Radio, Stereo, and Compact Disc: Testing and Inspection Procedures

Inspection and Verification (Start Testing Here)

1. Verify the customer concern by operating the audio system with the engine running (vehicle in and out of motion).
2. Visually inspect for the following obvious signs of mechanical and electrical damage.

VISUAL INSPECTION CHART

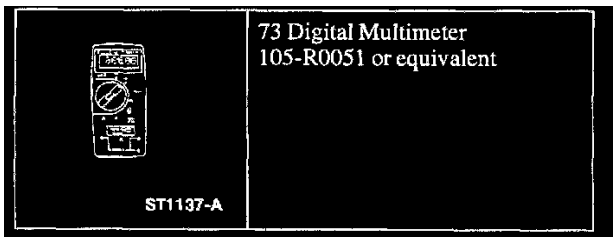
Mechanical

^ Audio unit physically damaged, misaligned, any control(s) inoperative
^ Antenna or cable physically damaged, misaligned connection(s)
^ Radio speakers or mountings physically damaged, misaligned
^ Radio ignition interference capacitor or radio receiver grounding strap misaligned (also check for cleanliness and metal-to-metal contact)

Electrical

^ Open Central Junction Box **(CJB)** fuse(s):
  - Fuse 3 **(15 A)**
  - Fuse 22 **(15 A)**
  - Fuse 27 **(5 A)**
^ Open connector(s)
^ Corroded connector(s)
^ Ignition switch
^ Open or shorted circuit(s)

3. If the fault is not visually evident, proceed to Speaker Walk-Around Test and ACM Self-Diagnostic Mode (P100i only). See: Extracting and Clearing Diagnostic Trouble Codes (DTC)/P100i Self-Diagnostic Mode



73 Digital Multimeter

DM100i Self-Diagnostic Mode

NOTE: The audio unit must be turned ON and in radio tuner mode (AM/FM) to enter the Speaker Walk-Around Test or the DM100i self-diagnostic mode.

The DM100i self-diagnostic mode can only be entered while in the Speaker Walk-Around Test.

1. To enter the Speaker Walk-Around Test, depress Preset Buttons 3 and 6 simultaneously and hold approximately **three seconds** and release.
2. The Speaker Walk-Around Test stops at each speaker and applies sound to each speaker for about one to **two seconds**. Each speaker is tested and shown on the display in the following sequence: RF, LF, LR, RR.
3. To exit Speaker Walk-Around Test, turn the ignition switch OFF, turn the audio unit OFF, or preset button I for "DIA".
4 The DM100i Self-Diagnostic Mode has six manual tests available:
   ^ Preset button 1 = ENTER DIAGNOSTICS. This test enters diagnostics from the Speaker Walk-Around Test. Metrics are available with SEL and ON buttons indicating time played in AM/FM, Media, number of buttons pressed, etc.
   ^ Preset button 2 EEPROM BLOCK STATUS. This test shows validity of memory to calibrate clock and seek sensitivity.
   ^ Preset button 3 = EXIT DIAGNOSTICS.
   ^ Preset button 4 Software configuration level. This test queries each radio system controller for its software configuration level.
   ^ Preset button 5 = DISPLAY TEST. This test lights all the DM100i display segments for **five seconds** and then turns all segments off.
   ^ Preset button 6 RAM CONTENTS READOUT. To enter these tests, depress preset button 1 while in the Speaker Walk-Around Test, then the desired preset button.

   NOTE: Always DOCUMENT, CLEAR, and CARRY OUT the DM100i Self-Test again.

5. To exit the DM100i Self-Diagnostic Mode, turn the ignition switch OFF or the DM100i OFF.
6. If the concern remains and the fault is not detected, proceed to the Symptom Chart to continue diagnostics. See: Diagnosis by Symptom

