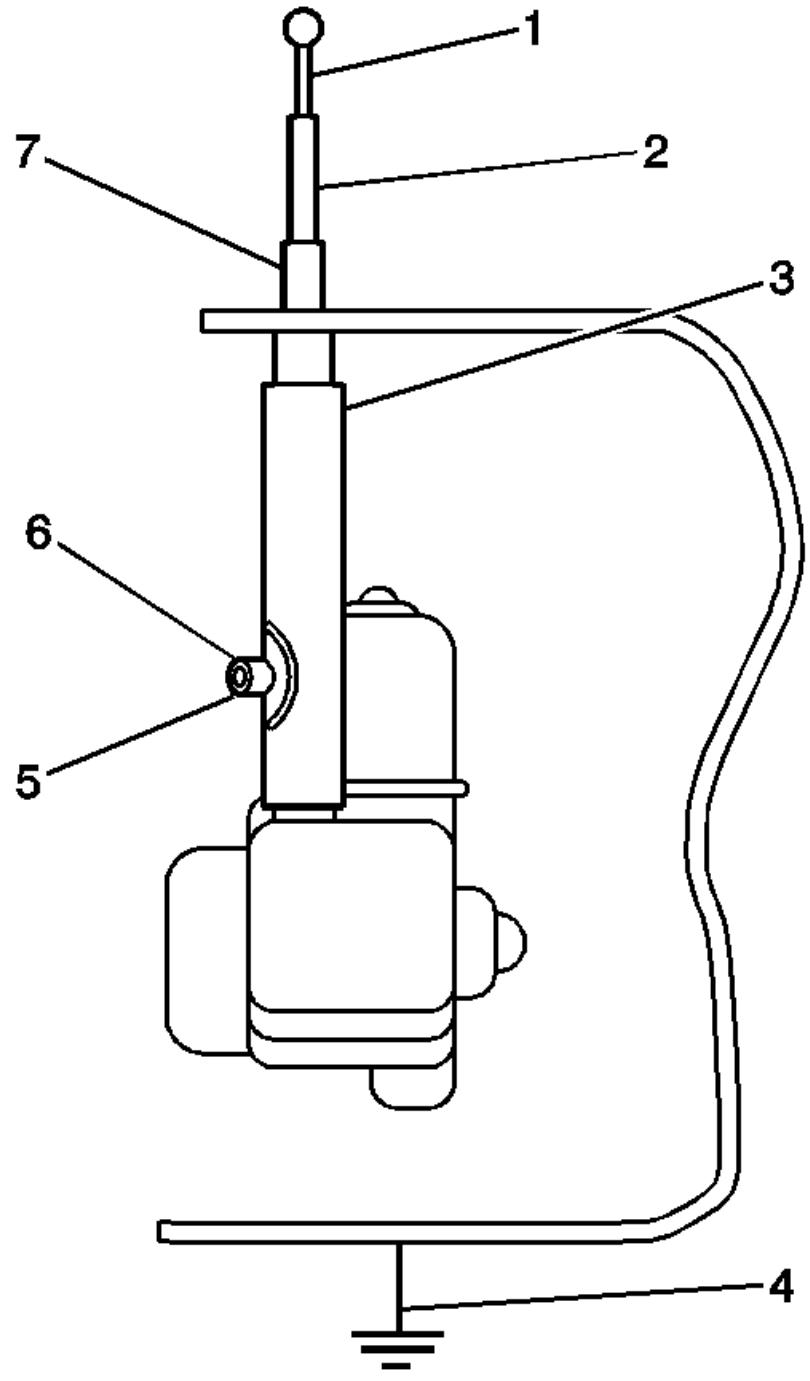


Fig. 12: Power Antenna System
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 12

Callout	Component Name
1	Top Antenna Mast Section

Callout	Component Name
2	Middle Antenna Mast Section
3	Antenna Metal Housing Case
4	Body Ground
5	Antenna Lead-in Connector, Outer
6	Antenna Lead-in Connector, Inner
7	Lower Antenna Mast Section

Radio Poor Reception

Ohmmeter Probes At Points	Resistance Measured In Ohms
1 and 6	Less than 0.2
2 and 6	Less than 0.2
7 and 6	Less than 0.2
5 and 4	Less than 0.2
1 and 4	Infinite
2 and 4	Infinite
7 and 4	Infinite

Refer to the table when testing the power antenna.

IMPORTANT: Always zero out the DMM before taking a resistance measurement in order to ensure an accurate reading.

1. Disconnect the negative battery cable.
2. Measure the resistance at the points specified in the table.
3. With the ohmmeter probes fastened to each point, wiggle the separate mast section and antenna housing case.
4. The resistance readings specified in the table should always be obtained. Test and/or replace the following when the resistance readings are out of specification.
   - Replace antenna mast section.
   - Test the ground for an open or high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
5. After finding and correcting the antenna condition, make sure the antenna lead-in connector is corrosion free and properly fastened.
6. Operate the system in order to verify the repair.

Windshield Type Antennas

Inspect the antenna connector wire at base of windshield. Make sure the wire is not pinched or broken and is fully seated into the lead-in receptacle.

Inspect dipole wires within the windshield for breaks. Use the figure and table for the mast antenna as a guide to test for continuity within the antenna coaxial cable. Repair or replace any portion of the coaxial cable that does not meet the resistance measurements. If test antenna indicates radio is OK and lead-in checks fine, the windshield may need to be replaced. A defective windshield antenna results in loss of sensitivity, particularly on AM.

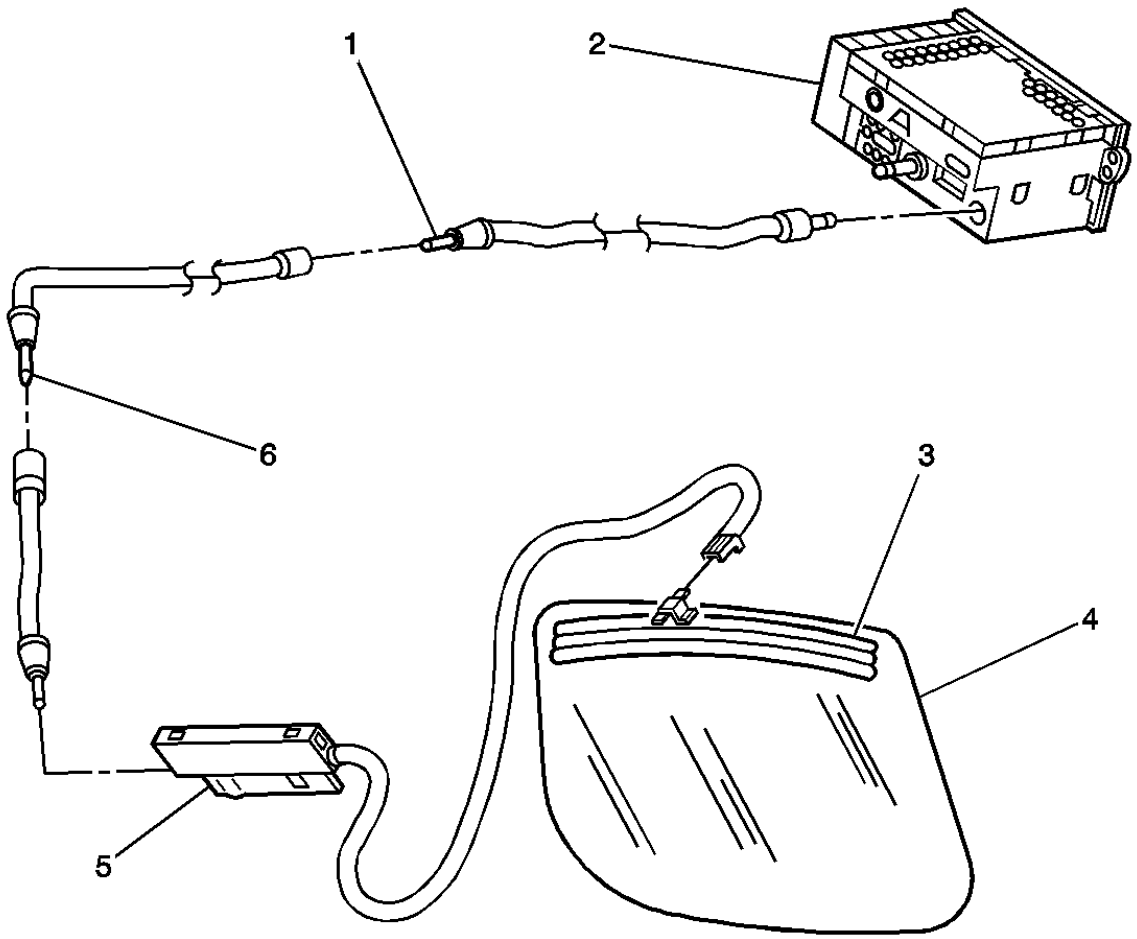


Fig. 13: Windshield Antenna System
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 13

Callout	Component Name
1	Antenna Coaxial Lead-in Connector
2	Radio Chassis
3	Window Antenna Grid, Front or Rear
4	Window Glass, Front or Rear
5	Antenna Module
6	Antenna Coaxial Lead-in Connector

Rear Defogger Antenna System

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. If the test leads to the replacement of a component, always inspect for a poor connection before proceeding with the replacement. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems.

This antenna system uses the existing rear defogger grid as an antenna. Using the defogger as an antenna requires the circuitry in the radio antenna module to decouple the

RF from the DC heater current.

Perform the Antenna System Test and test the antenna coax cable prior to performing the following tests.

1. The radio antenna module is not grounded properly. The module grounding screws should be clean and tight. Measure the resistance from the antenna module base plate to a good ground. Resistance should be 0.20 ohms or less. Find and correct the condition if the resistance is out of specification.
2. The antenna relay coil supply voltage circuit to the radio antenna module is open or shorted to ground. Test the antenna relay coil supply voltage circuit for an open or short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
3. Defective radio antenna module. Replace the radio antenna module.
4. No antenna relay coil supply voltage output from the radio. Disconnect the radio antenna module connector. Turn ON the radio and measure the voltage from the antenna relay coil supply voltage circuit of the radio to a good ground. Voltage measured should be near 12 volts. If no voltage is measured, replace the radio. Refer to **Radio Replacement** for service procedure.
5. If noise is present when the rear defogger is on, inspect the rear defogger grid for breaks. Repair as necessary.
6. After finding and correcting the condition, operate the system in order to verify the repair.

Diversity Antenna System

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. If the test leads to the replacement of a component, always inspect for a poor connection before proceeding with the replacement. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems.

This antenna system uses two antennas to form a diversity system. The primary antenna is part of the rear window. The primary antenna receives both AM and FM signals. The secondary antenna is located on the passenger side of the windshield. The secondary antenna receives only FM signals. The radio antenna module processes the antenna reception signals and phase aligns them to create one strong signal.

Perform the Antenna System Test and test the antenna coax cable prior to performing the following tests.

1. The radio antenna module is not grounded properly. The module grounding screws should be clean and tight. Measure the resistance from the antenna module base plate to a good ground. Resistance should be 0.20 ohms or less. Find and correct the condition if the resistance is out of specification.
2. The antenna enable signal circuit to the radio antenna module is open or shorted to ground. Test the antenna enable signal circuit for an open or short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
3. The FM composite signal circuit to the radio antenna module is open or shorted to ground. Test the FM composite signal circuit for an open or short to ground. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
4. Improper retention of the antenna cable in the floating retainer. Poor or no connection with the radio will result when the radio is installed if the antenna cable is not properly attached in the floating retainer. Inspect the antenna cable for movement in the floating retainer. Replace the antenna cable if movement is found. Refer to LINK 46832 for service procedure.
5. Defective radio antenna module. Replace radio antenna module.
6. No FM composite signal voltage output from the radio. Disconnect the radio antenna module connector. Turn ON the radio and tune the radio to the FM band. Measure the voltage from the FM composite signal circuit of the radio antenna module to a good ground. Voltage measured should be near 8 volts. If no voltage is measured, replace the radio. Refer to **Radio Replacement** for service procedure.
7. After finding and correcting the condition, operate the system in order to verify the repair.

On Board Diagnostics (U1C only)

Refer to On Board Diagnostics in **Radio/Audio System Description and Operation** for information on utilizing the Antenna Signal Strength Meter Mode (if available) for radio poor reception issues diagnosis.

DIGITAL RADIO POOR OR NO RECEPTION

Digital Radio Poor or No Reception

Step	Action	Values	Yes	No
Schematic Reference: Radio/Audio System Schematics **Connector End View Reference: Entertainment Connector End Views**				
1	Did you perform the Radio/Audio System Diagnostic System Check?	-	Go to **Step 2**	Go to **Diagnostic System Check - Radio/Audio System**
2	1. Make sure the vehicle is outside in an area with an unobstructed view of the southern sky. 2. Turn ON the ignition, with the engine OFF. 3. Turn ON the radio. 4. Tune the radio to satellite channel 1. Is the reception clear?	-	Go to **Step 3**	Go to **Step 5**
3	Tune the radio to several other satellite channels. Is the reception clear?	-	Go to **Audio System Troubleshooting Hints**	Go to **Step 4**
4	Contact XM at 1-800-556-3600 to verify customer account status or possible network problems. Did you find and correct the condition?	-	Go to **Step 14**	Go to **Step 10**
5	Contact XM at 1-800-556-3600 to verify possible network problems. Did you find and correct the condition?	-	Go to **Step 14**	Go to **Step 6**
6	With a scan tool, observe the digital radio antenna in the digital radio receiver data list. Does the scan tool indicate that the digital radio antenna is within the specified range?	1200-1800 mV	Go to **Step 10**	Go to **Step 7**
7	1. Disconnect the antenna cables from the digital radio receiver. 2. Measure the voltage from the center conductor of the inboard antenna connector on the digital radio receiver to one of the case screws. Does the voltage measure within the specified range?	4.5-5.5 V	Go to **Step 8**	Go to **Step 10**
8	Test the antenna cables for an open, short, or high resistance. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems. Did you find the condition?	-	Go to **Step 9**	Go to **Step 11**
9	Replace the antenna cable. Refer to **Coaxial Cable Replacement - Digital Radio**. Did you complete the replacement?	-	Go to **Step 14**	-
10	Inspect for poor connections at the digital radio receiver. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 14**	Go to **Step 12**
11	Inspect for poor connections at the digital radio antenna. Refer to **Testing for Intermittent Conditions and Poor Connections** in Wiring Systems. Did you find and correct the condition?	-	Go to **Step 14**	Go to **Step 13**
12	IMPORTANT:	-	Go to **Step 14**	-

Step	Action	Values	Yes	No
	Always perform the setup procedure for the digital radio receiver. Refer to **Digital Radio Receiver Setup**. Replace the digital radio receiver. Refer to **Receiver Replacement - Digital Radio**.Did you complete the replacement?			
13	Replace the digital radio antenna. Refer to **Antenna Replacement - Digital Radio**. Did you complete the replacement?	-	Go to **Step 14**	-
14	Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to **Step 2**

AUDIO DISTORTION - ONE OR MORE SPEAKERS

Schematic Reference: **Radio/Audio System Schematics**

Connector End Views Reference: **Entertainment Connector End Views**

Diagnostic System Check - Radio/Audio System

Always perform the Radio/Audio System Diagnostic System Check before proceeding with these diagnostic procedures. Refer to **Diagnostic System Check - Radio/Audio System**.

Speakers - Distortion

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** in Wiring Systems.

With RPO UZ6

1. Low level audio circuit open. Test the appropriate low level audio circuit for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
2. Defective speaker - Replace the appropriate speaker. Refer to **Speaker Replacement Reference**.

With RPO U2K

Audio output signal circuit from digital radio receiver open. Test left, right, and audio common signal circuits for opens. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.

RADIO DISPLAYS ERR1, ERR2, ----, OR LOCK

Refer to Theft Deterrent Feature in **Radio/Audio System Description and Operation**.

REDUCED VOLUME - ONE OR MORE SPEAKERS

Schematic Reference: **Radio/Audio System Schematics**

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. If the list leads to the replacement of a component, always inspect for a poor connection before proceeding with the replacement. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems.

Without RPO UZ6

- Speaker output circuit resistance high-Test the appropriate speaker output circuits for high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
- Defective Speaker-Replace the appropriate speaker. Refer to **Speaker Replacement Reference**.

With RPO UZ6

- Speaker output circuit resistance high-Test the appropriate speaker output circuits from the amplifier for high resistance. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
- Low level audio circuit open-Test the appropriate low level audio output circuits from the radio to the amplifier for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.
- Defective speaker-Replace the appropriate speaker. Refer to **Speaker Replacement Reference**.

SPEAKERS INOPERATIVE - ONE OR MORE

Schematic Reference: **Radio/Audio System Schematics**

Only Front Speakers or Only Rear Speakers Inoperative (ION- RPO UZ6 only) (VUE- RPO WBM only)

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

Audio output from amplifier to speaker shorted to ground or shorted to battery positive voltage.

Test the affected audio output circuits from the amplifier for a short to ground or a short to positive battery voltage. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.

Speaker Inoperative - One or More

Without RPO UZ6 (ION) or RPO WBM (VUE)

1. No audio output from the radio.

   Test for any AC voltage between the audio signal circuits at the affected speaker connector with the radio volume adjusted to 50 percent. If no AC voltage is present, check for shorts to battery positive voltage or shorts to ground on all speaker output circuits from the radio. If no shorts are located, replace the radio. Refer to **Radio Replacement**.

2. Speaker output open.

   Test the appropriate speaker outputs for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.

3. Defective speaker.

   Replace the appropriate speaker. Refer to **Speaker Replacement Reference**.

With RPO UZ6 (ION) or RPO WBM (VUE)

1. Speaker output from amplifier open.

   Test the appropriate speaker outputs for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.

2. Defective speaker.

Replace the appropriate speaker. Refer to **Speaker Replacement Reference**.

3. No audio output from the amplifier.

   Test for any AC voltage between the audio signal circuits at the affected speaker connector with the radio volume adjusted to 50 percent. If no AC voltage is present, check for shorts to battery positive voltage or shorts to ground on the affected speaker outputs. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. If no shorts are located, replace the amplifier. Refer to **Amplifier Replacement**.

SPEAKERS INOPERATIVE - ALL

Schematic Reference: Radio/Audio System Schematics

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. If the list leads to the replacement of a component, always inspect for a poor connection before proceeding with the replacement. Refer to **Testing for Intermittent Conditions and Poor Connections** and **Connector Repairs** in Wiring Systems.

Without RPO UZ6 (ION) or RPO WBM (VUE)

No audio output from the radio.

Test for any AC voltage between the left front audio signal circuits at the left front speaker connector with the radio volume adjusted to 50 percent. If no AC voltage is present, check for shorts to battery positive or shorts to ground on any speaker output circuit from the radio. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. If no shorts are located, replace the radio. Refer to **Radio Replacement**.

With RPO UZ6 (ION) or RPO WBM (VUE)

1. Battery positive voltage to the amplifier open.

   Test the battery positive circuit to the amplifier for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.

2. Ground to the amplifier open.

   Test the ground circuit to the amplifier for an open. Refer to **Circuit Testing** and**Wiring Repairs** in Wiring Systems.

3. No low level audio output from the radio.

   Test for any AC voltage between the left front low level audio signal circuits at the amplifier connector with the radio volume adjusted to 50 percent. If no AC voltage is present, check for shorts to battery positive or shorts to ground on any speaker output circuit from the radio. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems. If no shorts are located, replace the radio. Refer to **Radio Replacement**.

4. No radio on signal to the amplifier

   Test the radio on signal circuit to the amplifier for an open. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems.

5. Defective amplifier

   Replace the amplifier. Refer to **Amplifier Replacement**.

RADIO SETUP

To setup a new radio for the vehicle, complete the setup procedure under the Special Functions menu of the scan tool.

If the new radio is not properly setup, the radio will display a locked message (LOC) or Calibrate.

IMPORTANT: The radio setup will configure the radio amplifier and internal equalization settings.
Without following the setup procedure, the radio will display a calibrate message (CALIBRATE), and the sound quality and volume may be degraded.

DIGITAL RADIO RECEIVER SETUP

The digital radio receiver setup option does not contain a submenu. Digital radio receiver setup will configure the following systems:

IMPORTANT:

- DTCs
- GMLAN and class 2 radio messages

To setup the digital radio receiver, complete the setup procedure under the Special Functions menu of the scan tool, then cycle ignition.

XM Activation

IMPORTANT: After replacement of an XM receiver, call XM radio to deactivate the receiver that has been removed from the vehicle and activate the new XM radio receiver. 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.

