

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Signal Terminal 2	-	1	1	-
Signal Terminal 5	6	6	6	-
Signal (+) Terminal 7	3	3	3	-
Signal (-) Terminal 17	3	3	3	-
Signal (+) Terminal 8	2	2	2	-
Signal (-) Terminal 18	2	2	2	-
Signal (+) Terminal 14	4	4	4	-
Signal (-) Terminal 13	4	4	4	-
Signal (+) Terminal 15	5	5	5	-
Signal (-) Terminal 16	5	5	5	-
Control Terminal 4	B1287	B1287	B1287	-
ANC Ground	-	1	-	-
Audio Amplifier Ground	-	1	-	-
1. No diagnostic tones. 2. Noise Cancellation Microphone- no front tone during diagnostics. 3. Noise Cancellation Microphone- no rear tone during diagnostics. 4. No front response tone. 5. No rear response tone. 6. Getting all test tones but ANC still inoperative.				

Circuit/System Description

An active noise cancellation (ANC) system has four main components; the ANC module, microphone(s), audio amplifier(s) and speaker(s). The microphone is connected to the audio system and picks up the sound/noise in the vehicle cabin while the speakers produce the cancellation vibrations.

Reference Information

Schematic Reference

Radio/Navigation System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Radio/Audio System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTCs B1025, B1035, B1045, and B1055 are not set.
 - If any DTCs are set, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .
2. Ignition ON, radio ON, verify that there is no low or high response test tones.
 - If a response test tone is heard, refer to Diagnostic Mode Signal Circuit Testing.
3. Place the active noise cancellation module into diagnostic mode. Install a 3 A fuse jumper wire between the spare fuse 3 located in the I/P fuse block and ground.
4. Verify that a low response test tone is heard from the front speakers indicating the module has entered diagnostic mode.
 - If a low response test tone is not heard, refer to Active Noise Cancellation Module and Front Speaker Circuit Testing.
5. After the low response test tone is heard from the front speakers, verify that a high response tone is heard from the front speakers.
 - If a high response tone is not heard, refer to Front Microphone Circuit Testing.
6. After the high response tone is heard from the front speakers, verify that a low test tone should be heard from the rear speakers.
 - If a low response test tone is not heard from the rear speakers, refer to Rear Speaker Circuit Testing.
7. After the low test response tone is heard from the rear speakers, a high response tone should be heard from the rear speakers.
 - If a high response tone is not heard from the rear speakers, refer to Rear Microphone Circuit Testing.
8. If all four tones are heard, refer to Engine RPM Signal Circuit Testing.

Circuit/System Testing

Active Noise Cancellation Module and Front Speaker Circuit Testing

1. Ignition OFF, disconnect the harness connector at the active noise cancellation module.
2. Test for less than 5.0 ohms between the ground circuit terminal 11 and ground.
 - If greater than specified range, test the ground circuit for an open/high resistance.

3. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If less than specified value, test the B+ circuit for a short to ground or an open/high resistance.
4. Radio ON, test for B+ between the signal circuit terminal 2 and ground.
 - If not the specified value, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the T3 amplifier.
5. Ignition OFF, connect the harness connector at the active noise cancellation module. Disconnect the X2 harness connector at the T3 amplifier.
6. Radio ON, test for 4-8 V between the signal circuit terminals listed below and ground.
 - Front low level audio signal (+) - terminal 14
 - Front low level audio signal (-) - terminal 13
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the active noise cancellation module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the active noise cancellation module.
7. If all circuits test normal, replace the active noise cancellation module.

Front Microphone Circuit Testing

1. Ignition OFF, disconnect the harness connector at the active noise cancellation front microphone.
2. Ignition OFF, test for less than 5 ohms between the low reference circuit terminal A and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the active noise cancellation module.
3. Ignition ON, test for 9-11 V between the signal circuit terminal B and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the active noise cancellation module.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the active noise cancellation module.
4. If all circuits test normal, replace the active noise cancellation front microphone.

Rear Speaker Circuit Testing

1. Ignition OFF, disconnect the X2 harness connector at the T3 amplifier.
2. Radio ON, test for 4-8 V between the signal circuit terminals listed below and ground.
 - Rear low level audio signal (+) - terminal 15
 - Rear low level audio signal (-) - terminal 16
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the active noise cancellation module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the active noise cancellation module.
3. If all circuits test normal, replace the T3 amplifier.

Rear Microphone Circuit Testing

1. Ignition OFF, disconnect the harness connector at the active noise cancellation rear microphone.
2. Ignition OFF, test for less than 5 ohms between the low reference circuit terminal A and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the active noise cancellation module.
3. Ignition ON, test for 9-11 V between the signal circuit terminal B and ground.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the active noise cancellation module.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the active noise cancellation module.
4. If all circuits test normal, replace the active noise cancellation front microphone.