P100i Self-Diagnostic Mode

P100i Self-Diagnostic Mode

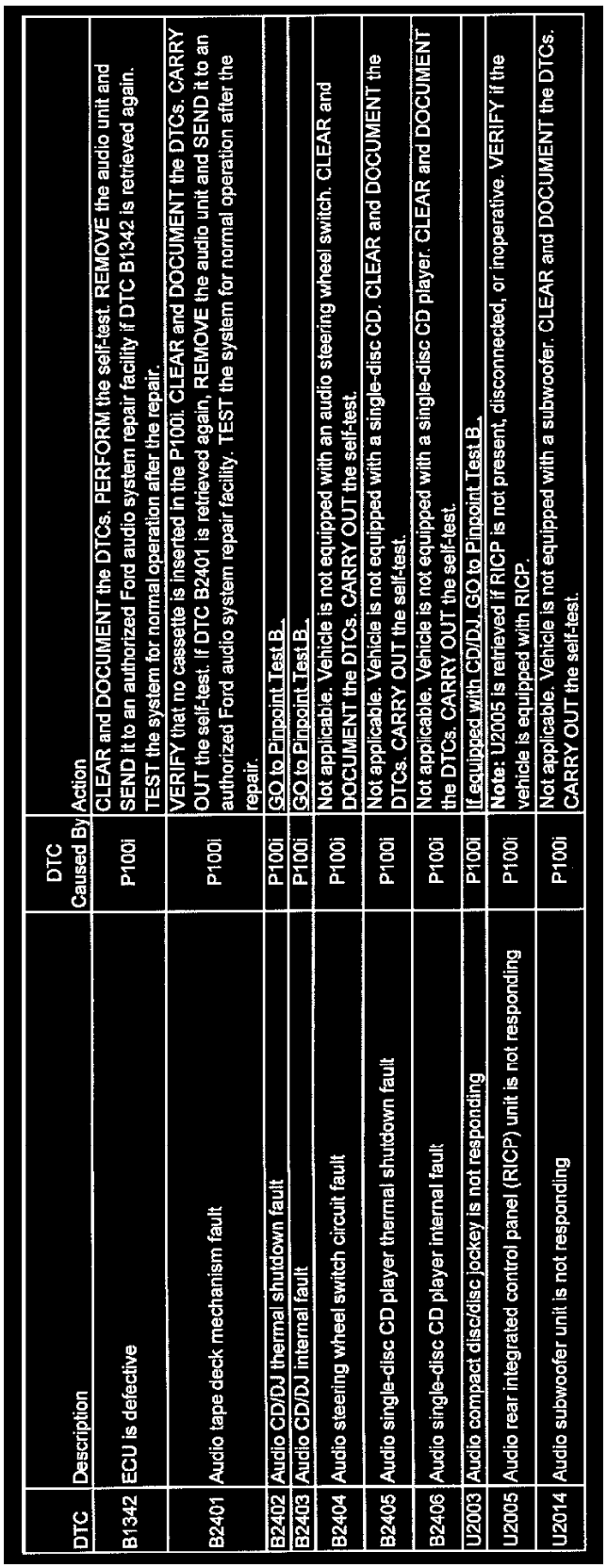
NOTE: To enter the Speaker Walk-Around Test or ACM self-diagnostic mode, the ACM must be turned on and in radio tuner mode (AM/FM).

1. The ACM self-diagnostic mode has five tests available:
   - ^ Preset Button 1 = Audio internal/external SELF TEST. This test is an on-demand self-test. If SELF FAIL is displayed, press TUNE> to scroll view the DTCs stored. If the system is OK, SELF PASS will be displayed.
   - ^ Preset Button 2 = View/Clear continuous DTCs. NO DTCS is displayed if no DTCs are retrieved. If DTCS FOUND is displayed, press TUNE> to view the DTCs retrieved. To clear all DTCs, press the EJECT button. DTCS CLEAR will be displayed.
   - ^ Preset Button 3 = SIGNAL TEST. This test measures the average strength at the CL ifent tuner setting.
   - ^ Preset Button 4 = Software configuration level. This test queries each radio system controller for its software configuration level. SOFTLEVELS will be displayed upon completion of the query. Press TUNE > to scroll view the software configuration version level.

     NOTE: Always DOCUMENT, CLEAR and PERFORM the P100i DM On-Demand Self-Test again.

   - ^ Preset Button 5 = DISPLAY TEST. This test will light all the P100i DM display segments for **five seconds**. When the test is complete, DISPLAY TEST is displayed on the bezel.

2. To enter these tests, depress the desired preset button while in the speaker walk-around test or while in the P100i self-diagnostic mode.
3. To exit the P100i self-diagnostic mode, turn the ignition switch or the audio unit off.
4. If the concern remains and the fault is not detected, proceed to the Symptom Chart to continue diagnostics. See: Diagnosis by Symptom



DTC	Description	DTC Caused By	Action
B1342	ECU is defective	P100i	CLEAR and DOCUMENT the DTCs. PERFORM the self-test. REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility if DTC B1342 is retrieved again. TEST the system for normal operation after the repair.
B2401	Audio tape deck mechanism fault	P100i	VERIFY that no cassette is inserted in the P100i. CLEAR and DOCUMENT the DTCs. CARRY OUT the self-test. If DTC B2401 is retrieved again, REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility. TEST the system for normal operation after the repair.
B2402	Audio CD/DJ thermal shutdown fault	P100i	GO to Pinpoint Test B.
B2403	Audio CD/DJ internal fault	P100i	GO to Pinpoint Test B.
B2404	Audio steering wheel switch circuit fault	P100i	Not applicable. Vehicle is not equipped with an audio steering wheel switch. CLEAR and DOCUMENT the DTCs. CARRY OUT the self-test.
B2405	Audio single-disc CD player thermal shutdown fault	P100i	Not applicable. Vehicle is not equipped with a single-disc CD. CLEAR and DOCUMENT the DTCs. CARRY OUT the self-test.
B2406	Audio single-disc CD player internal fault	P100i	Not applicable. Vehicle is not equipped with a single-disc CD player. CLEAR and DOCUMENT the DTCs. CARRY OUT the self-test.
U2003	Audio compact disc/disc jockey is not responding	P100i	If equipped with CD/DJ, GO to Pinpoint Test B.
U2005	Audio rear integrated control panel (RICP) unit is not responding	P100i	**Note:** U2005 is retrieved if RICP is not present, disconnected, or inoperative. VERIFY if the vehicle is equipped with RICP.
U2014	Audio subwoofer unit is not responding	P100i	Not applicable. Vehicle is not equipped with a subwoofer. CLEAR and DOCUMENT the DTCs. CARRY OUT the self-test.