SPEAKER REPLACEMENT REFERENCE

Speaker Replacement Reference

Component	Repair Instruction
Front Door Speaker	Refer to **Speaker Replacement - Front Door**
Front Side Door Upper Speaker	Refer to **Speaker Replacement - Front Upper**
Rear Speaker	Refer to **Speaker Replacement - Rear**

REPAIR INSTRUCTIONS

RADIO REPLACEMENT

Removal Procedure

1. Pull out on the accessory trim plate in order to release the retaining fasteners.

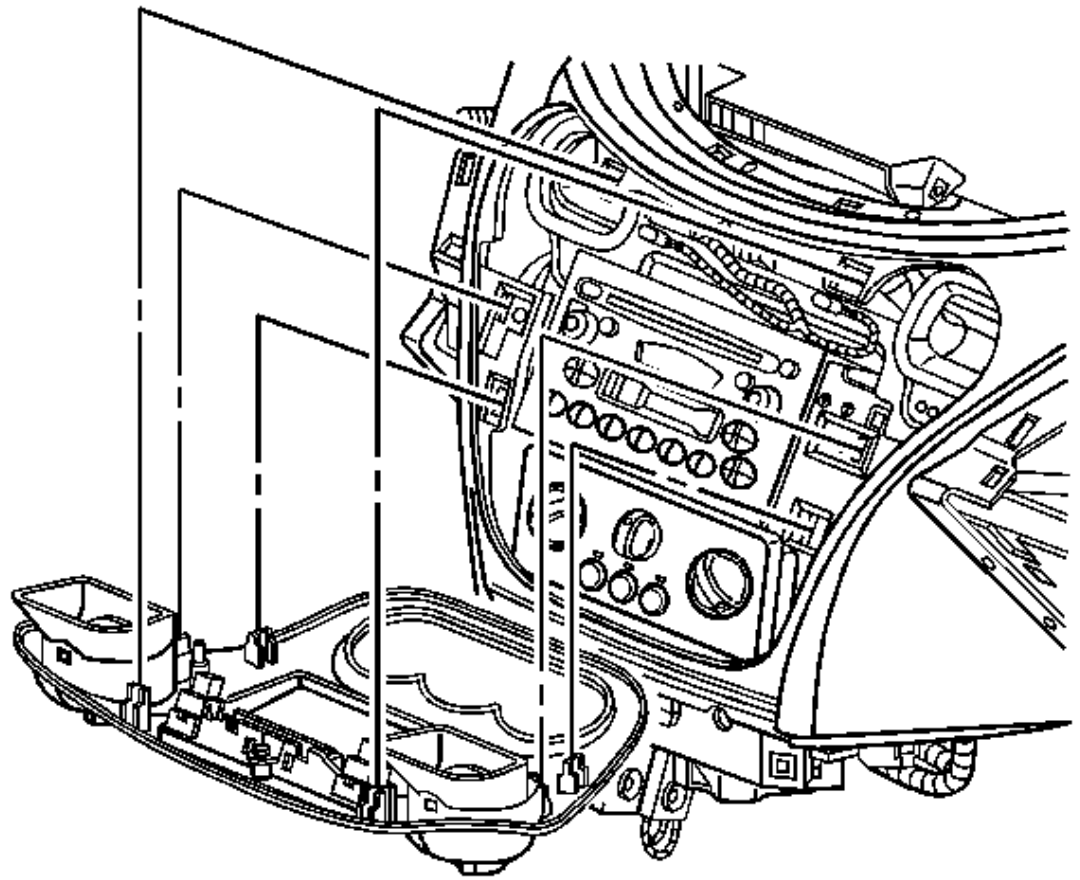


Fig. 14: Instrument Panel Bezel/Trim Plate
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the electrical connectors from the accessory trim plate.

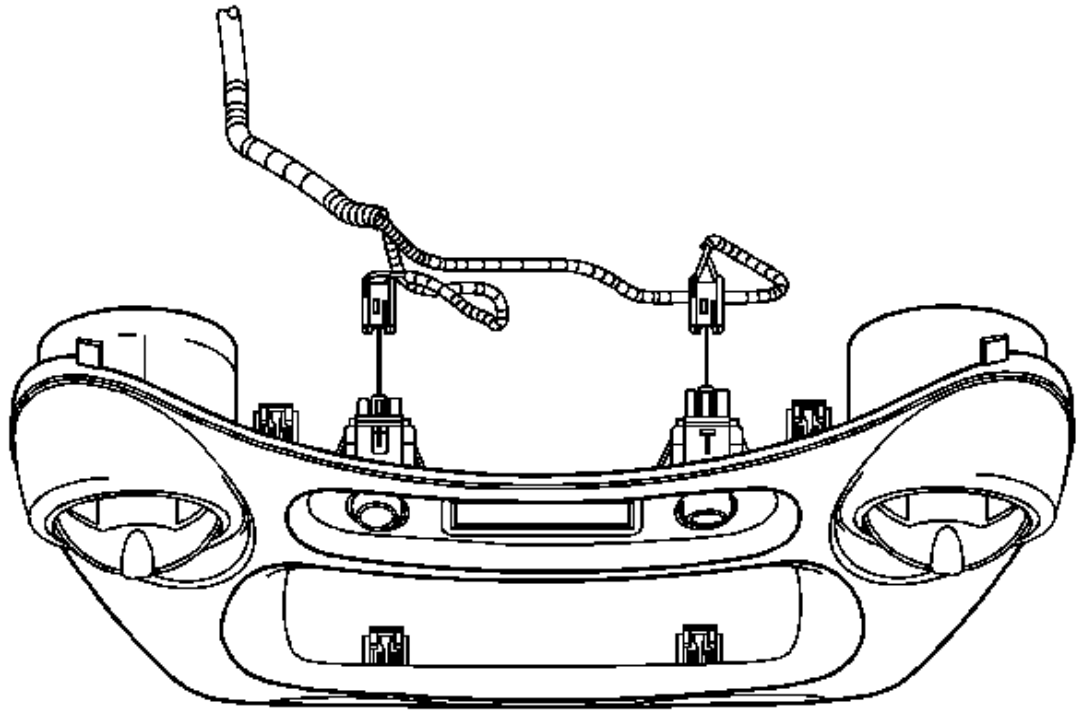


Fig. 15: View Of Accessory Trim Plate Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

3. Remove the screws from the radio and pull the radio out.

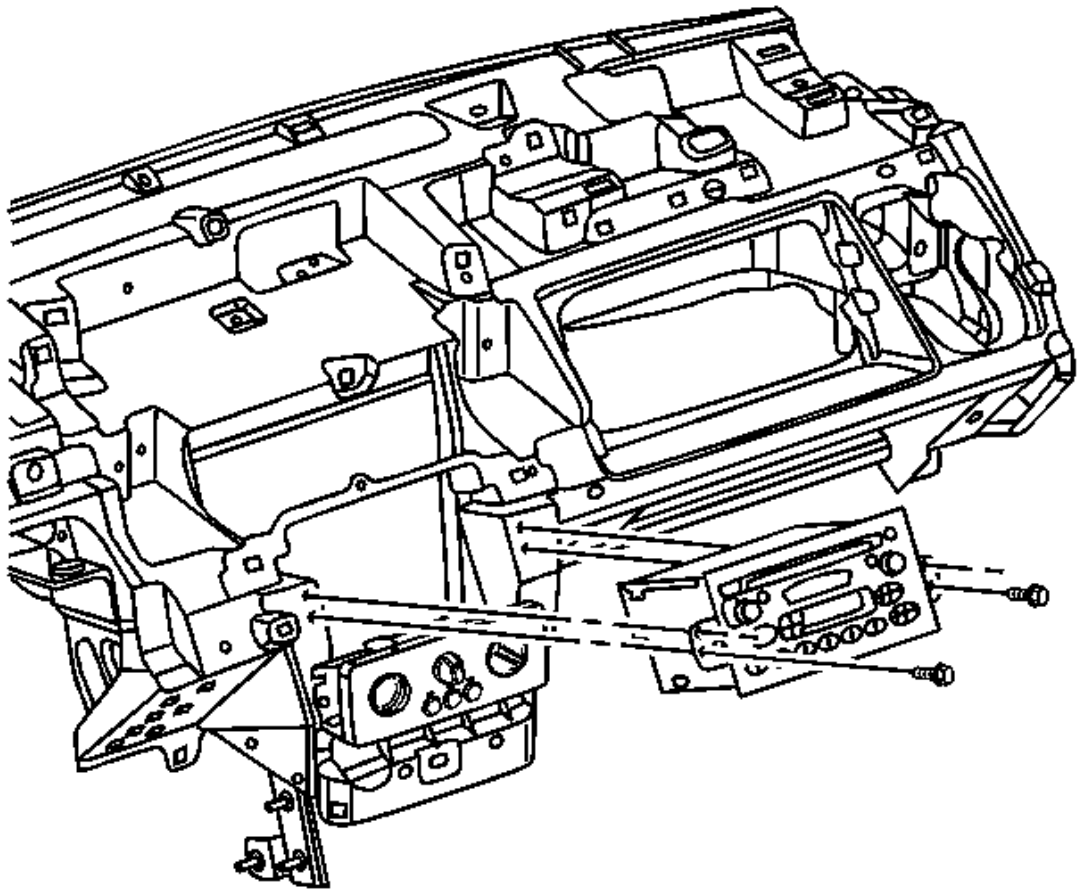


Fig. 16: View Of Radio
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the radio electrical connectors and remove the radio.

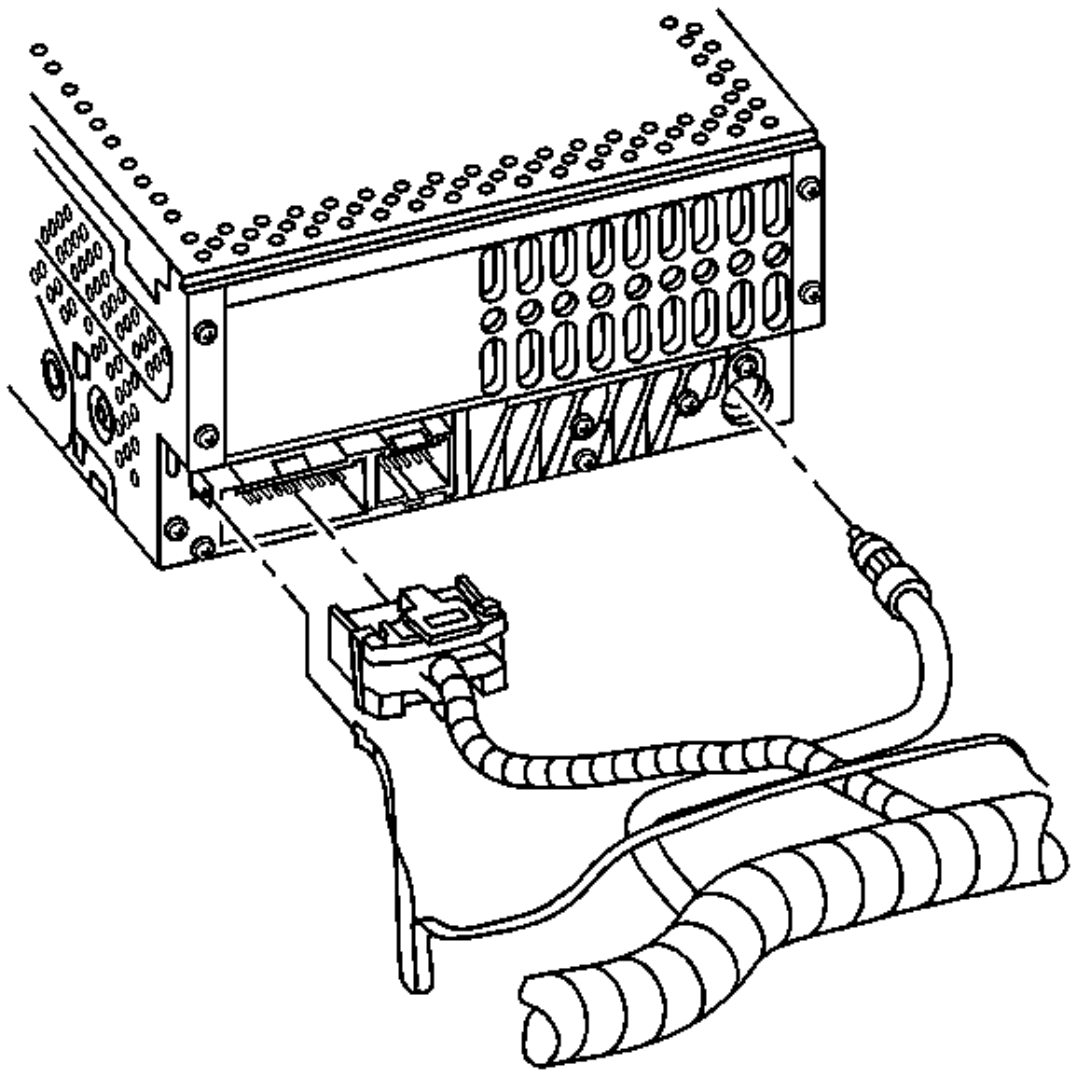


Fig. 17: View Of Radio Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Place the radio in the vehicle and connect the radio electrical connectors.

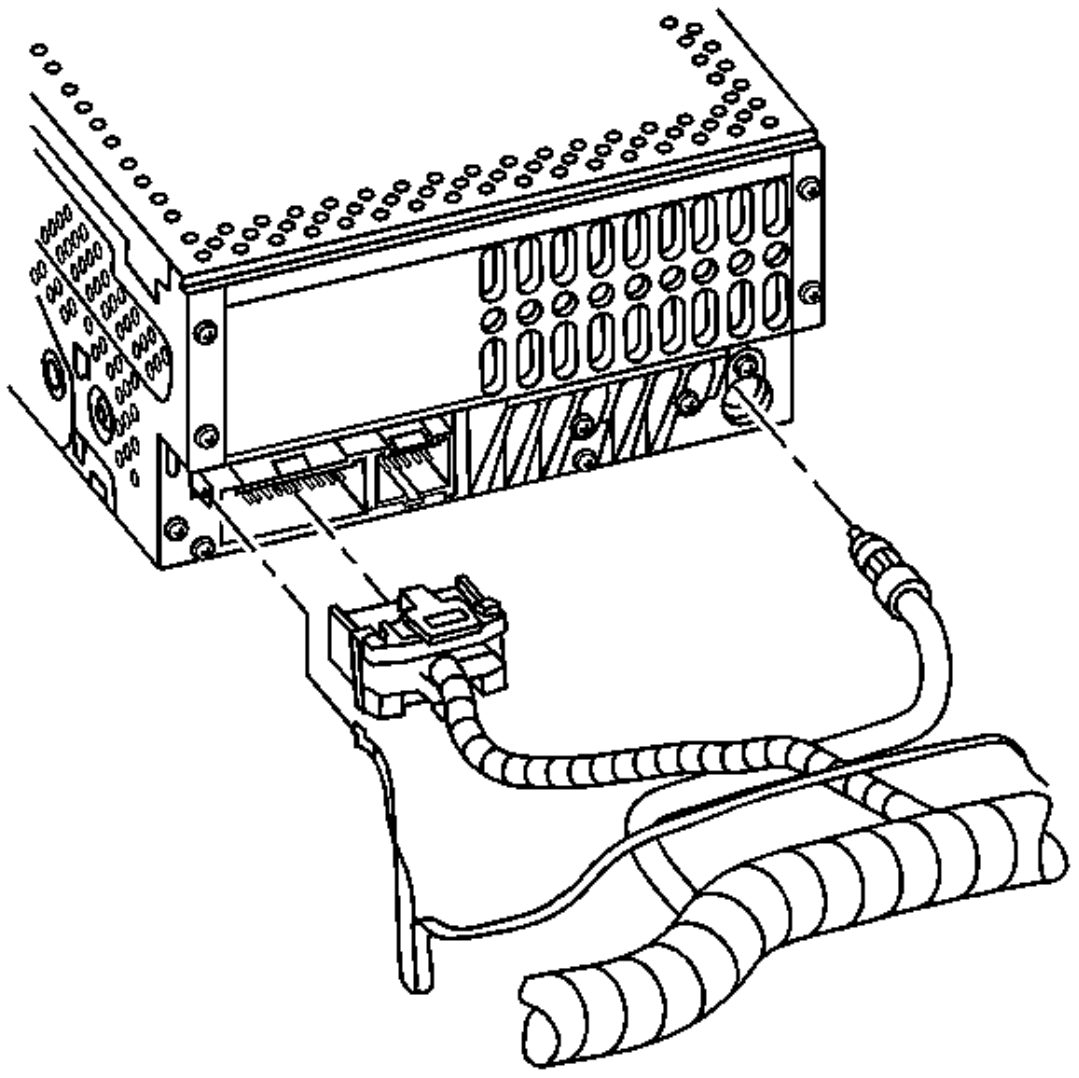


Fig. 18: View Of Radio Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

2. Push the radio into position and install the screws.

   Tighten: Tighten the screws to 2.5 N.m (22 lb in).

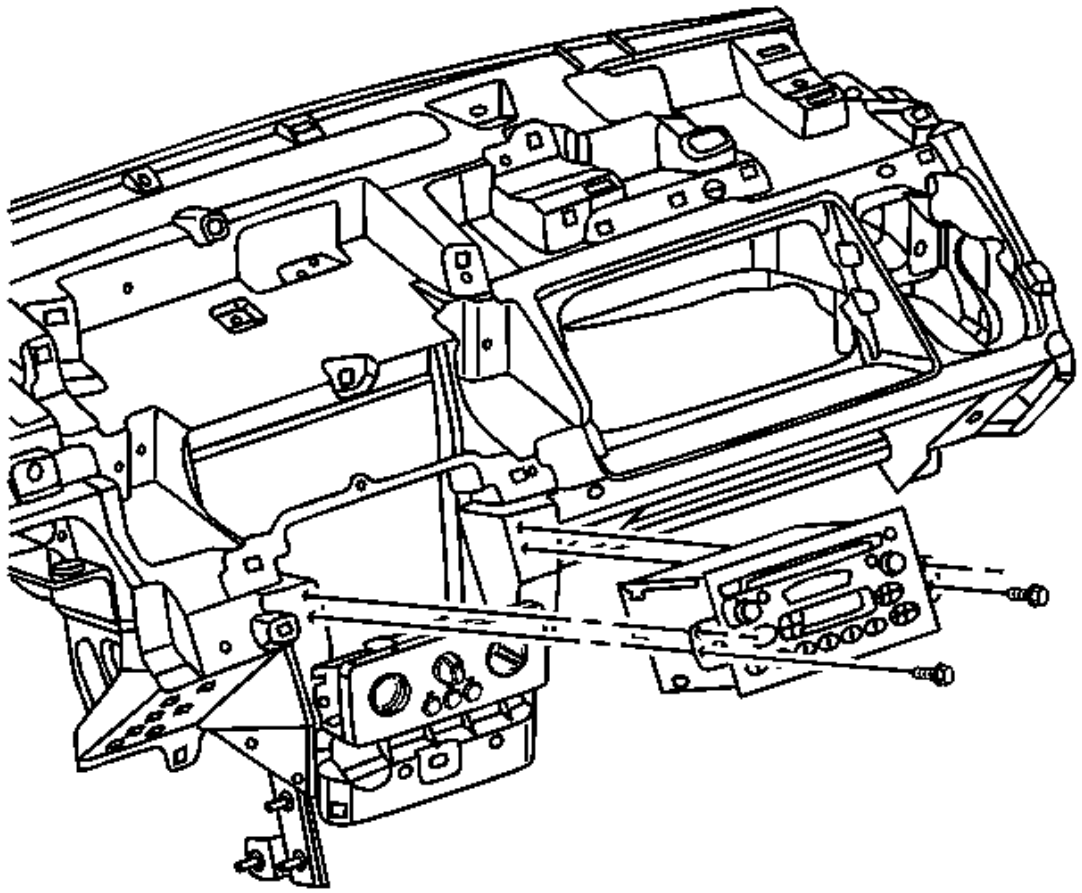


Fig. 19: View Of Radio
Courtesy of GENERAL MOTORS CORP.

3. Connect the electrical connectors to the accessory trim plate.

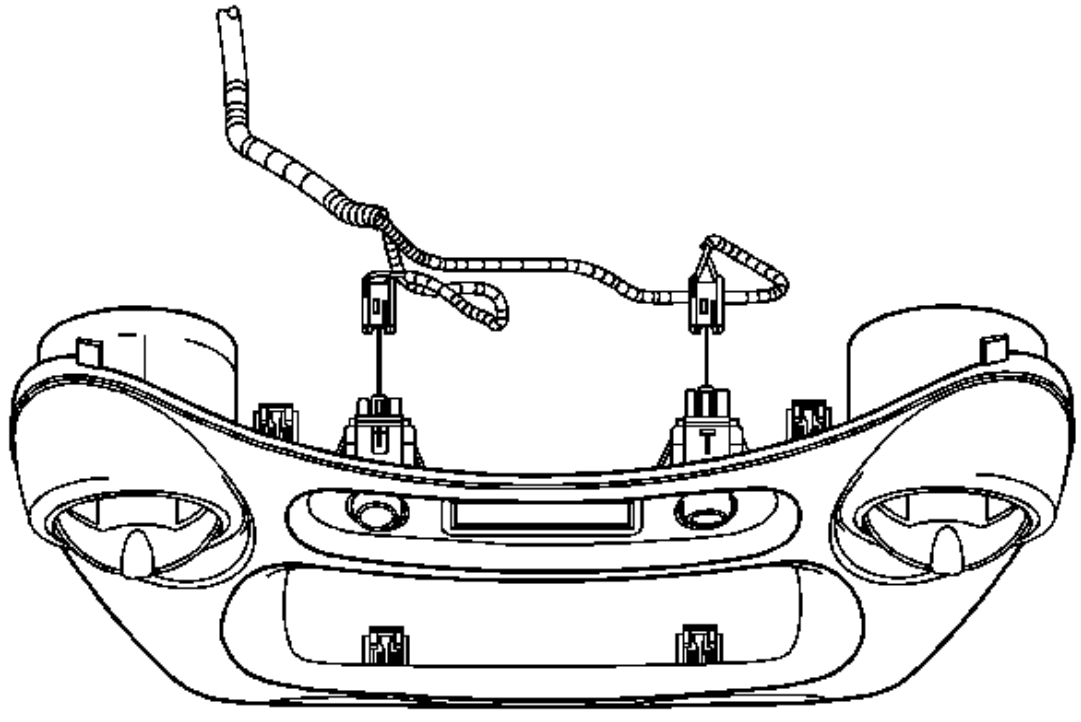


Fig. 20: View Of Accessory Trim Plate Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

4. Align the retaining fasteners with the instrument panel.

   Push on the outer edge of the accessory trim plate in order to secure the retaining fasteners.