Engine RPM Signal Circuit Testing

1. Ignition ON, radio ON, test for 4-5 V between the signal circuit terminal 5 and ground.
 - If greater than specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the active noise cancellation module.
 - If less than specified range, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the active noise cancellation module.
2. If all circuits test normal, replace the active noise cancellation module.

Diagnostic Mode Signal Circuit Testing

1. Ignition ON, radio ON, verify that the low and high response test tones are not heard.
 - If the test tones are audible, test the signal circuit for a short to ground. If the circuit tests normal, replace the active noise cancellation module.
2. If all circuits test normal, replace the active noise cancellation module.

Repair Procedures

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

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

REPAIR INSTRUCTIONS

ACTIVE NOISE CANCELLATION MODULE REPLACEMENT

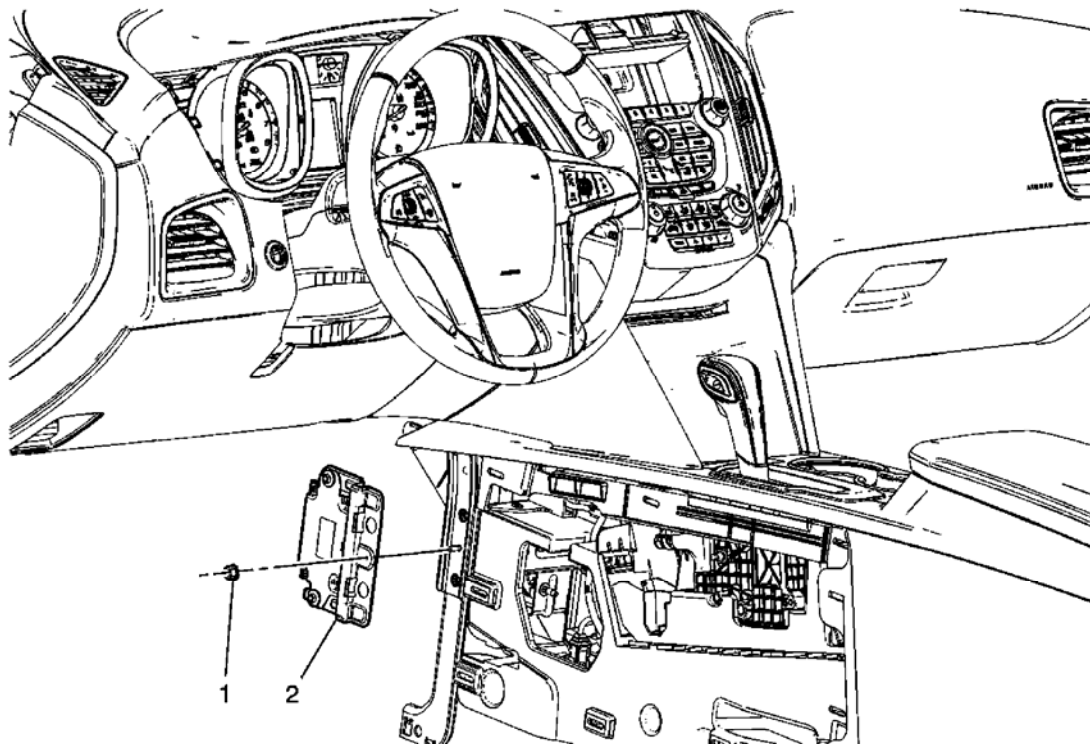


Fig. 2: Identifying Active Noise Cancellation Module Components
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the left front floor console side finish cover. Refer to <u>Front Floor Lower Console Side Finish Cover Replacement - Left Side (Equinox)</u> or <u>Front Floor Lower Console Side Finish Cover Replacement - Left Side (Terrain)</u> .	
1	Active Noise Cancellation Module Nut CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 3 N.m (27 lb in)
2	Active Noise Cancellation Module Procedure 1. Disconnect the electrical connections. 2. Refer to <u>Control Module References</u> for programming and setup information.

DESCRIPTION AND OPERATION

ACTIVE NOISE CANCELLATION DESCRIPTION AND OPERATION

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

Active Noise Cancellation (ANC) is a method used to cancel out undesirable sound generated by the engine or an open window.

Active Noise Cancellation Control Circuit Operation

An Active Noise Cancellation (ANC) system has four main components: the ANC module, microphone(s), audio amplifier(s), and speaker(s). The microphone is connected to the audio system and picks up the sound/noise in the vehicle cabin while the speakers produce the cancellation vibrations. The ANC system is composed of two microphones. The microphones are centrally located in the headliner to detect noise in the vehicle caused by the engine, or an open window. The processor analyzes the noise signal and outputs a cancellation signal audio tone based on positive coefficient and phase change to moderate the engine noise and make the vehicle seem quieter and without vibration. The ANC system uses the engine revolutions per minute (RPM) signal from the tachometer to determine the rotational speed in an engine. The ANC system works within 1500-2500 engine RPM. The cancellation signal is then amplified and a signal is sent to the speaker and subwoofer.