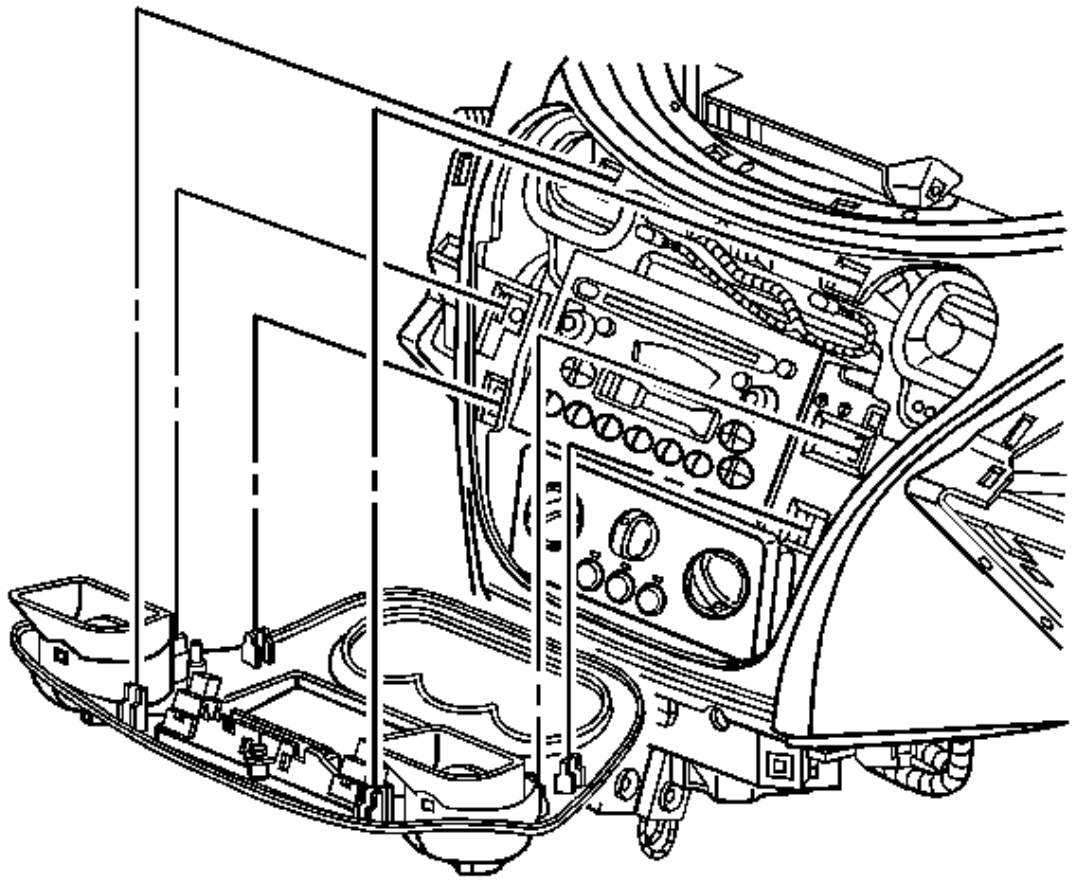


Fig. 21: Instrument Panel Bezel/Trim Plate
Courtesy of GENERAL MOTORS CORP.

5. Set up the radio. Refer to **Radio Setup**.

RECEIVER REPLACEMENT - DIGITAL RADIO

Removal Procedure

IMPORTANT: Do NOT swap digital radio receivers between vehicles. Swapping digital receivers between vehicles will activate the digital radio Theftlock®, and "XM Theftlock®" will display.

1. Remove the rear compartment trim panel. Refer to **Compartment Trim Panel Replacement - Rear** in Body Rear End.
2. Disconnect the wire connector (1).

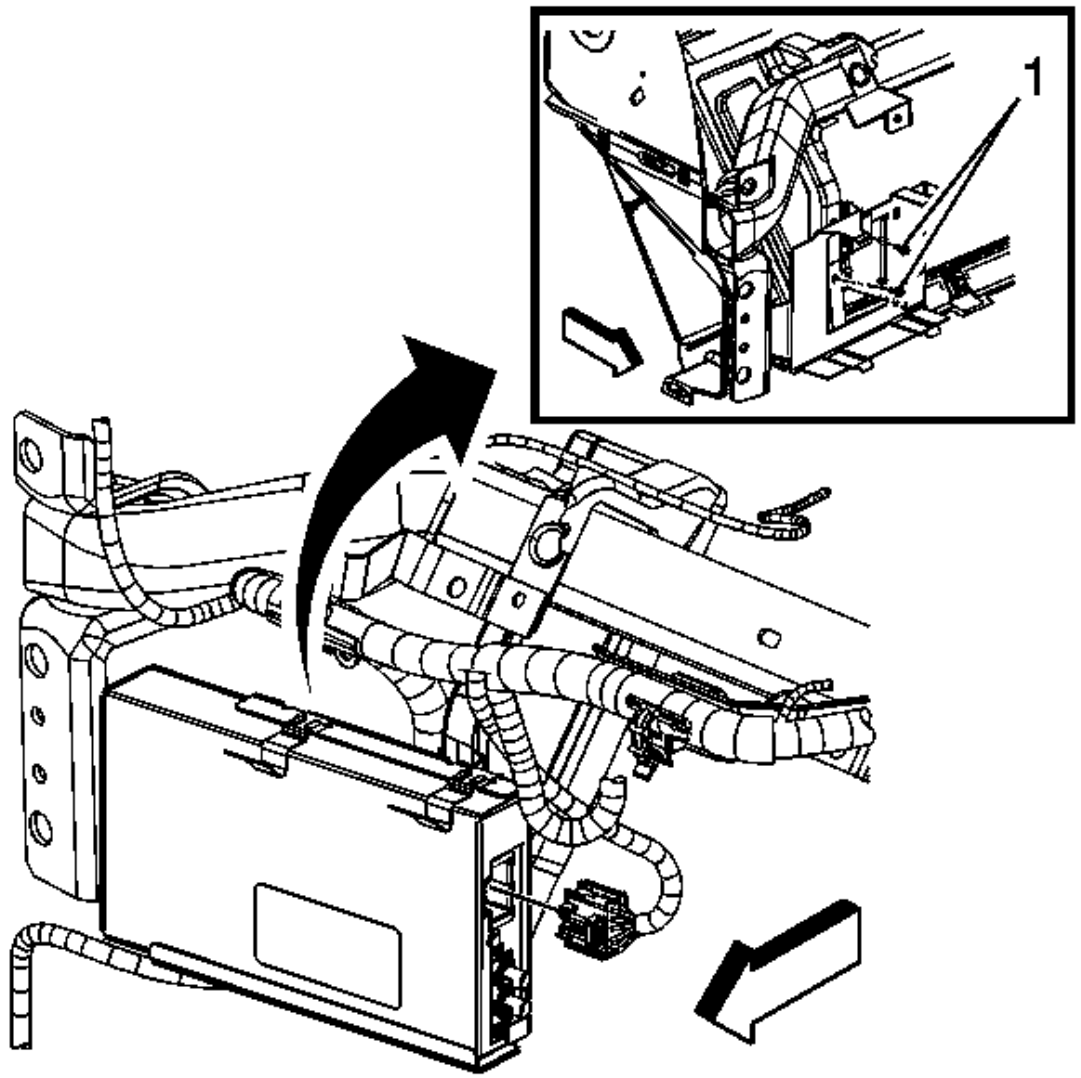


Fig. 22: View Of Digital Radio Receiver & Wire Connector
Courtesy of GENERAL MOTORS CORP.

3. Disconnect the coaxial cables from the receiver.
4. Remove the receiver from the bracket assembly.

Installation Procedure

1. Install the receiver to the bracket assembly.
2. Connect the coaxial cables.
3. Connect the wire connector (1).

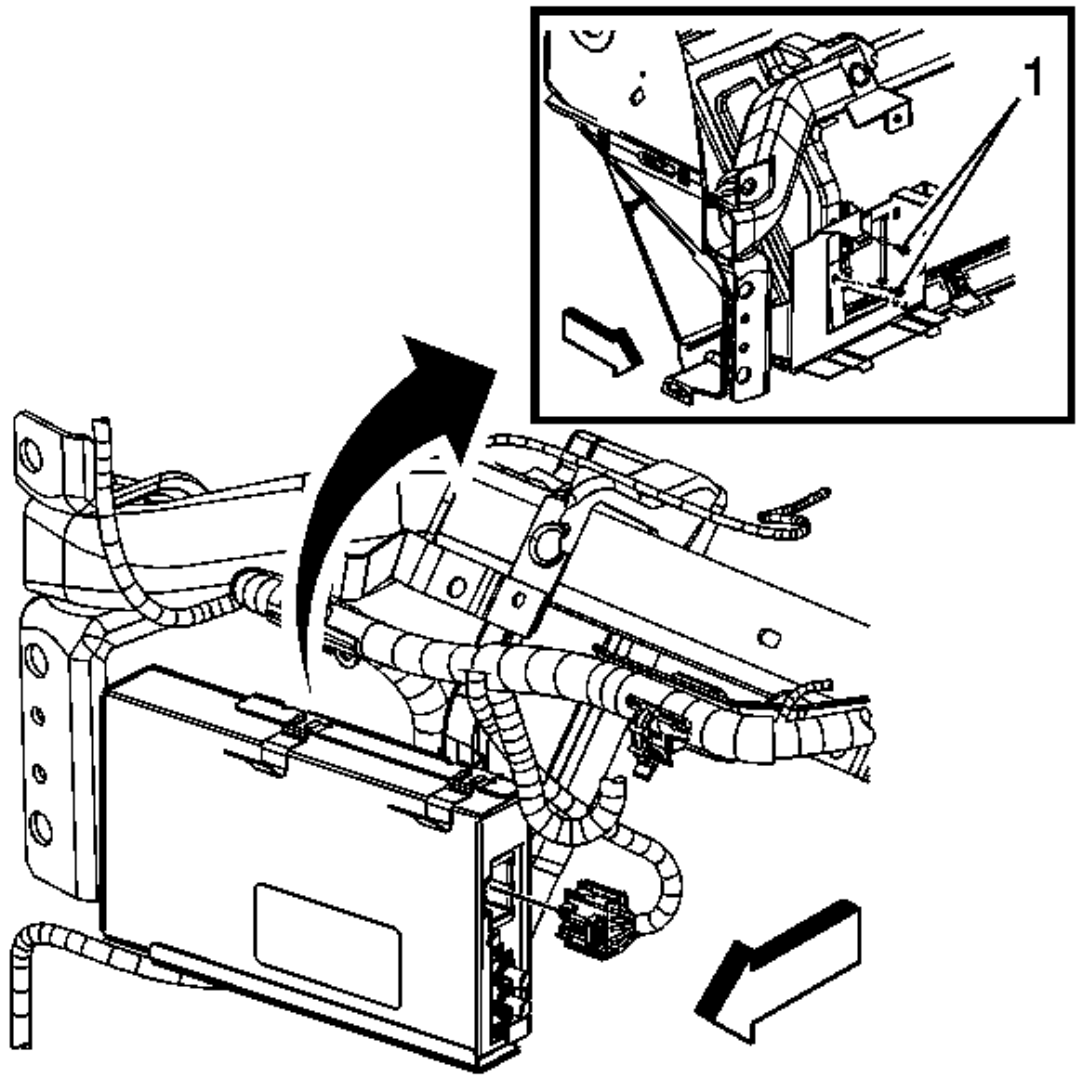


Fig. 23: View Of Digital Radio Receiver & Wire Connector
Courtesy of GENERAL MOTORS CORP.

4. Install the rear compartment trim panel. Refer to **Compartment Trim Panel Replacement - Rear** in Body Rear End.
5. Perform the setup procedure for the digital radio receiver. Refer to **Digital Radio Receiver Setup**.

AMPLIFIER REPLACEMENT

Removal Procedure

1. Pull the release handle in the rear compartment to lower the rear seat backs.

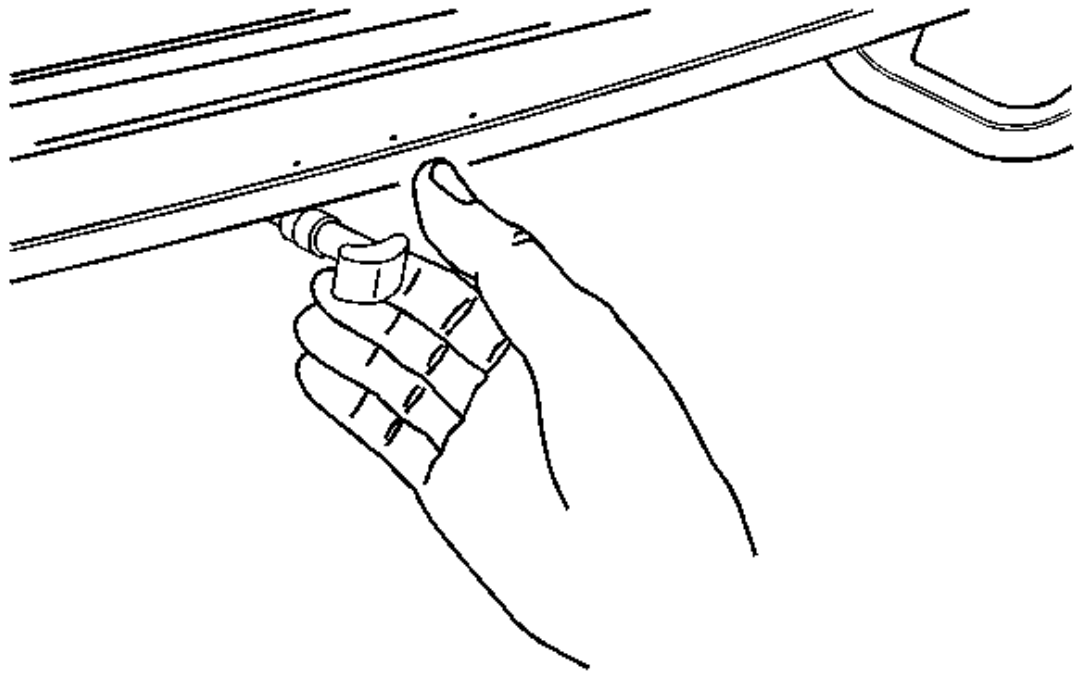


Fig. 24: Pulling Release Handle
Courtesy of GENERAL MOTORS CORP.

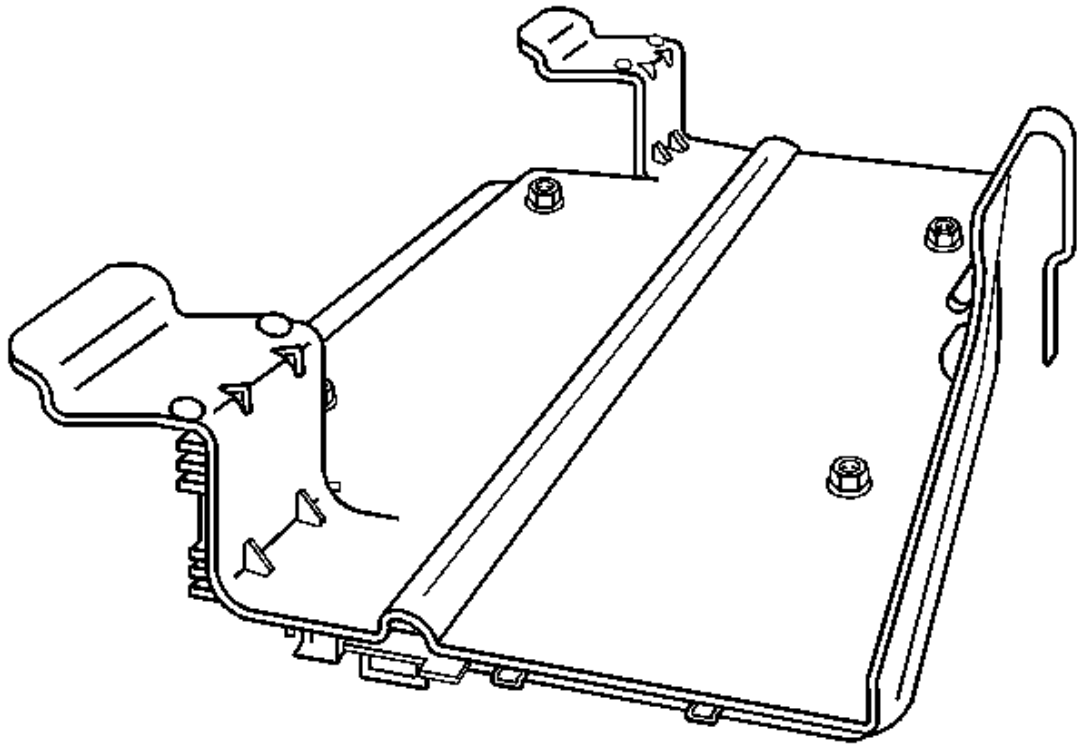


Fig. 25: View Of Amplifier Bracket
Courtesy of GENERAL MOTORS CORP.

2. Press the front tab on the retaining clip to release the front of the amplifier from the underside of the window shelf.
3. Pull the amplifier toward the passenger compartment to disengage the rear tabs from the shelf.

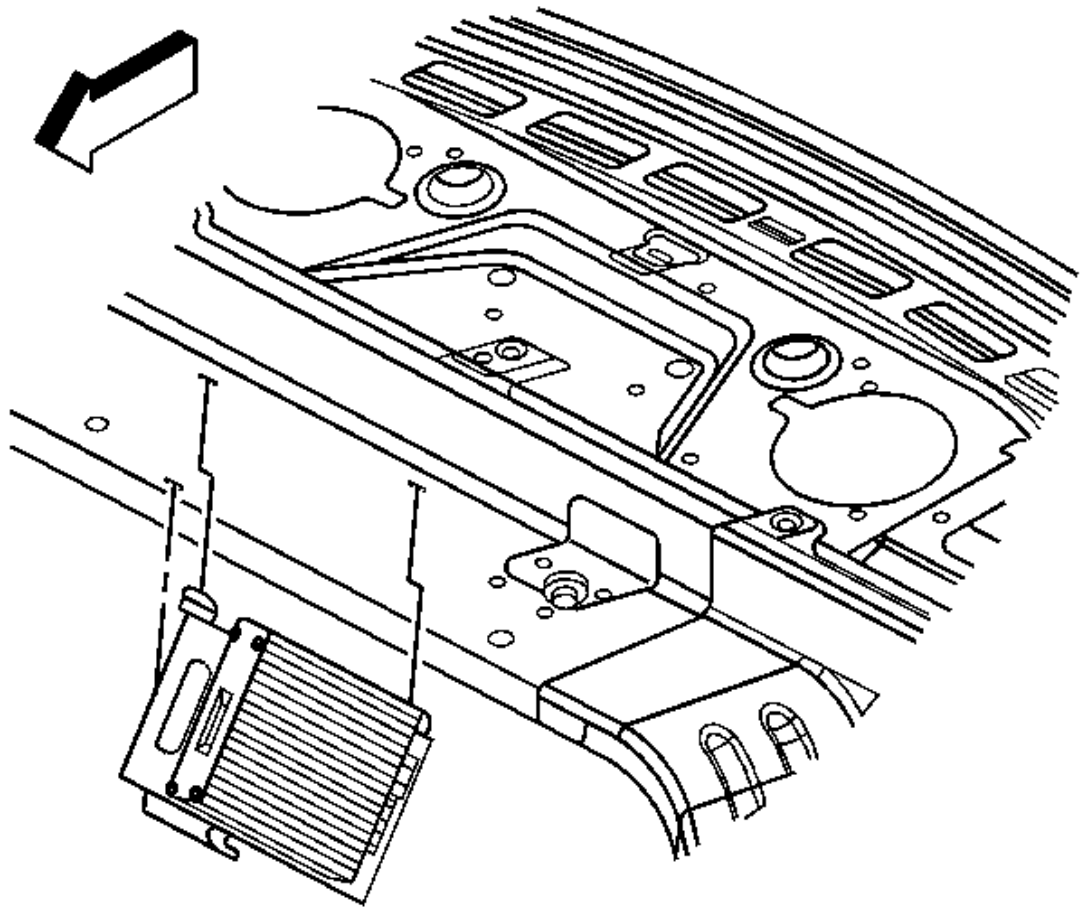


Fig. 26: View Of Amplifier
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connectors.

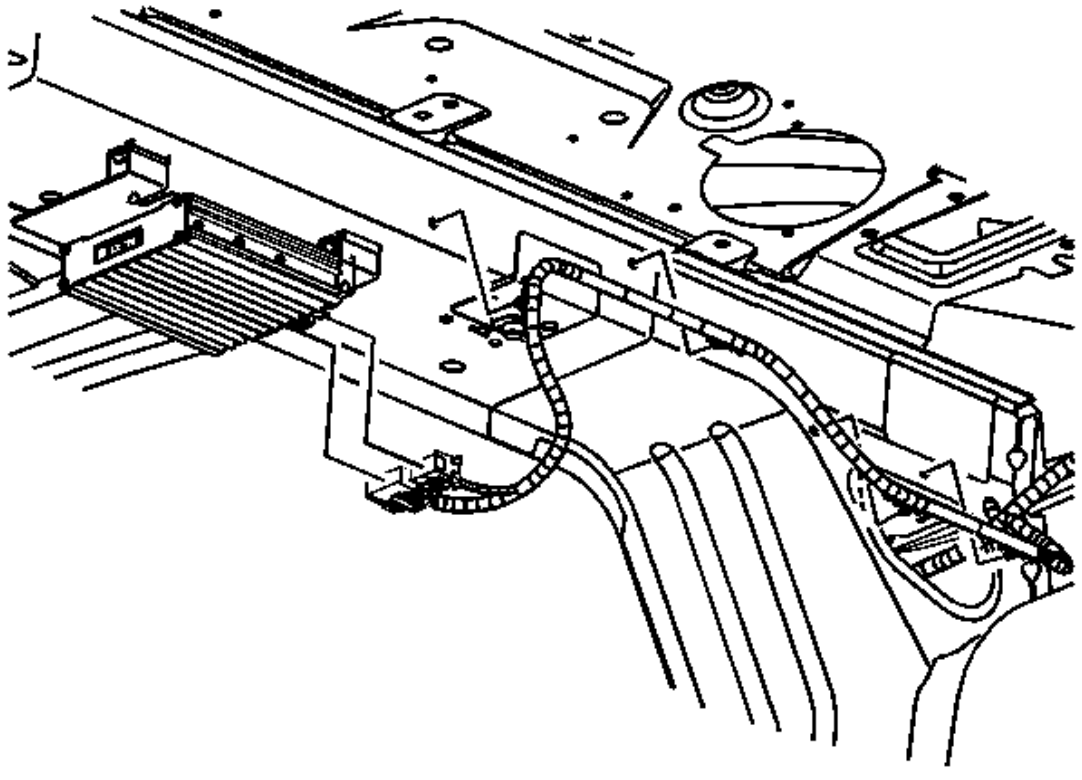


Fig. 27: View Of Amplifier Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

5. Remove the amplifier.

Installation Procedure

1. Connect the electrical connectors.

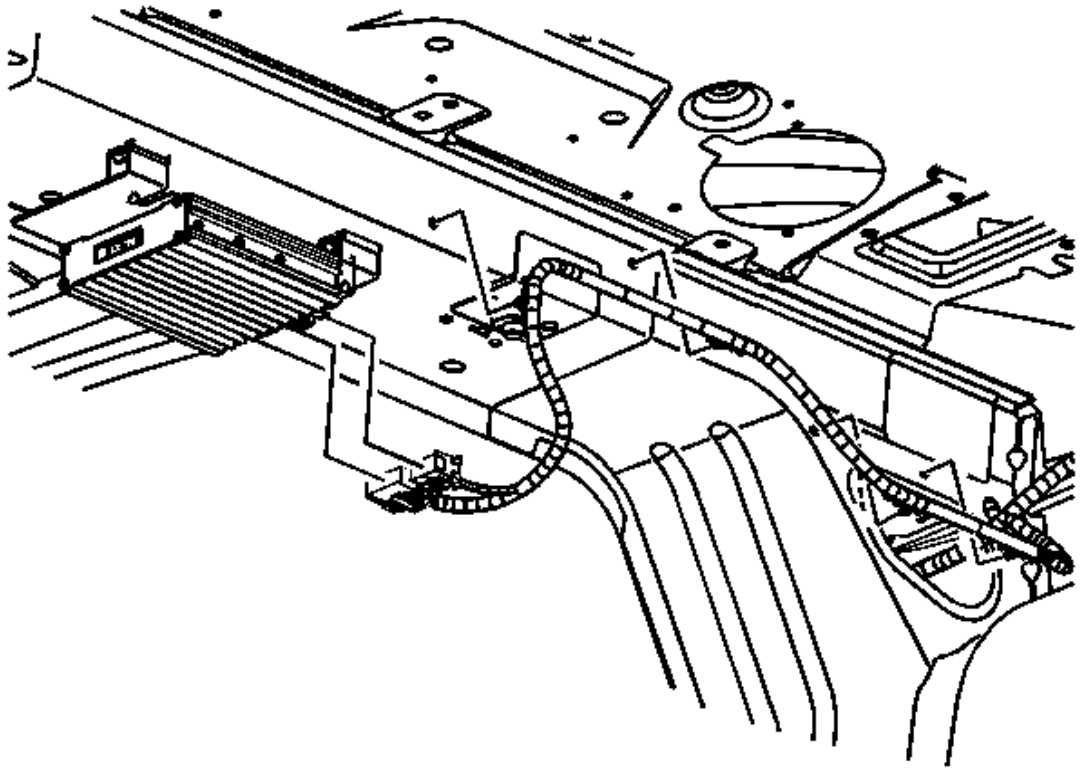


Fig. 28: View Of Amplifier Electrical Connectors
Courtesy of GENERAL MOTORS CORP.

2. Insert the amplifier rear tabs in the window shelf.

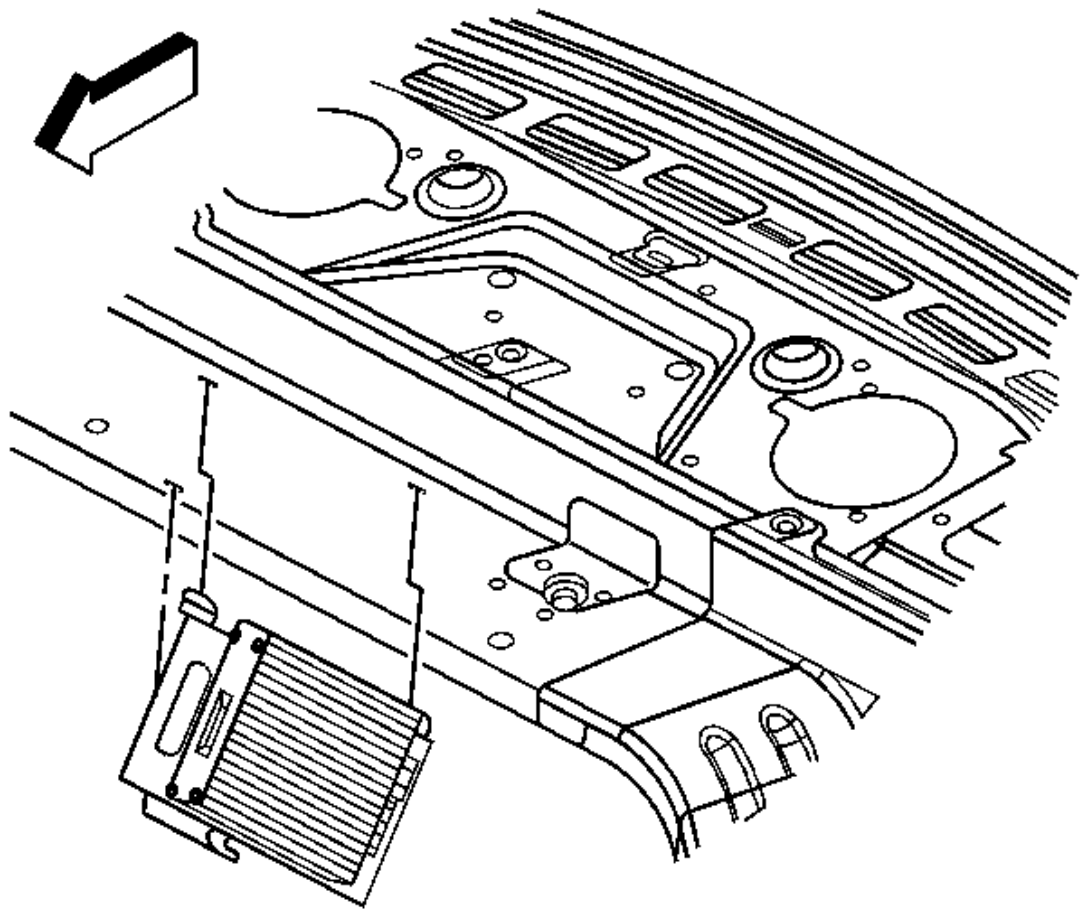


Fig. 29: View Of Amplifier
Courtesy of GENERAL MOTORS CORP.

3. Push up to engage the amplifier bracket forward clip.
4. Raise the rear seat backs.
5. Press down over the latch locations to ensure that the latches engage.
6. Pull up on the seat backs to ensure that the seat back latches are fully engaged.
7. Verify that the seat belts operate properly.

FIXED ANTENNA MAST REPLACEMENT

Removal Procedure

Turn the antenna mast counterclockwise to remove the mast.

Installation Procedure

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

Install the antenna mast. Turn the mast clockwise to tighten.

Tighten: Tighten the mast to 10 N.m (89 lb in).

FIXED ANTENNA REPLACEMENT

Removal Procedure

1. Remove the front fender. Refer to **Fender Replacement - Front (Sedan)** or **Fender Replacement - Front (Coupe)** in Body Front End.
2. Remove the antenna mast from the antenna base by turning counterclockwise.
3. Disconnect the antenna lead-in from the antenna base.
4. Remove the antenna base screws from the bracket on the antenna base.
5. Remove the antenna base.

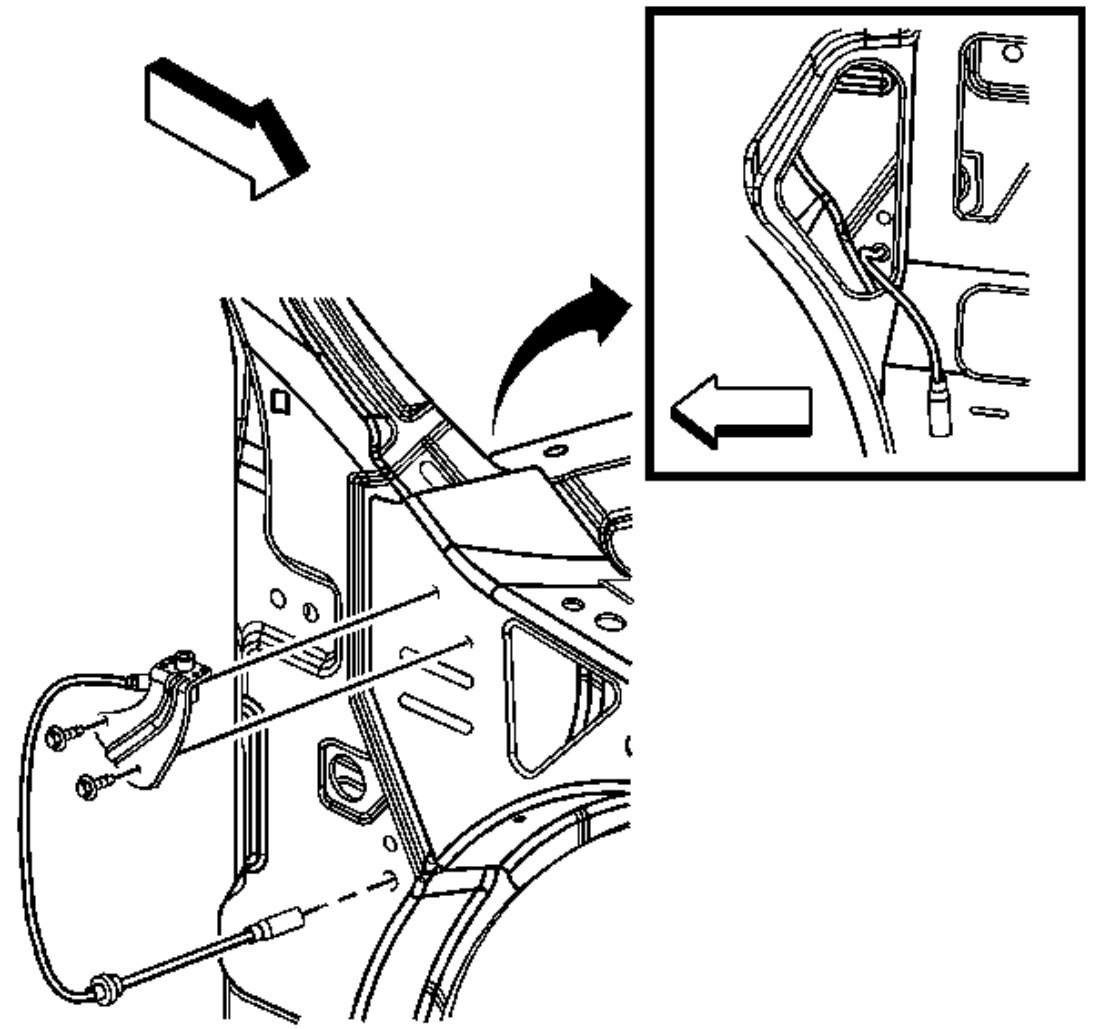


Fig. 30: View Of Antenna & Antenna Base

Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect the antenna lead-in to the antenna base.
2. Install the antenna base.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

3. Install the screws to the bracket on the antenna base.

   Tighten: Tighten the screws to 10 N.m (89 lb in).

4. Install the antenna mast to the antenna base by turning clockwise.

   Tighten: Tighten the mast to 10 N.m (89 lb in).

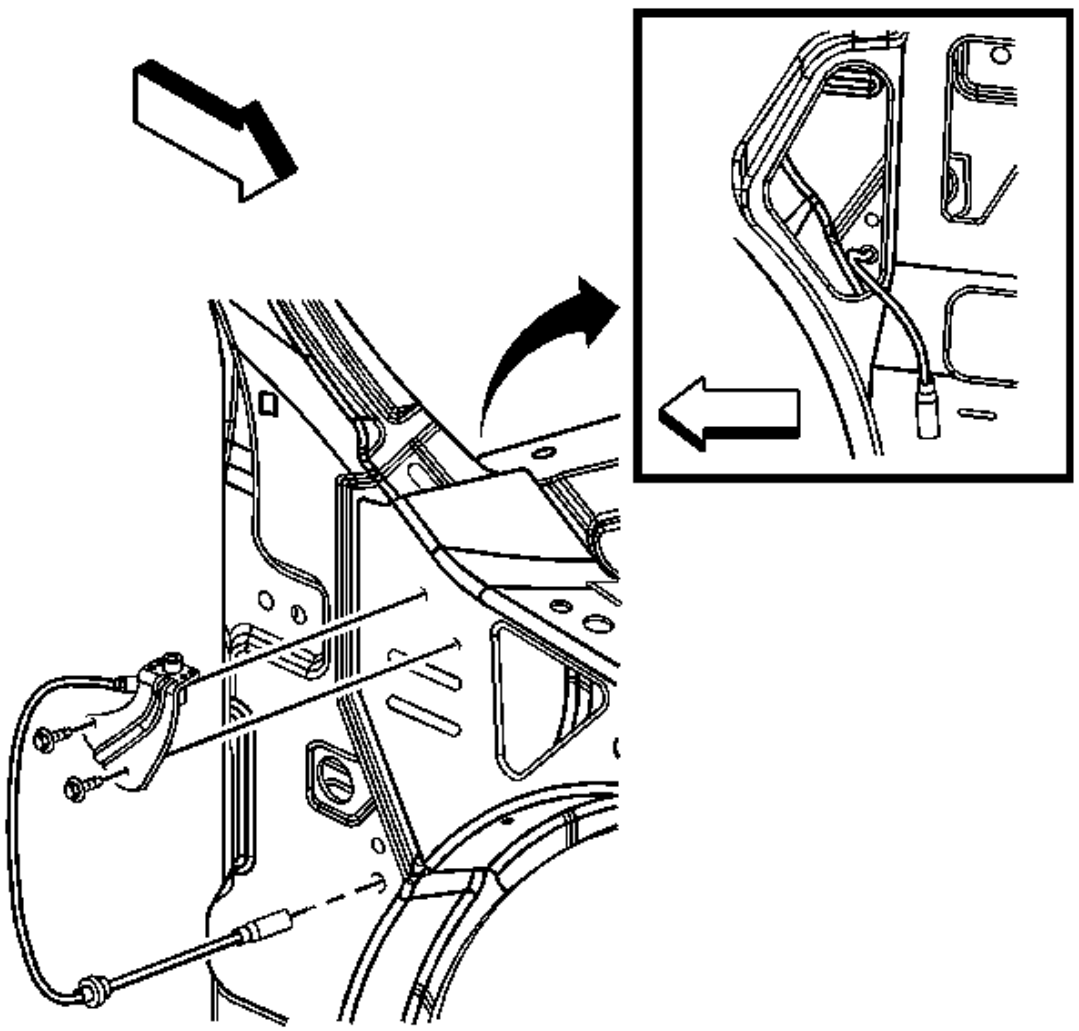


Fig. 31: View Of Antenna & Antenna Base
Courtesy of GENERAL MOTORS CORP.

5. Install the front fender. Refer to **Fender Replacement - Front (Sedan)** or **Fender Replacement - Front (Coupe)** in Body Front End.

ANTENNA REPLACEMENT - DIGITAL RADIO

Removal Procedure

NOTE: **DO NOT apply paint or clear coat to the antenna. This will damage the function of the antenna, causing poor reception or loss of signal reception.**

NOTE: **Use care when removing or installing the headliner. Excessive bending will damage the headliner.**

1. Lower the headliner. Refer to **Headliner Replacement (w/ Sunroof)** or **Headliner Replacement (w/o Sunroof)** in Interior Trim.
2. Disconnect the cables (4) from the antenna base (1).
3. Remove the retaining nut (2).
4. Remove the antenna base (1) from the top of the roof.

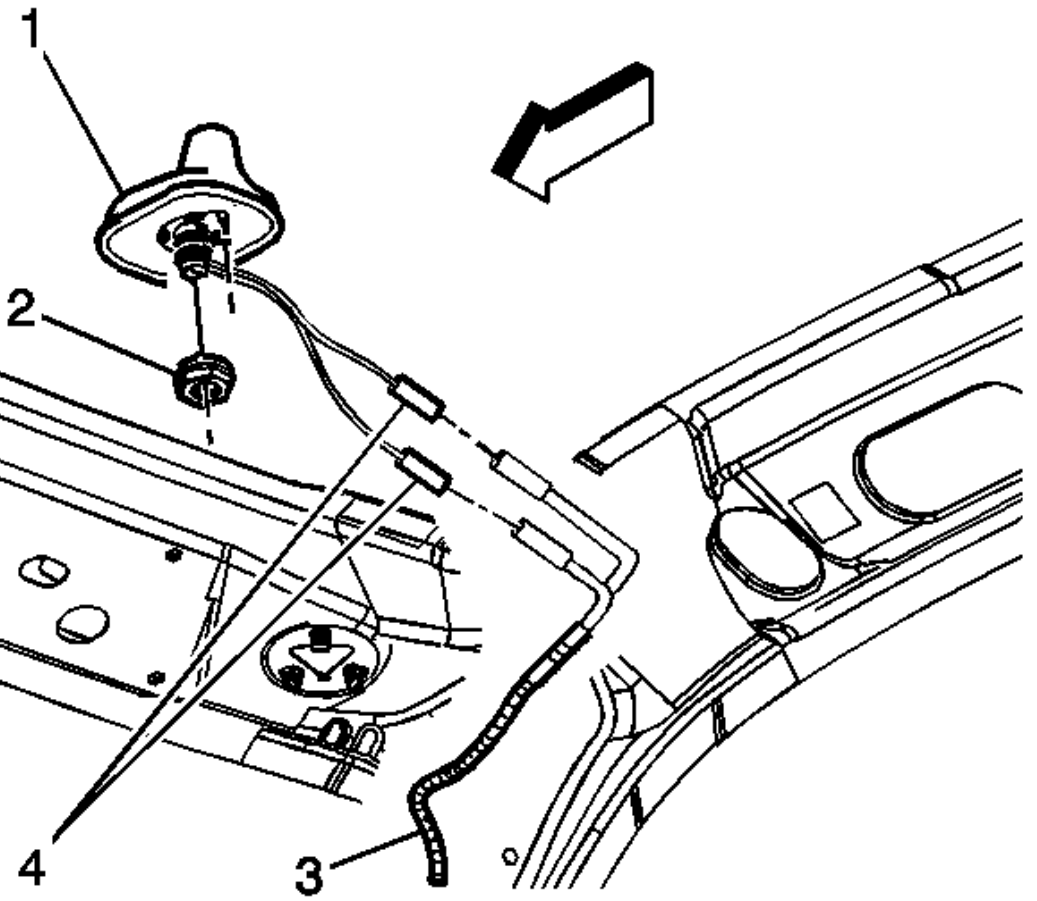


Fig. 32: View Of Digital Antenna Base & Cables
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Place the antenna base (1) to the roof opening.

   NOTE: **Refer to Fastener Notice in Cautions and Notices.**

2. Install the retaining nut (2).

   Tighten: Tighten the nut to 3.5 N.m (30 lb in).

3. Connect the antenna cables (4).

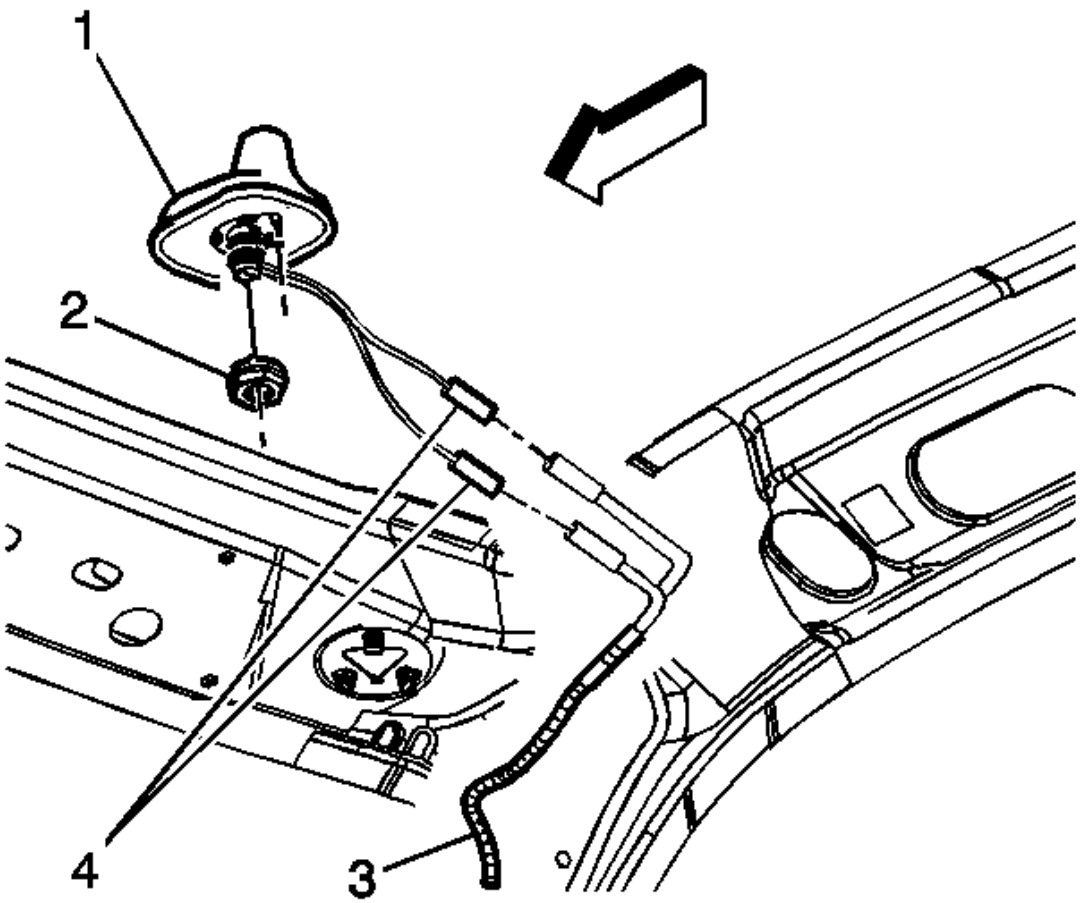


Fig. 33: View Of Digital Antenna Base & Cables
Courtesy of GENERAL MOTORS CORP.

4. Install the headliner. Refer to **Headliner Replacement (w/ Sunroof)** or **Headliner Replacement (w/o Sunroof)** in Interior Trim.

ANTENNA CABLE REPLACEMENT

Removal Procedure

1. Remove the antenna. Refer to **Fixed Antenna Replacement**.
2. Remove the front carpet retainer. Refer to **Carpet Retainer Replacement - Front** in Interior Trim.
3. Reach under the passenger side of the instrument panel (I/P). Pull back the carpet and the dash mat to expose the antenna cable.
4. Disconnect the antenna cable from the I/P wiring harness.
5. Remove the antenna cable grommet.
6. Remove the antenna cable.

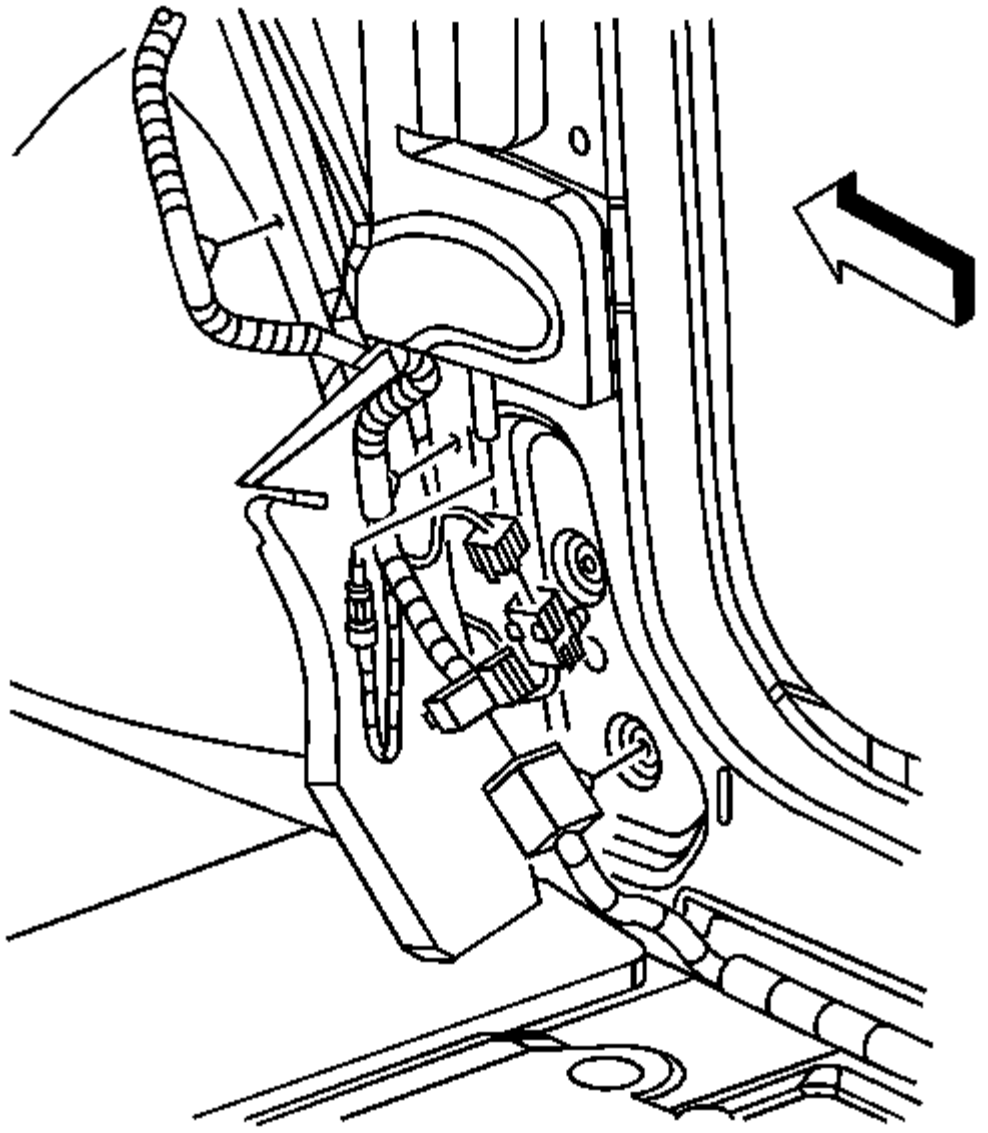


Fig. 34: View Of Antenna Cable & I/P Wiring Harness
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the antenna cable through the body hinge pillar.
2. Install the antenna grommet.
3. Install the antenna. Refer to **Fixed Antenna Replacement**.
4. Connect the antenna cable to the I/P wiring harness.

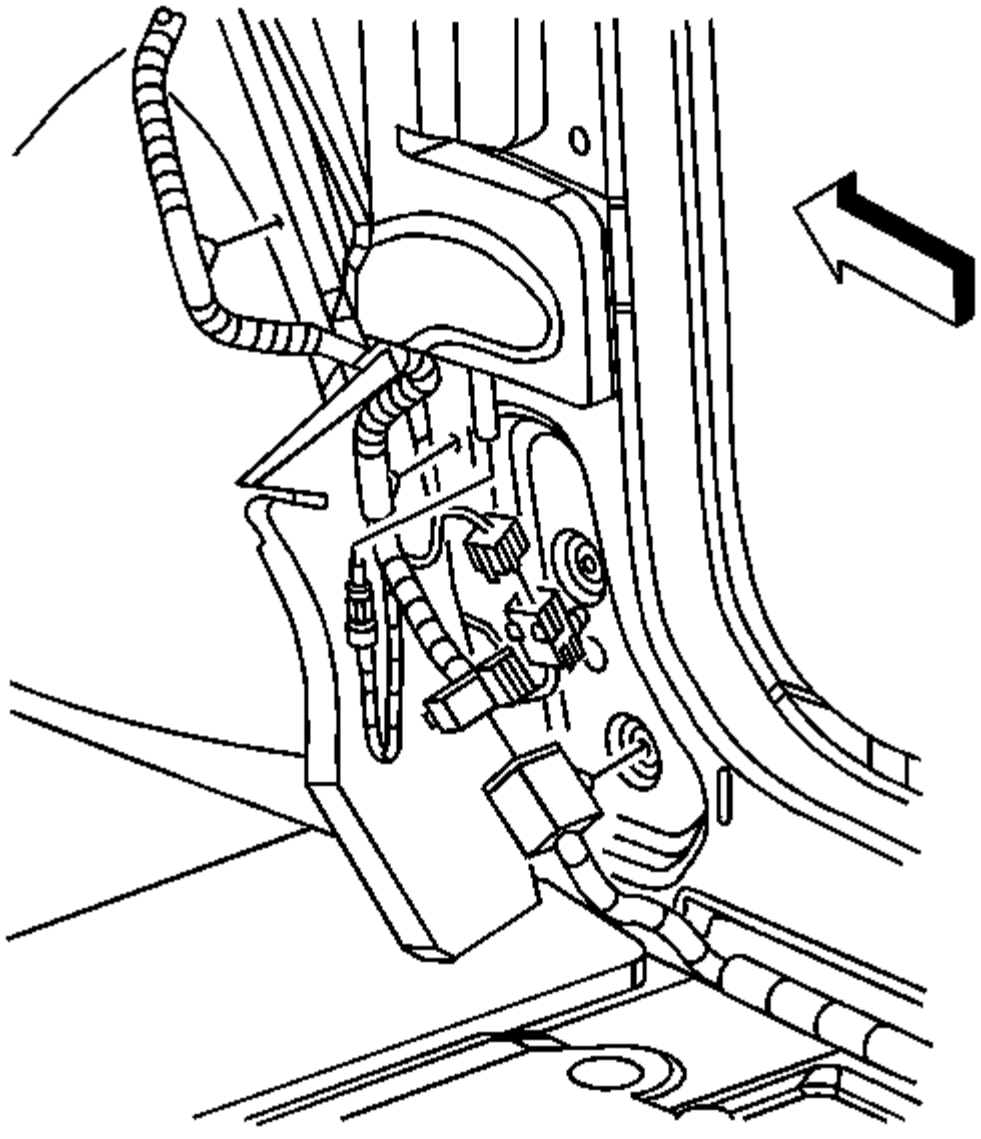


Fig. 35: View Of Antenna Cable & I/P Wiring Harness
Courtesy of GENERAL MOTORS CORP.

5. Replace the dash mat and the carpet.

6. Install the front carpet retainer. Refer to **Carpet Retainer Replacement - Front** in Interior Trim.

COAXIAL CABLE REPLACEMENT - DIGITAL RADIO

Removal Procedure

1. Remove the headliner. Refer to **Headliner Replacement (w/ Sunroof)** or **Headliner Replacement (w/o Sunroof)** in Interior Trim.
2. Remove the corner upper garnish molding. Refer to **Garnish Molding Replacement - Lock Pillar Upper** in Interior Trim.
3. Remove the rear trunk trim. Refer to **Compartment Trim Panel Replacement - Rear** in Interior Trim.
4. Remove the antenna cable (2) from the module.

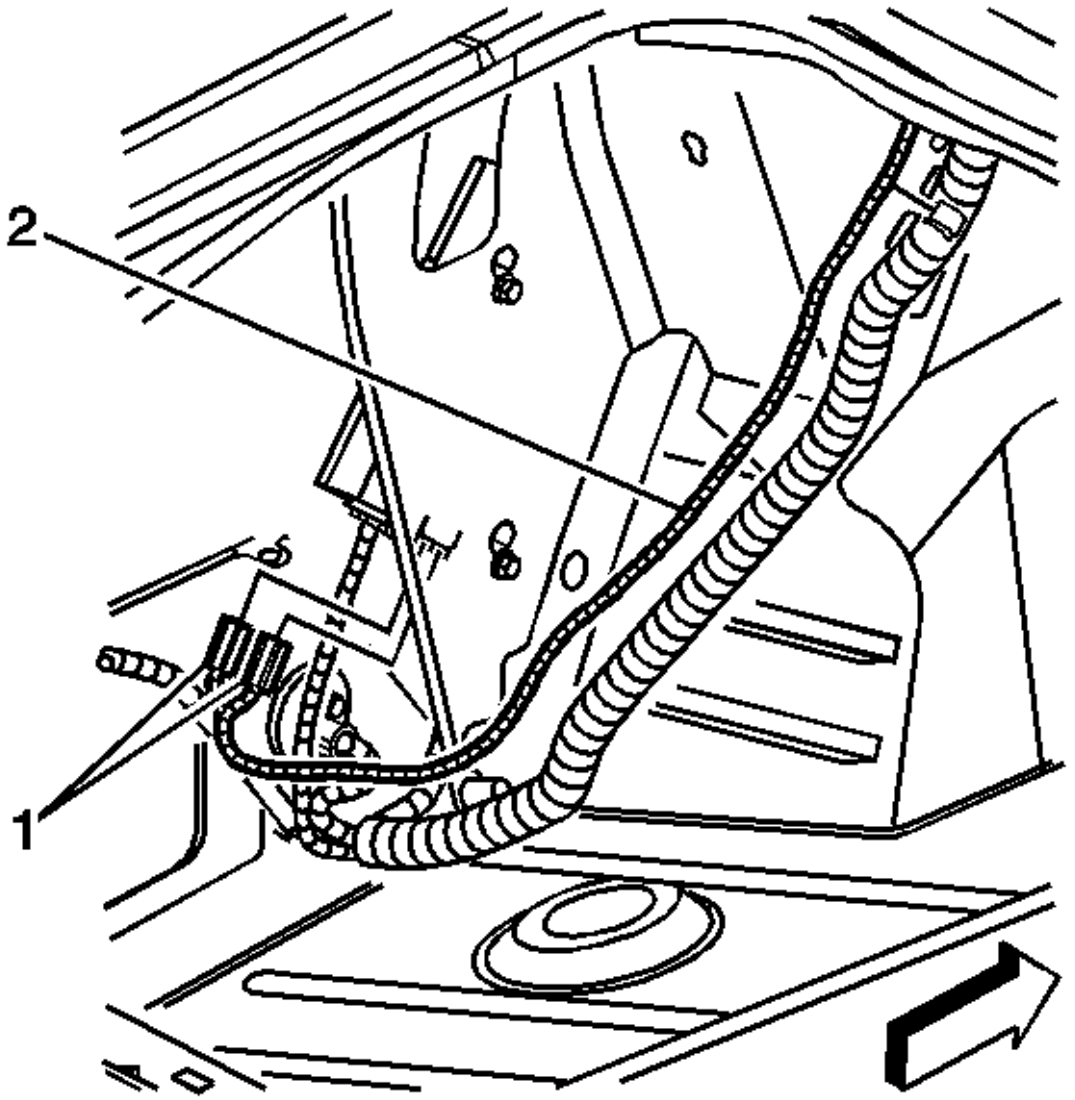


Fig. 36: Attaching Antenna Cable To Module
Courtesy of GENERAL MOTORS CORP.

5. Remove the antenna cable (2) from the vehicle.

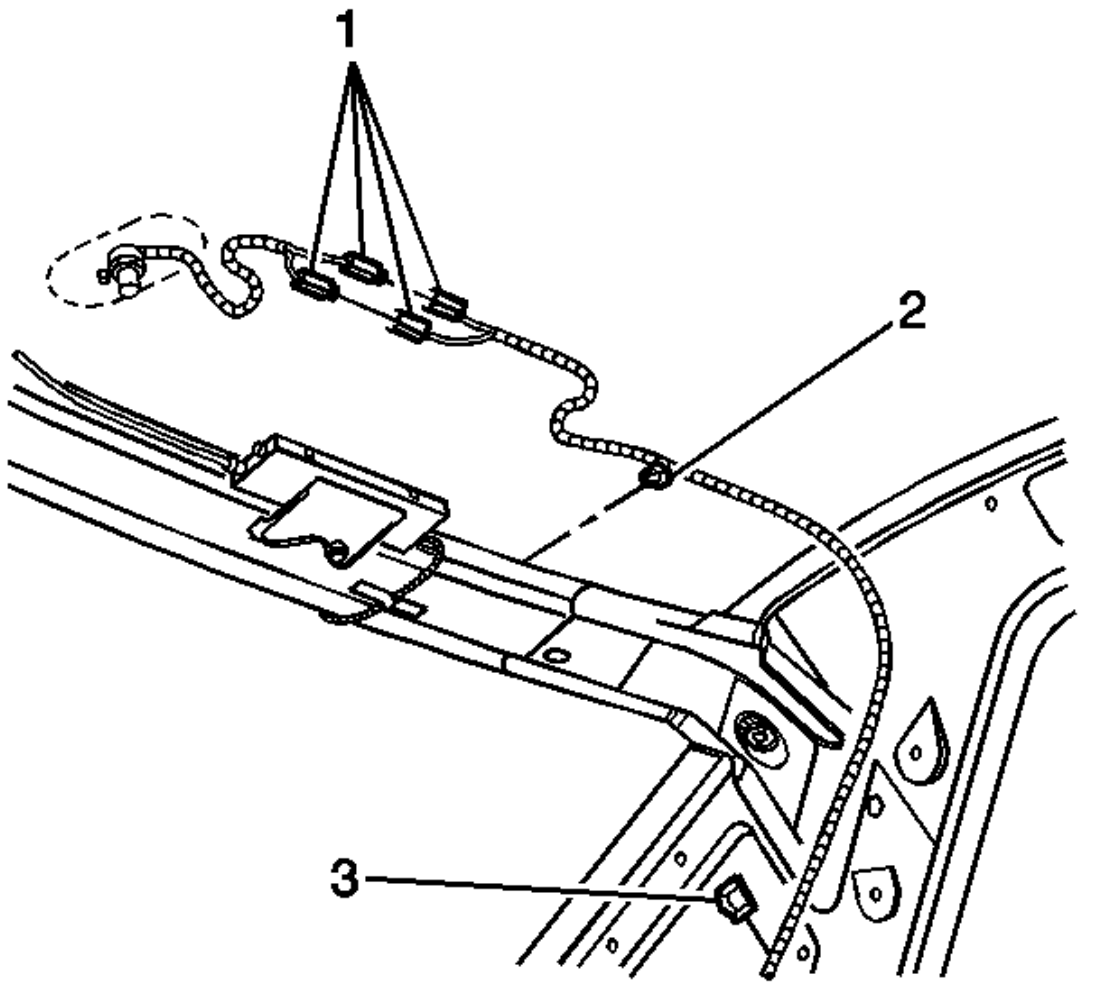


Fig. 37: View Of Antenna Cable
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the antenna cable (2) to the vehicle.

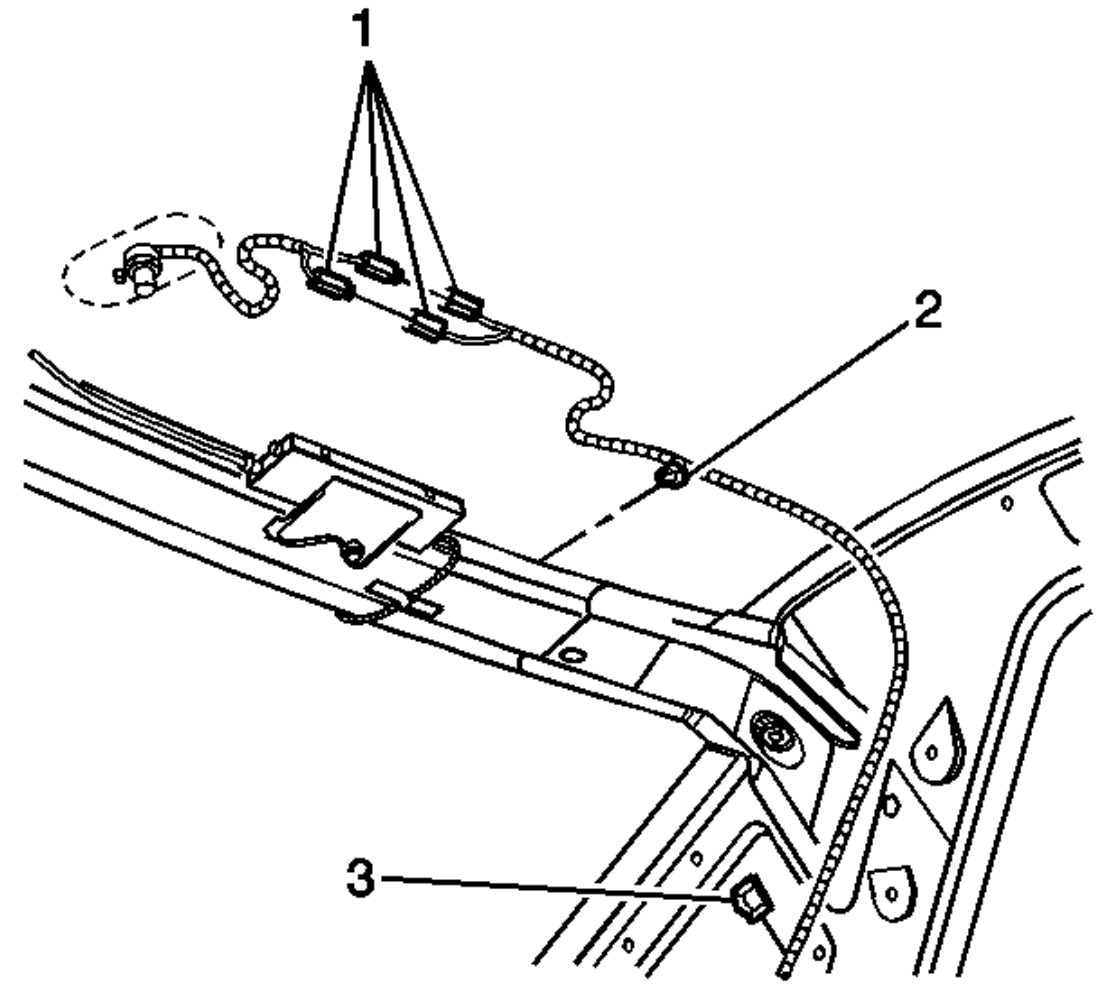


Fig. 38: View Of Antenna Cable
Courtesy of GENERAL MOTORS CORP.

2. Install the antenna cable (2) to the module.

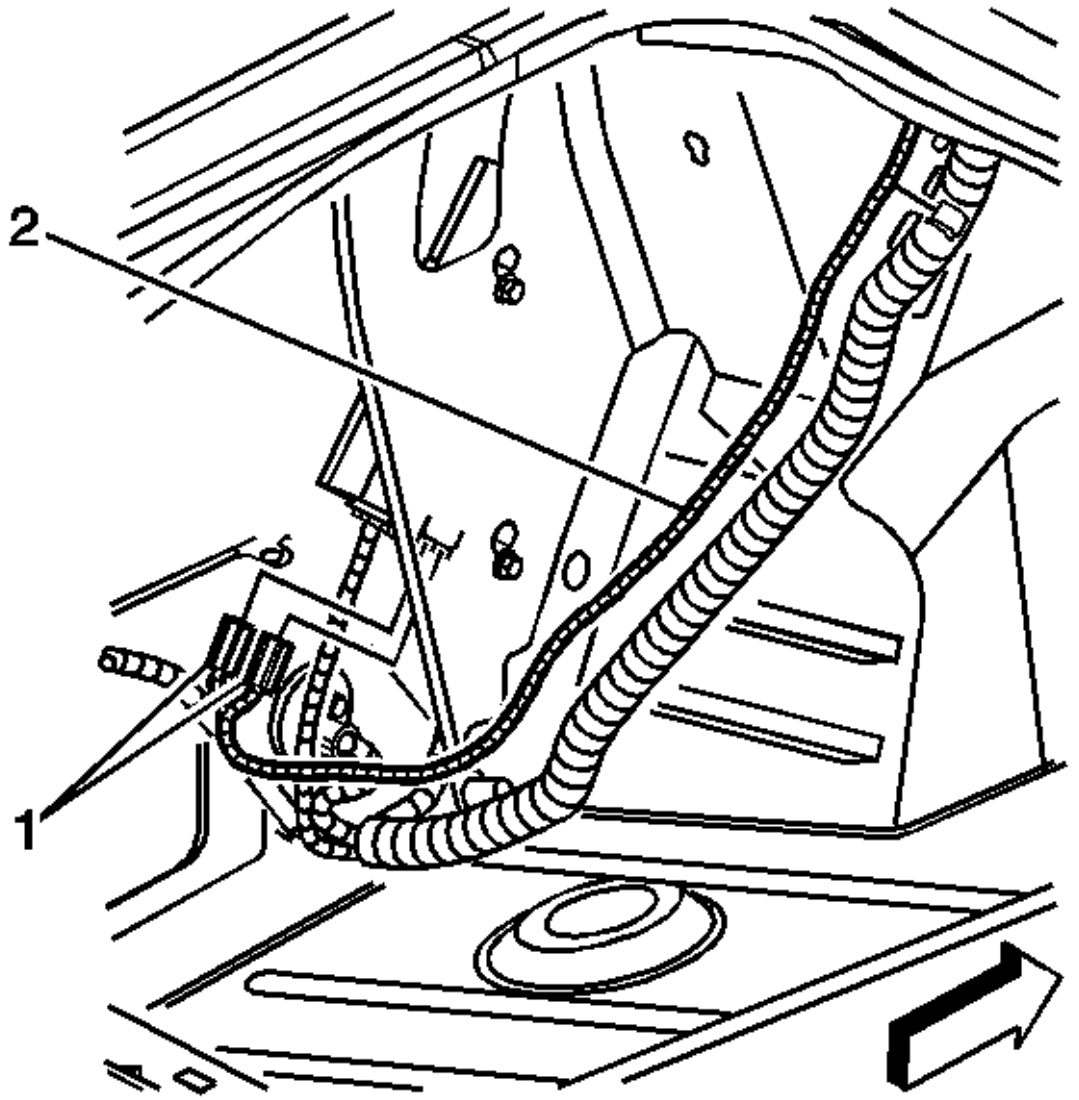


Fig. 39: Attaching Antenna Cable To Module
Courtesy of GENERAL MOTORS CORP.

3. Install the rear trunk trim. Refer to **Compartment Trim Panel Replacement - Rear** in Interior Trim.
4. Install the corner upper garnish molding. Refer to **Garnish Molding Replacement - Lock Pillar Upper** in Interior Trim.
5. Install the headliner. Refer to **Headliner Replacement (w/ Sunroof)** or **Headliner Replacement (w/o Sunroof)** in Interior Trim.

SPEAKER REPLACEMENT - FRONT DOOR

Removal Procedure

1. Remove the front door trim panel. Refer to **Trim Panel Replacement - Side Front Door** in Doors.
2. Remove the front door speaker screws.

3. Disconnect the electrical connector from the speaker.
4. Remove the speaker from the front door.

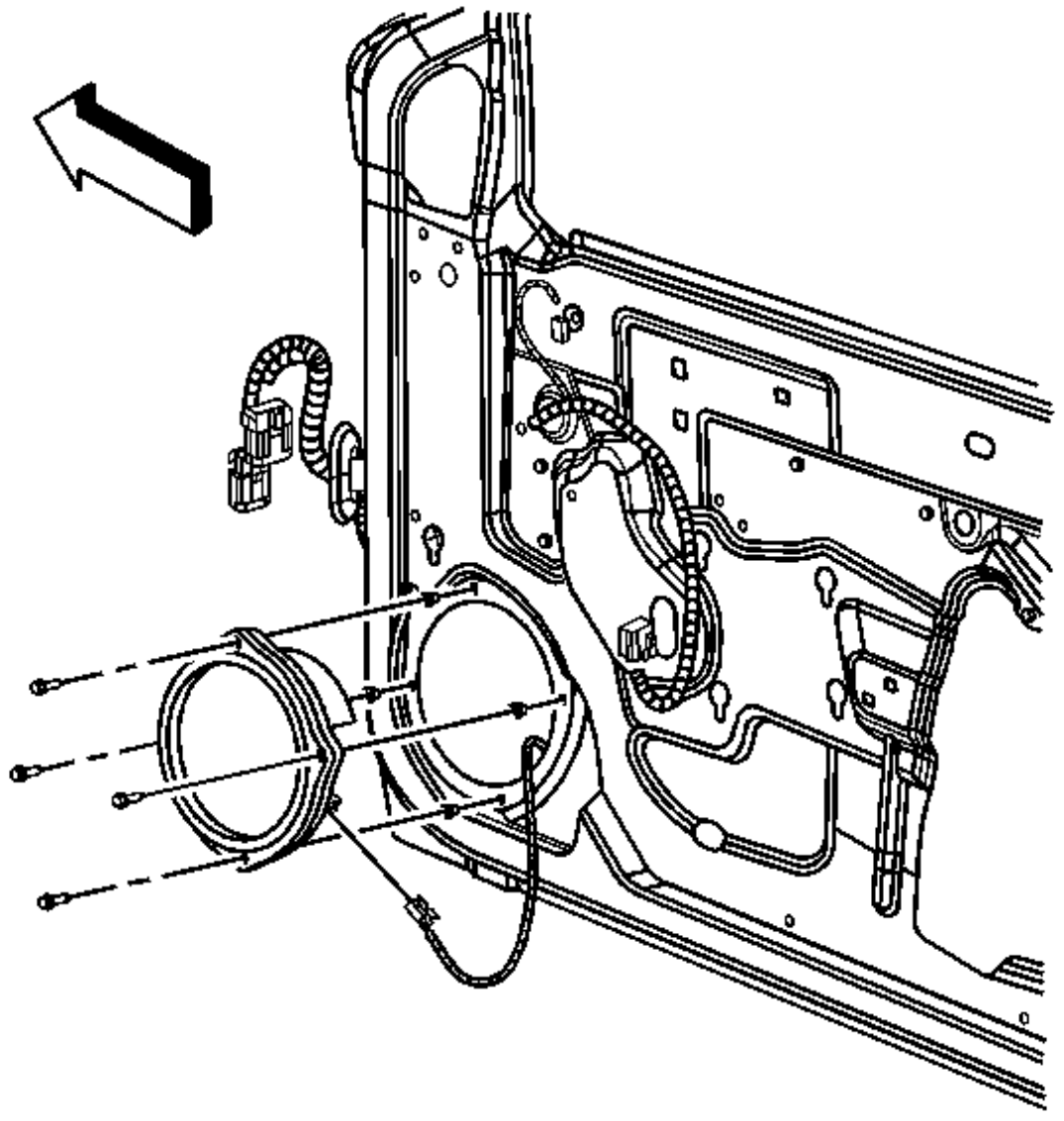


Fig. 40: View Of Front Door Speaker
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect the electrical connector to the speaker.
2. Install the speaker to the front door.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

3. Install the screws to the speaker.

   Tighten: Tighten the screws to 1.2 N.m (9 lb in).

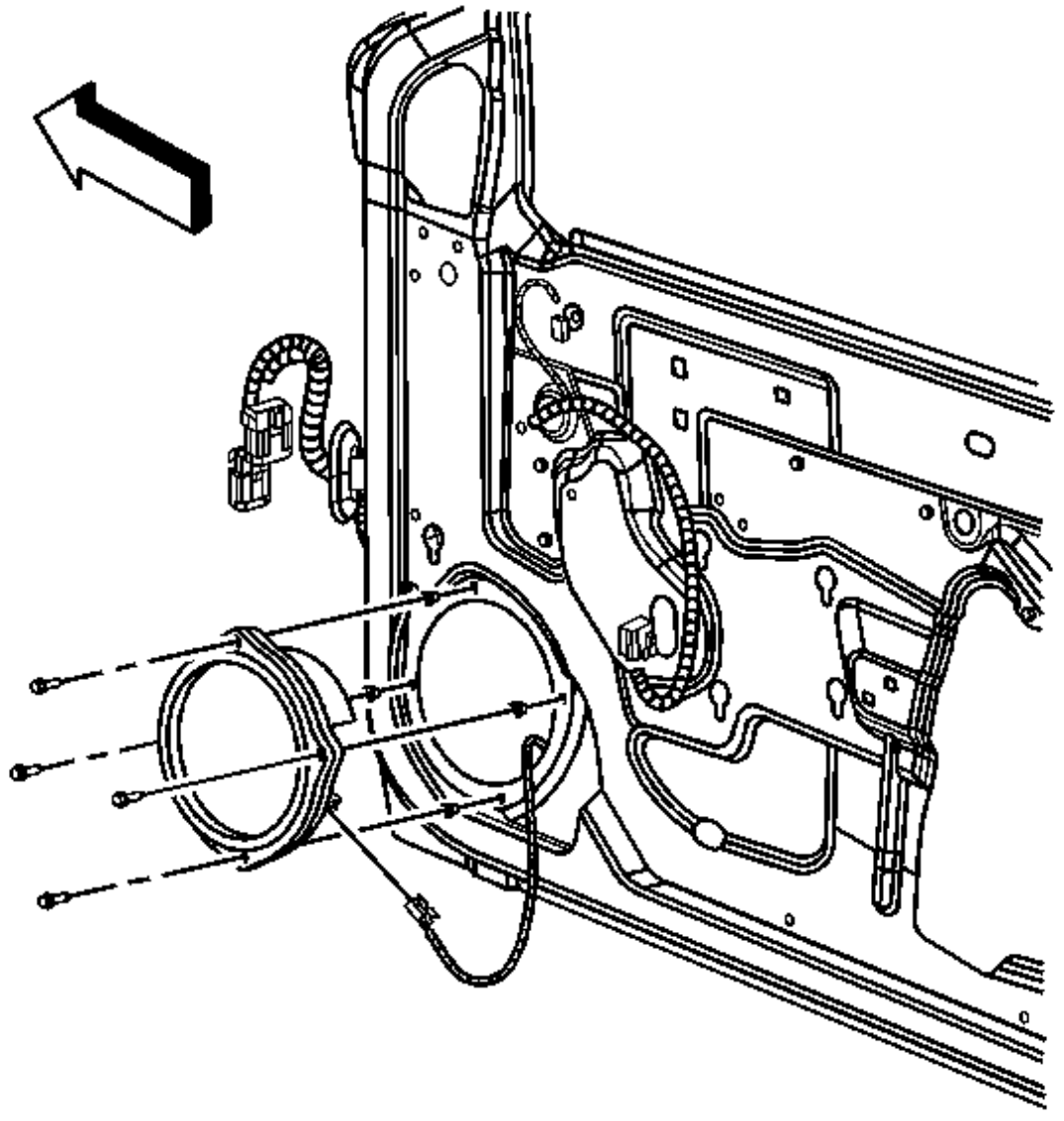


Fig. 41: View Of Front Door Speaker
Courtesy of GENERAL MOTORS CORP.

4. Install the front door trim panel. Refer to **Trim Panel Replacement - Side Front Door** in Doors.

SPEAKER REPLACEMENT - FRONT UPPER

Removal Procedure

1. Remove the upper extension of the door trim panel.
    1. Pull at the top of the trim panel to disengage the trim clip.
    2. Lift up to remove the lower tabs from behind the door trim.
    3. Disconnect the speaker wiring harness.
2. Disengage the locking tabs from the speaker.
3. Remove the speaker from the trim panel.

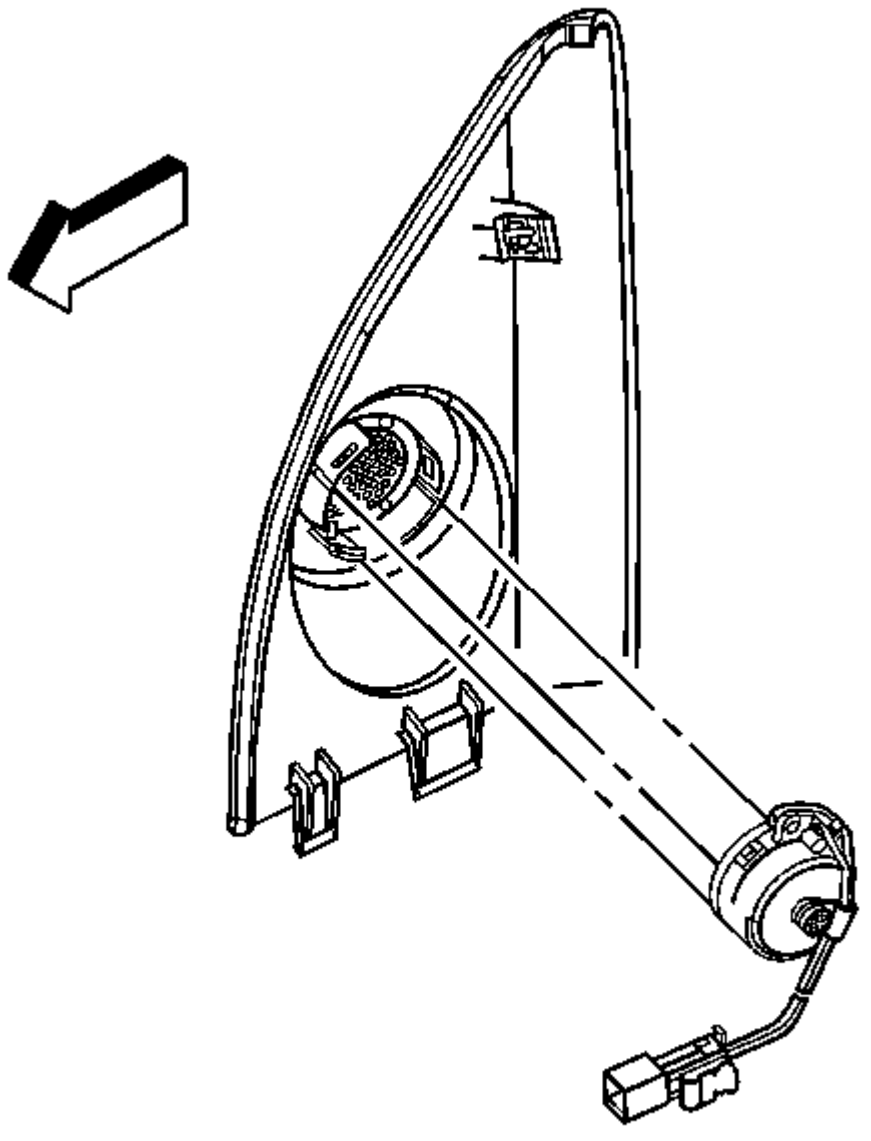


Fig. 42: View Of Front Upper Speaker
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Position the speaker on the trim panel and push to install the speaker.
2. Connect the speaker wiring harness.

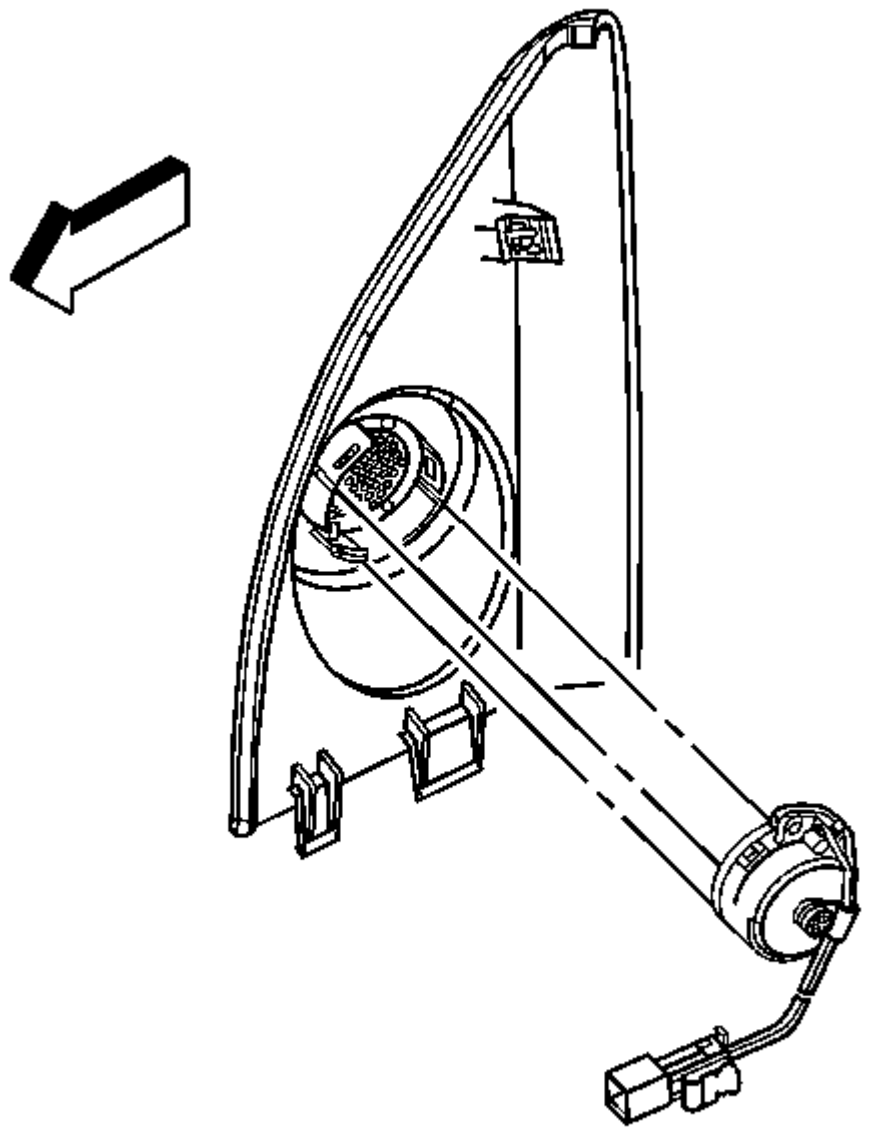


Fig. 43: View Of Front Upper Speaker
Courtesy of GENERAL MOTORS CORP.

3. Install the upper extension of the door trim panel.
    1. Insert the tabs behind the door trim.
    2. Push to engage the clip.

SPEAKER REPLACEMENT - REAR

Removal Procedure

1. Remove the rear window panel trim. Refer to **Trim Panel Replacement - Rear Window Shelf (Early Production)** or **Trim Panel Replacement - Rear Window Shelf (Late Production)** in Interior Trim.
2. Remove the rear speaker screws.
3. Remove the speaker from the rear shelf.
4. Disconnect the electrical connector from the speaker.
5. Remove the rear speaker from the vehicle.

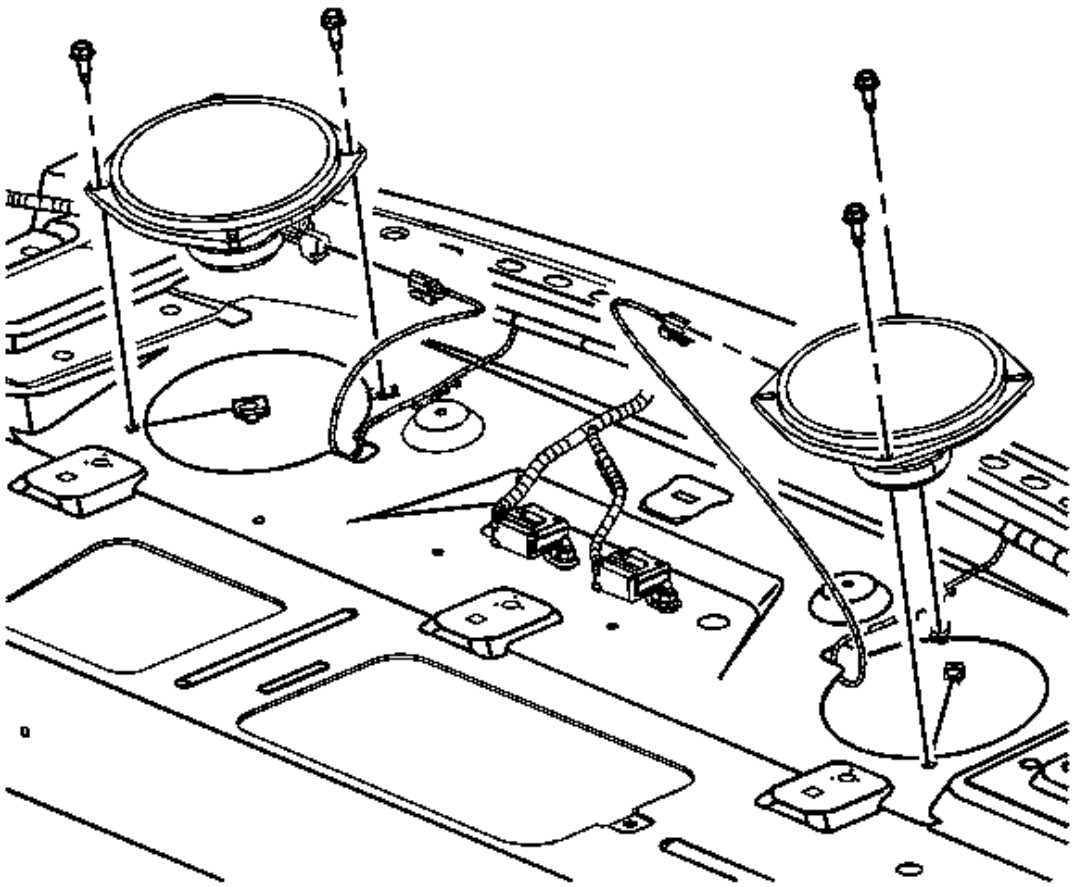


Fig. 44: View Of Rear Speakers
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect the electrical connectors.
2. Install the rear speaker to the rear shelf.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

3. Install the rear speaker screws.

   Tighten: Tighten the screws to 2.3 N.m (18 lb in).

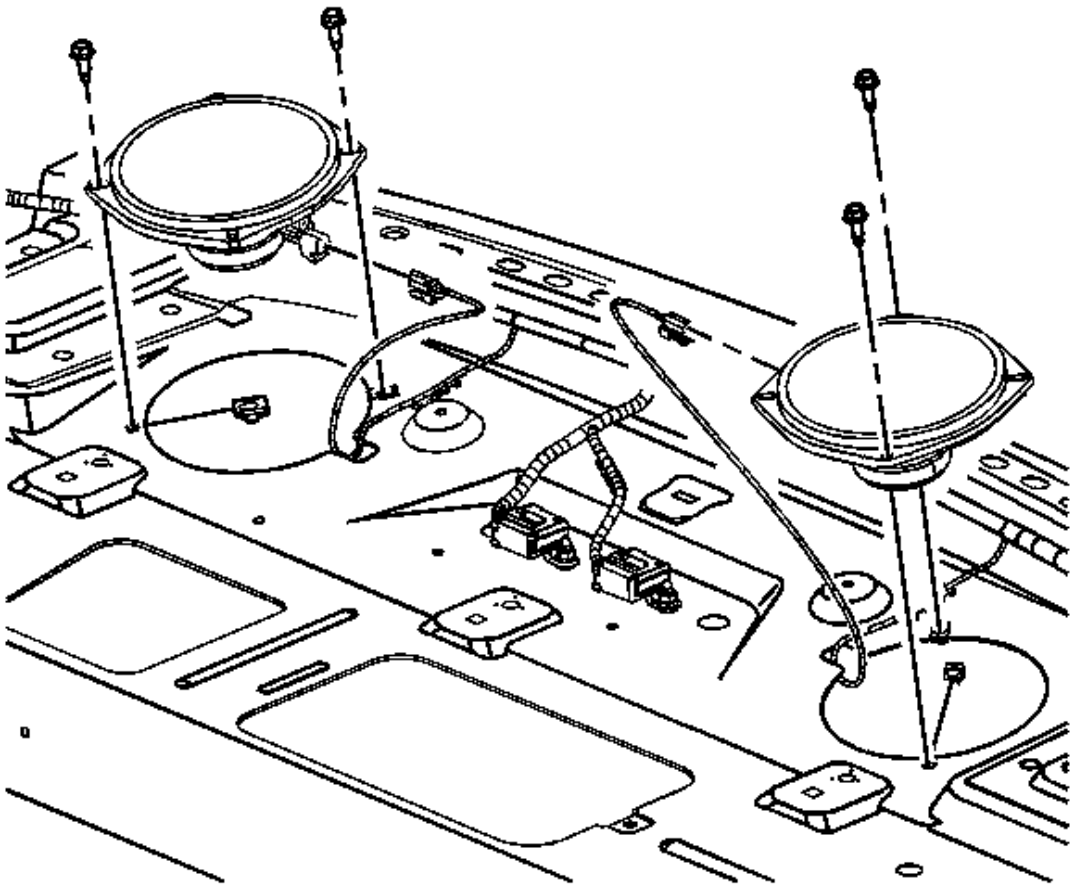


Fig. 45: View Of Rear Speakers
Courtesy of GENERAL MOTORS CORP.

4. Install the rear window panel trim. Refer to **Trim Panel Replacement - Rear Window Shelf (Early Production)** or **Trim Panel Replacement - Rear Window Shelf (Late Production)** in Interior Trim.

DESCRIPTION AND OPERATION

RADIO/AUDIO SYSTEM DESCRIPTION AND OPERATION

Contents

- Regular Production Options (RPO)
- Features

- Circuit Description
- Component Description
- Customer Tips
- On Board Diagnostics
- Theft Deterrent Feature

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:

- (UM7) AM/FM Stereo
- (U1C) AM/FM Stereo CD
- (US8) AM/FM Stereo, CD, MP3, RDS, EQ
- (US9) AM/FM Stereo, 6-Disc CD, MP3, RDS, EQ
- (UX7) Base Four Speaker
- (U79) Uplevel Four Speaker
- (UZ6) Premium Audio
- (U2K) Digital Radio

Radio Features

Controls	AM/FM Radio (UM7)	AM/FM CD Radio (U1C)	AM/FM Single CD/MP3 (US8)	AM/FM 6 Disc CD/MP3 (US9)
Power	Push the VOL Knob			
Volume	Rotate the VOL knob			
Recall	Push the RCL button			
Recall Preset	Push station preset rocker buttons 1-6	Push station present buttons 1-6.		
Save Preset	Tune Radio to desired frequency. Push and hold desired preset button until tone is heard.			
Band	Press AM/FM	Press AM/FM. If listening to CD, will change function from CD to radio.	Press AM/FM. If listening to CD or XM, will change function to radio.	
A. Set	Press and hold AM/FM button until tone is generated. The radio will automatically scan and preset the strongest stations. Press and hold again to cancel.			
Balance	Lightly pull out on VOL knob. Detent signifies center of balance.	Press MODE button until BAL is displayed, then use + or - button to adjust.	Press BASS/TREB/FAD/BAL button until BAL is displayed. Rotate knob to desired setting.	
Fade	Rotate the FADE ring. Detent signifies center of balance.	Press MODE button until FAD is displayed, then use + or - button to adjust.	Press BASS/TREB/FAD/BAL button until FAD is displayed. Rotate knob to desired setting.	
Bass	Press BASS/TREB knob to release. Rotate to change amount of bass in audio.	Press MODE button until BAS is displayed, then use + or - button to adjust.	Press BASS/TREB/FAD/BAL button until BASS is displayed. Rotate knob to desired setting.	
Treble	Press BASS/TREB knob to release. Lightly pull outward. Rotate to change amount of treble	Press MODE button until TREB is displayed, then use + or - button to adjust.	Press BASS/TREB/FAD/BAL knob until TREB is displayed. Rotate knob to desired setting.	

Controls	AM/FM Radio (UM7)	AM/FM CD Radio (U1C)	AM/FM Single CD/MP3 (US8)	AM/FM 6 Disc CD/MP3 (US9)
Tune	in audio. TUNE/SEEK rocker manually increases or decreases frequency.	TUNE/SEEK rocker manually increases or decreases frequency.	Rotate TUNE knob to manually increase or decrease station frequency.	
Seek	Hold TUNE/SEEK rocker until tone sounds. Radio will automatically increase or decrease frequency to next receivable station.		Momentarily press the SEEK rocker to automatically increase or decrease frequency to next receivable station.	
Scan	Press SCN button to automatically scan through all stations sequentially, pausing at each one for 5 seconds.		Press SEEK rocker button until tone is generated to automatically scan through, in either ascending or descending order, pausing at each receivable station.	
Tone Control	-	-	Use either side of the AUTO TONE rocker to scroll through the preset tone options.	
Setting Clock	1. Push and hold RCL button. 2. While holding RCL, push the left side of the TUNE/SEEK rocker button until the correct hour appears. 3. While holding RCL, push the right side of the TUNE/SEEK rocker until the correct minute appears. 4. Release the RCL button when finished.		1. Push and hold RCL button. 2. While holding RCL, push the left side of the auto tone rocker button until the correct hour appears. 3. While holding RCL, push the right side of the auto tone rocker until the correct minute appears. 4. Release the RCL button when finished.	

CD Player Features

Controls	AM/FM Radio (UM7)	AM/FM CD Radio (U1C)	AM/FM Single CD/MP3 (US8)	AM/FM 6 Disc CD/MP3 (US9)
Change Modes	-	Press CD button to change function from radio to CD. CD begins to play automatically.	Press AUX button to change between CD/MP3 and XM (if available). Operation only available if CD is already loaded.	Press AUX button to change between CD/MP3 and XM (if available). Operation only available if CD is already loaded.
Play CD	-	CD will automatically begin to play when one is inserted.	CD will automatically begin to play when one is loaded.	
Eject SINGLE CD	-	Press the EJECT button.		Press the EJECT button. Then press the preset button when prompted to indicate which CD should ejected, or which slot should be loaded.
Eject ALL CDs	-	-	-	Press and hold the EJECT button and all discs are ejected in order. "LOAD" is then displayed.
Load Single CD	-	-	Insert CD into empty player, or press CD button and insert disc when prompted.	Press CD button for less than three seconds. Radio will prompt use to select which location to load a CD. User selects location by pressing preset/disc buttons 1-6.
Load ALL CDs	-	-	-	Press and hold CD button for at least 3 seconds. The radio will prompt user to insert discs to fill all empty slots.
Previous Track	-	Press the PRV button.	Press preset 1 button, or rotate TUNE knob clockwise.	

Controls	AM/FM Radio (UM7)	AM/FM CD Radio (U1C)	AM/FM Single CD/MP3 (US8)	AM/FM 6 Disc CD/MP3 (US9)
Next Track	-	Press the NXT button.	Press preset 2 button, or rotate TUNE knob counterclockwise.	
Rewind	-	Press and hold REV button.	Press and hold left side of <<CAT>> button.	
Fast Forward	-	Press and hold FWD button.	Press and hold right side of <<CAT>> button.	
Random Track Order	-	Press the RDM button. Press again to cancel.	Press the RDM button. Press again to cancel.	Press RDM to random play current disc. Press and hold for 2 seconds to random play all discs. Press again to cancel.
Repeat	-	Press the RPT button to repeat the current track. Press again to cancel.		Press the RPT button to repeat the current disc. Press again to cancel.
Previous Disc	-	-	-	Press left side of SEEK rocker button.
Next Disc	-	-	-	Press right side of SEEK rocker button

MP3 Features

Controls	AM/FM Radio (UM7)	AM/FM CD Radio (U1C)	AM/FM Single CD/MP3 (US8)	AM/FM 6 Disc CD/MP3 (US9)
Change Folder	-	-	Press <<CAT>> rocker button to scroll through available folders	
Previous Track	-	-	Press preset 1 button	
Next Track	-	-	Press preset 2 button	
Pause/Play	-	-	Press preset 3 button	
Random	-	-	Press RDM to random play current disc. Press and hold for more than 2 seconds to random play current directory. Press again to cancel.	
Repeat	-	-	Press RPT button to repeat one track. Press again to cancel.	Press RPT to repeat entire disc. Press again to cancel.
Info	-	-	Press left side of i/TRAF button to scroll through available track information, including Song Title, Artist Name, Album Name, Filename, and Directory Name.	
Fast Forward	-	-	Hold right side of <<CAT>> button.	
Fast Reverse	-	-	Hold left side of <<CAT>> button.	
Scan	-	-	Press and hold SEK rocker button to play first 10 seconds of each song in ascending or descending order.	
Display	-	-	To change the default display of "ELAPSED" and the track time: 1. Press the left side of the i/TRAF button to scroll through the available information 2. Once the desired information is displayed, press and hold the RCL button for 5 seconds and the radio will use the current information as the default display.	

Circuit Operation

Radio Power

The main radio power is supplied by the 10A RADIO (BATT1) fuse in the Body Control Module (BCM). Radio switch-on power, 12 volts in ACC, RUN or RAP, is supplied by the 10A RADIO (ACC.) in the BCM.

Radio Grounds

The main radio ground provides a ground for the radio circuits. An additional braided ground strap provides a shielding radio case ground to reduce EMI noise. Both grounds are connected together inside the radio.

Radio Speaker Outputs

At zero volume, the plus (+) and minus (-) speaker outputs are both approximately 5-6 volts, measured to vehicle ground. If a plus or minus for any speaker output is shorted to ground or voltage, the radio circuitry will turn off all 4 speaker outputs for component protection. Above zero volume, the plus and minus change to create a voltage difference between each other, to drive the voice coil of the speaker.

Radio Park Lamp Input

The radio park lamp input allows the radio to sense when the vehicle parking lamps are on. When the parking lamps are on, this circuit goes to battery voltage, and the radio display back-lighting switches from full bright to the brightness level determined by the I/P illumination input.

Radio I/P Illumination Input

A pulse width modulated (PWM) voltage for instrument panel (I/P) illumination is provided to the radio I/P illumination input. The Radio uses this input to directly illuminate the radio buttons and adjust the radio display back-lighting when the park lamp input is on.

Amplifier Power

The main amplifier power is provided by the 20A PREM AUDIO fuse in the Under-Hood Fuse Block (UHFB).

Amplifier Radio Speaker Inputs (UZ6 only)

The radio speaker outputs, at a reduced output level for amplified systems, are the amplifier inputs. The amplifier boosts these inputs and outputs them to the vehicle speakers. Speaker plus and minus circuits from the radio change to create a voltage difference between each other. If one speaker plus or minus is open between the radio and the amplifier, the input to the amplifier is approximately half because only one of the circuits is changing. The speaker for that channel then operates at approximately only half the normal volume.

Amplifier Speaker Outputs (UZ6 only)

At zero volume, the plus (+) and minus (-) speaker outputs are both approximately 5-6 volts, measured to vehicle ground. If a plus or minus for any speaker output is shorted to ground or voltage, the amplifier circuitry will turn OFF either the front outputs or rear outputs for component protection. Above zero volume, the plus and minus change to create a voltage difference between each other, to drive the voice coil of the speaker.

Amplifier Present (UZ6 only)

The amplifier grounds this circuit so the radio can detect an amplified speaker system. When this circuit is grounded, the radio sets the internal equalization to match the amplified speaker system and lowers the radio speaker output level for amplifier input use. If an amplifier is being sensed, the radio OBD equalization setting function will show EQ:00.

Amplifier Radio-On (UZ6 only)

When the radio is ON, this circuit is pulled to 12 volts by the radio. The amplifier switches ON when this circuit is 12 volts and switches OFF when this signal is 0 volts.

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 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 2 volts 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 AutoTone 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.

The antenna base and mast should be installed to the torque specifications provided in the **Antenna Replacement - Digital Radio** procedures.

The antenna mast is a single 1/4 wave design located at the right front fender.

Ground Strap

The braided ground strap, which is connected between the radio case and the instrument panel fuse block (IPFB), is provided to improve reception and deter noise from entering the audio system.

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 2 fasteners. Guide pins are provided to aid in aligning the radio. Electrical connections to the radio are a 24-way connector from the I/P harness, antenna lead connector and braided ground strap. An additional 12-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.

Clock time is displayed continuously on the UM7 and U1C radios when the ignition is off. Pressing the RCL provides momentary backlighting. Time is not displayed on the US8 and US9 radios when the ignition is off. Pressing RCL will temporarily display the time.

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.

Speakers

The speaker system consists of 4 speakers, mounted in the doors and rear package shelf. The optional speaker system (RPO UZ6) includes an additional speaker mounted in the front driver and passenger door mirror trim panel.

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, autotone 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 12-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 12-way connector.

Disconnecting the 12-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** and **Diagnostic System Check - Radio/Audio System** in this section. For further information regarding OnStar® operation, refer to the OnStar® section of this service manual.

Amplifier

Vehicles equipped with premium audio (RPO UZ6) include an amplifier. The amplifier has low level inputs from the radio for the 4-speaker channels and amplifies the sound. The amplifier receives a radio on signal from the radio. This signal is delayed momentarily at initial key on to prevent any speaker pops during startup.

The purpose of an amplifier is to increase the power of a voltage or current signal. The output signal of an amplifier may consist of the same frequencies as the input signal or it may consist of only a portion of the frequencies of the input signal, as in the case of a subwoofer or a mid-range amplifier.

Customer Tips

Radio Reception - FM

Select Stations Within Range: The best FM fidelity will be obtained from stations within a 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 Structures: Tall buildings or hills may cause degrading or loss of signal. FM stations tend to travel "line of sight." Buildings or hills can interrupt the FM signal.

Suggestion: Reduce treble response.

Interference from another station: Although receiver circuits are among the most advanced type available, there are instances where a radio station can be interfered with by another station.

Suggestion: Select another station or switch to a cassette or CD.

Radio Reception - AM

Static Interference During Weather Disturbances: AM reception is sensitive to storm disturbances such as lightning.

Suggestion: Reduce treble response or select an FM station for weather related information.

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, 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

On Board Diagnostic Mode (U1C only)

Follow the instructions below to enter and properly utilize the On Board Diagnostics:

To Enter On Board Diagnostic Mode

1. Key ON, engine OFF, radio in AM/FM mode.
2. Press and hold RCL button, preset 1 button, and preset 6 button.
3. While holding these buttons, press the VOL knob.
4. A beep sounds when the radio enters On Board Diagnostic Mode.

Use the Seek button to advance to the desired mode:

- (T-01) Diagnostic Trouble Code Mode (if available)
- (T-02) Test Tone Mode
- (T-03) LCD Display Segment Mode
- (T-04) Key Test Mode (if available)
- (T-05) Antenna Signal Meter Mode (if available)
- (T-06) Clear Diagnostic Trouble Code Mode (if available)

Press the AM/FM button to select the desired mode. Refer to the Diagnostic Mode descriptions.

Press the RCL button to return to OBD menu or press VOL knob to exit OBD Mode.

Diagnostic Trouble Code Mode (if available)

The diagnostic trouble code mode is available to provide DTCs and the number of times each code has set. Refer to Enter On Board Diagnostic Mode procedure prior to referencing this information.

To use the DTC Mode:

AM/FM CD Radio-Diagnostic trouble code E04 and the number of times it has set will be displayed first. Codes E01 through E03 do not apply to this radio. Use SEEK rocker button to tab through error codes E04, E05, and E06. Press the RCL button to return to the OBD menu. Press VOL knob to exit OBD.

Diagnostic Trouble Codes

Diagnostic Trouble Code	Possible Causes	Procedure
E04-CD Eject Error	CD is warped or cracked.	Inspect the CD. Remove any burrs. A deformed CDs. If using an 8 cm (3 in

Diagnostic Trouble Code	Possible Causes	Procedure
E05-CD Play Error		installation of adapter. Do not use adapters with broken hooks.
	CD player opening is blocked by foreign material.	Remove foreign material. If the material cannot be removed, replace the radio. Refer to **Radio Replacement**.
	CD Player failure.	Refer to **Radio Replacement**.
	CD is upside down.	CD will eject after loading. Insert CD, label side up.
	CD is scratched.	The CD will skip, eject unexpectedly, eject after loading, or mute intermittently. Inspect CD for dirt, scratches, or pinholes. Clean CD, refer to Handling CDs. Do not use any chemicals and avoid touching the CD surface.
	CD is dirty.	Clean the CD. Refer to Handling CDs.
	CD optics obscured by condensation.	Use car air conditioning system or car heater blower motor to help evaporate any condensation.
	CD Player failure.	Refer to **Radio Replacement**.
E06-CD Insertion Error	CD is scratched.	The CD will skip, eject unexpectedly, eject after loading, or mute intermittently. Inspect CD for dirt, scratches, or pinholes. Clean CD, refer to Handling CDs. Do not use any chemicals and avoid touching the CD surface.
	CD is warped or cracked.	Inspect the CD. Remove any burrs. Avoid using cracked or deformed CDs. If using an 8 cm (3 in) disc, check for correct installation of adapter. Do not use adapters with broken hooks.
	CD is upside down.	CD will eject after loading. Insert CD label side up.
	CD Player failure.	Refer to **Radio Replacement**.

Test Tone Mode

The Test Tone Mode is available to check for proper speaker function. Once Test Tone mode has been selected, a tone alternating between 100 Hz and 3 kHz will automatically begin to sound. Refer to Enter On Board Diagnostic Mode procedure prior to referencing this information.

To use the Test Tone Mode:

- The display with show "1" indicating the left front speaker is selected.
- Use the SEEK rocker button to move between speakers, "2" indicates right front, "3" indicates left rear, and "4" indicates right rear.
- Press RCL button to return to OBD menu.

If no test tone is heard audibly, increase the volume using the VOL knob. If any of the test tones are not heard from one or more speakers, refer to **Speakers Inoperative - One or More**.

LCD Display Segment Mode

The LCD Display Segment Mode is available to verify that all display segments are operating properly. Refer to Enter On Board Diagnostic Mode procedure prior to referencing this information. If any display segments are not displayed, replace the radio. Refer to **Radio Replacement**. Press the appropriate button to return to the OBD menu.

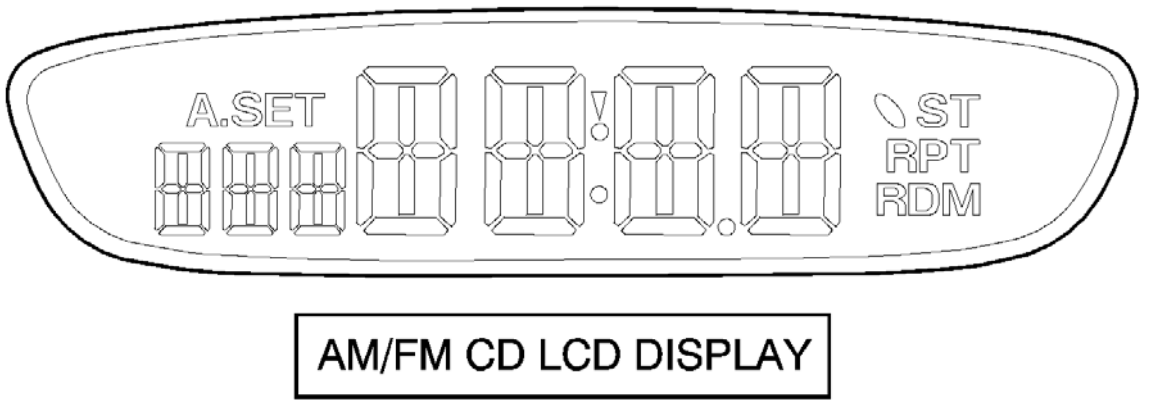


Fig. 46: AM/FM CD LCD Display Segment
Courtesy of GENERAL MOTORS CORP.

Key Test Mode (if available)

The Key Test Mode is available to verify that each button will function. Refer to Enter On Board Diagnostic Mode procedure prior to referencing this information. A tone is generated each time a button is pressed, to confirm button operation. If a button is pressed and a tone is not generated, replace the radio. Refer to **Radio Replacement**.

IMPORTANT: The RCL button and VOL knob will not produce a tone in this test, as performance of their function is known once the On Board Diagnostic Mode and Key Test Mode have been entered. When the key test is complete, press the appropriate button to return to the OBD menu.

Antenna Signal Meter Mode (if available)

The antenna signal meter mode is available to evaluate signal strength. Refer to Enter On Board Diagnostic Mode procedure prior to referencing this information. Once this mode is entered, the audio of the last tuned station is played while the signal strength is displayed. This function may be useful for performing a side-by-side, vehicle-to-vehicle comparison, for evaluating audio system reception complaints. Press the appropriate button to return to the OBD menu.

Clear Diagnostic Trouble Code Mode (if available)

The Clear Diagnostic Trouble Code Mode is available to clear the diagnostic trouble code counters. Refer to Enter On Board Diagnostic Mode procedure prior to referencing this information. Once this mode is selected, press and hold RCL for 2 seconds, a tone will be generated and the DTC counters will reset. Press the appropriate button to return to the OBD menu.

Theft Deterrent Feature

The U1C, US8, and US9 are equipped with a programmable theft deterrent feature. When the radio has the SEC (armed) mode activated, the radio will enter the LOCK (locked) mode if the power between the battery and the radio is interrupted for more than 20 seconds. While in the locked mode, "LOCK" appears on the radio display and all radio functions are disabled.

When the vehicle is first purchased or the radio is new or remanufactured, the theft deterrent feature is unarmed. If desired, the customer must program a 4-digit code into the radio to activate the theft deterrent feature.

Operating Modes

The theft deterrent feature causes 3 operating modes:

- VULNERABLE (UNARMED) MODE -The radio does not have a 4-digit code stored. If stolen, the radio will operate normally when power is applied.
- SECURE (ARMED) MODE - The radio has a 4-digit code stored. The radio will enter the LOCK (locked) mode if the power between the battery and the radio is interrupted for more than 20 seconds.
- LOCK (LOCKED) MODE - The radio has been removed from power for more than 20 seconds or the wrong four-digit code has been entered while in the SEC (armed) mode.

IMPORTANT:

Before performing service on a vehicle, verify the theft deterrent feature is in the VULNERABLE (unarmed) mode. This check is made by the following steps:

1. Turn the ignition ON. Radio OFF.
2. Press and hold preset buttons "1'" and "2" for 5 seconds.
3. If SEC (armed), a 4-digit number will appear on the radio display. This number is NOT the customer's code. Ask the customer to disarm the feature by following the procedure given in the owner's manual. The procedure is the same procedure used for activating the theft deterrent feature.
4. If no number appears, the theft deterrent feature is VULNERABLE (unarmed) and service may be performed.

Activating Theft Deterrent

To arm the theft deterrent feature on the U1C radio, perform the following:

1. Turn the ignition ON. Radio OFF.
2. Press and hold preset buttons 5 and 6, at the same time, for 5 seconds. The radio will display "- - - -".
3. Have the customer select a 4-digit code. Suggest to use a number that is familiar to them.
4. Enter the 4-digit code by using the SEEK/SCAN and TUNE rocker buttons (U1C) or by using the SEEK and AUTO EQ rocker buttons (US8 and US9). The numbers will start at 0000 and will increase on the display each time the corresponding side of the rocker button is pushed.

   U1C Radio

   1. Press the down arrow side of the SEEK/SCAN rocker button to change the left digit.
   2. Press the up arrow side of the SEEK/SCAN rocker button to change the second to left digit.
   3. Press the down arrow side of the TUNE rocker button to change the third to left digit.
   4. Press the up arrow side of the TUNE rocker button to change the fourth to left digit.
5. Push the AM/FM button.
6. The display prompt you to repeat the code, requesting the 4-digit code to be entered again to verify correct entry. Enter the same four-digit code, using the applicable rocker buttons.

   U1C Radio

   1. Press the down arrow side of the SEEK/SCAN rocker button to change the left digit.
   2. Press the up arrow side of the SEEK/SCAN rocker button to change the second to left digit.
   3. Press the down arrow side of the TUNE rocker button to change the third to left digit.
   4. Press the up arrow side of the TUNE rocker button to change the fourth to left digit.

   US8 and US9 Radios

1. Press the left arrow side of the SEEK rocker button to change the left digit.
2. Press the right arrow side of the SEEK rocker button to change the second to left digit.
3. Press the left arrow side of the AUTO EQ rocker button to change the third to left digit.
4. Press the right arrow side of the AUTO EQ rocker button to change the fourth to left digit.

7. Push the AM/FM button to store the code.
8. The display will show "SEC" (U1C) or "SECURITY ON" (US8 and US9) indicating the radio is armed and the radio will return to normal operation.

If the radio displays "Err1", "Err2", or "LOCK", then the radio was already in the secure state and is armed with a different code than the one that was entered. Proceed to the appropriate part of this Theft Deterrent section to deactivate the system if deactivation is desired.

Deactivating the Theft Deterrent Feature-Radio in "SEC" (ARMED) MODE

To deactivate the theft deterrent feature, enter the customer's code or the factory unlock code using steps 1-7 of the "Activating Theft Deterrent" procedure that applies to the radio in this section. After completing those steps, the display will show no number. This indicates the theft deterrent feature is in the VULNERABLE (unarmed) mode and service may be performed.

When the vehicle is returned to the customer, remind the customer to reactivate the theft deterrent feature using the procedure given in the owner's manual.

Deactivating Theft Deterrent-Radio in "LOCK" or "- - - -" MODE (CODE KNOWN)

When the theft deterrent feature is in the SEC (armed) mode, the radio can enter the locked state if the power is removed for greater than 20 seconds or an incorrect code entry is attempted three times. An error message is displayed after every wrong entry.

When the radio is in the LOCK (locked) mode, "LOCK" is displayed and all radio functions are disabled.

Before another attempt at the correct code can be made, the radio must be ON and the display must show "LOCK" for an hour. After an hour, "- - - -" will be displayed and the correct code may be entered using the following steps.

1. Turn the ignition ON.
2. Press the power button on the radio. The display will show "- - - -".
3. Enter the 4-digit code by using the SEEK/SCAN and TUNE rocker buttons (U1C) or by using the SEEK and AUTO EQ rocker buttons (US8 and US9). The numbers will start at 0000 and will increase on the display each time the corresponding side of the rocker button is pushed.

   U1C Radio

   1. Press the down arrow side of the SEEK/SCAN rocker button to change the left digit.
   2. Press the up arrow side of the SEEK/SCAN rocker button to change the second to left digit.
   3. Press the down arrow side of the TUNE rocker button to change the third to left digit.
   4. Press the up arrow side of the TUNE rocker button to change the fourth to left digit.

   US8 and US9 Radios

   1. Press the left arrow side of the SEEK rocker button to change the left digit.
   2. Press the right arrow side of the SEEK rocker button to change the second to left digit.
   3. Press the left arrow side of the AUTO EQ rocker button to change the third to left digit.
   4. Press the right arrow side of the AUTO EQ rocker button to change the fourth to left digit.
4. Press the AM/FM button after entering the 4-digit code. If the incorrect code has been entered, the radio will return to the SEC (armed) mode and normal operation will return. If the wrong code is entered, the display will show an error message and display "- - - -" indicating another attempt at the correct code can be made.

Deactivating Theft Deterrent - Radio in "LOCK" or "- - - -" Mode (Code Unknown)

When the theft deterrent feature is armed or secure (SEC), the radio can enter the locked state if the power is removed from the radio for greater than 20 seconds or an incorrect code is attempted 3 times. An error message is displayed after every wrong entry.

When the radio is in the LOCK (locked) mode, "LOCK" is displayed and all radio functions are disabled.

Before another attempt at the correct code can be made, the radio must be ON and the display must show "LOCK" for an hour. After an hour, "- - - -" will be displayed and the correct code may be entered using the following steps:

If the customer code is unknown, perform the following steps to retrieve the customer code:

1. Turn the ignition ON.
2. Turn radio power OFF.
3. Press and hold preset buttons 1 and 2 for 5 seconds. A 4-digit code will be displayed. This number is not the customer's code. Record this number as it is needed before technical support is called.
4. Using a touch tone phone only, call the technical support system at 1-888-225-2306 (USA and Canada). When advised, give the following information:
    1. Your retailer code
    2. The 4-digit radio display code obtained in step 3
    3. In response, you will receive the factory unlock code; record this number

       NOTE: The factory unlock code received is the same as the code that was entered by the customer.
5. Turn the ignition ON.
6. Press the radio power button. The display will show "- - - -".
7. Enter the 4-digit code by using the SEEK/SCAN and TUNE rocker buttons (U1C) or by using the SEEK and AUTO EQ rocker buttons (US8 and US9). The numbers will start at 0000 and will increase on the display each time the corresponding side of the rocker button is pushed.

   U1C Radio

    1. Press the down arrow side of the SEEK/SCAN rocker button to change the left digit.
    2. Press the up arrow side of the SEEK/SCAN rocker button to change the second to left digit.
    3. Press the down arrow side of the TUNE rocker button to change the third to left digit.
    4. Press the up arrow side of the TUNE rocker button to change the fourth to left digit.

   US8 and US9 Radios

    1. Press the left arrow side of the SEEK rocker button to change the left digit.
    2. Press the right arrow side of the SEEK rocker button to change the second to left digit.
    3. Press the left arrow side of the AUTO EQ rocker button to change the third to left digit.
    4. Press the right arrow side of the AUTO EQ rocker button to change the fourth to left digit.
8. Press the AM/FM button after entering the 4-digit code. If the correct code has been entered, the radio will return to the SEC (armed) mode and normal operation will return. If the wrong code has been entered, the display will show an error message and display "- - - -" indicating another attempt at the correct code can be made.

Radio Data System (RDS)

The CD/MP3 audio systems are equipped with technology known as the Radio Data System (RDS). The RDS is a system that sends data along with the audio of the FM station you are currently tuned to. The RDS is a standard that defines how a FM broadcast station may send digital data along with the audio program. Think of it as a one-way wireless modem, allowing the broadcaster to send information about the program to your receiver.

RDS Basic Information

- RDS functions are provided in the FM broadcast band only.
- RDS functions will only work with FM broadcast stations that are broadcasting RDS data.
- Not all FM Broadcast stations broadcast RDS data or offer all of the RDS services.
- RDS functions may not work properly when reception is weak, reception is of poor quality, or the FM Broadcaster does not implement RDS properly.

In some cases, a radio station broadcasting incorrect information may cause the RDS features of the radio to appear to work improperly.

Displaying RDS Information

The RDS feature is always on. When tuned to a non-RDS station, the radio will display frequency information as you would normally expect. When tuned to an RDS station, the radio can operate as follows:

- The radio will change from displaying the frequency of the FM station to displaying the call letters of the station or display the nickname of the station.
- Display the type of program.
- Display general information such as artist and song title, call in phone numbers, etc.

Viewing and Selecting RDS Information for Display

Press the RCL button once for less than 2 seconds when the radio displays the program service (PS) name and the frequency of the station will be displayed. Press the button again, and the program type (P-Type) will be displayed. Pressed again, and the program type (PTY) name will be displayed, if the broadcaster is broadcasting one. The PTY name is an eight-character name that the broadcaster may use to further identify the type of programming currently being broadcast. Should you decide that Frequency, P-Type or PTY name is more desirable to display when tuned to an RDS station than the PS name, press the RCL button until the desired information is displayed, then press and hold for more than 2 seconds. A beep should be heard and the radio will now display the selected information whenever tuned to an RDS broadcaster. The radio will display frequency for all non-RDS broadcast stations.

Using RDS Program Types to Tune Radio

Listed are several ways on how to tune your radio using RDS program types. The radio will now be configured to tune based on RDS data rather than frequency

Finding a RDS Station By Specific Program Type

1. Press the PROG TYPE or P-TYPE button, the radio will display the current P-Type to search for.
2. Press the CAT rocker button until the desired program type is shown in the display.
3. Press the SEEK button and the radio will now seek the first RDS Broadcaster of the selected P-Type.

If the radio cannot find the desired P-Type, the radio displays NOT FOUND and will return to the last station you were listening to.

Using the INFO Feature

When the INFO icon appears in the radio display, a new text message is available for viewing. These text messages are from the RDS broadcaster to the listening public and may be general information such as artist and song title, call in phone numbers, etc.

How to View the INFO Message

- To view the message when the INFO icon appears, press the INFO button to display the text message. If you do not press the INFO button again, the text message will automatically be displayed 8 characters at a time, 3 seconds between updates.
- To view the text message faster, press the INFO button for less than 1 second to scroll through the message at your own speed.
- The INFO icon disappears as soon as you press the INFO button. The INFO icon will appear when a new different message is received.

- To view the most recent received message, press the INFO icon at any time, even if the icon does not appear in the display.

Controlling the Radio

The user can activate RDS to control the radio by using the data received to do the following:

- Interrupt the playback of your CD for traffic or emergency bulletins
- Search for stations by type of program.
- Set your clock to the time that the RDS broadcast station broadcasts.

Using the RDS Traffic Feature

Some RDS broadcasters may carry traffic information programming to inform you of current traffic conditions in your listening area and is indicated by the TA icon in the radio display. Not all FM broadcasters will use this RDS feature. RDS enables the broadcaster to get this information to you even when you are listening to a tape or compact disc. This feature can be enabled or disabled by the listener. Press the TRAF button to find a station that claims to carry traffic information. You may do this even when playing a cassette tape or compact disc. This action will operate in the background without interrupting the current playback. If the radio is not currently tuned to an RDS traffic station, the radio will immediately seek an RDS traffic station. If the radio finds an RDS traffic station, the "TA" icon will appear on the radio display, as will brackets around the [TA] icon. If the radio cannot find an RDS traffic station after searching through the entire FM band, the radio will display NO TRAFFIC.

Traffic Interrupt Feature

Whenever the TA icon is displayed, the current FM station may also broadcast traffic announcements. Traffic announcements are reports of the current traffic conditions in the listening area of the tuned FM broadcasters.

Your radio can interrupt the playback of a compact disc by use of the traffic interrupt feature. The traffic interrupt feature is enabled when the TRAF icon is displayed.

If the broadcaster sends out a traffic announcement while you are listening to FM or in the playback mode, TRAFFIC will be displayed on the radio and the audio from the broadcaster will be heard. At the conclusion of the traffic announcement, the radio will return to the previous playback mode.

During the time the radio displays TRAFFIC, you can adjust the volume of the traffic announcement. This will be the volume at which all future traffic announcements will be heard until the volume during another traffic announcement is adjusted.

You can also interrupt a traffic announcement interrupt by pressing the TRAF button.

During a national or local emergency, a special program type interrupt message ALERT! is displayed. This special announcement will cancel all other RDS features that are in progress, such as a traffic announcement.

RDS Clock Time

Broadcasters can choose to send clock time information in the RDS data. This information can be used to update the clock time on the radio. RDS clock time is broadcasted once a minute. To set the clock using RDS clock data perform the following:

- Press and hold the RCL and RDS buttons together for two or more seconds to update the time.
- The display will show SET RDS TIME after receiving the broadcasted time data.
- If the broadcaster is not broadcasting the time data, the radio will display NO RDS TIME SET and the time remains unchanged.

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 class 2 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.

XM Advisory Messages

Radio Display Message	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)

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.

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.