Radio Model P100i DTC Index

Component Tests

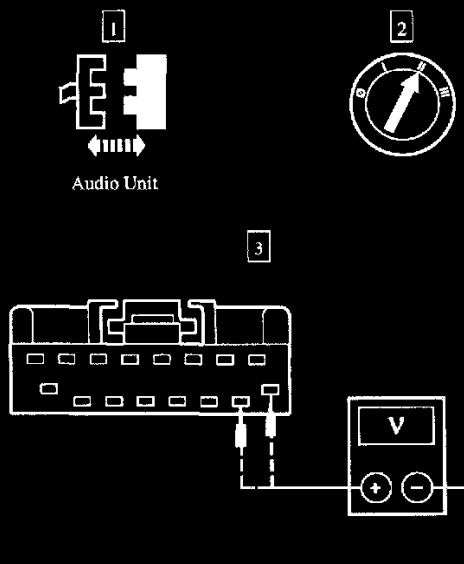
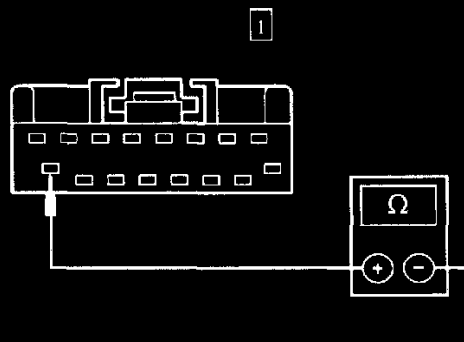
NOTE: To enter the Speaker Walk-Around Test or Audio Control Module **(ACM)** self-diagnostic mode, the ACM must be turned on, and in radio tuner mode (AM/FM)

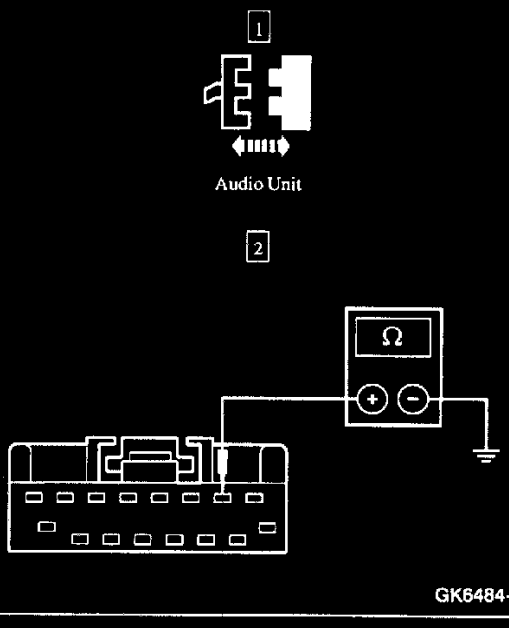
1. To enter the Speaker Walk-Around Test, simultaneously press the ACM Preset Buttons 3 and 6 (1 and 4 for ULC only).
2. The Speaker Walk-Around Test stops at each speaker and applies sound to each speaker for about **1-2 seconds**. Each speaker is tested and displayed on the ACM in the following sequence: RF, LF, LR, RR.

3. The speaker walk-around test automatically continues and tests Antenna, Subwoofer I and Subwoofer II, for speaker short and CD/DJ (P100i only). If a speaker short exists, SPKR SHORT will be displayed. If the vehicle is not equipped with CD/DJ or if the CD/DJ is not responding, NO DJ (P100i only) will be displayed.

A: Radio Inoperative - Does Not Operate Properly

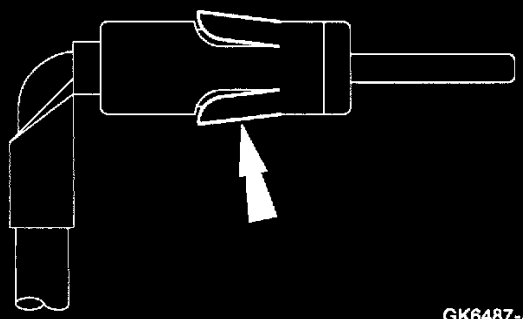
TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
A1 CHECK OPERATION OF THE AUDIO UNIT	
1 	2 Turn on the radio. • Is the audio unit display illuminated? → **Yes** GO to **A2**. → **No** GO to **A4**.
A2 CHECK FOR SOUND COMING FROM THE RADIO SPEAKERS	
	1 Carry out the Speaker Walk-Around Test by pressing Preset Buttons 3 and 6 (1 and 3 ULC radio only) simultaneously. 2 Verify that sound is coming from the radio speakers (18808). • Is there sound coming from the radio speakers? → **Yes** GO to **A3**. → **No** GO to Pinpoint Test G.
A3 CONTROLS AND FEATURES TEST	
	1 Refer to the owner literature for audio system controls. 2 Verify that all the controls and features operate correctly. • Do all the controls and features operate correctly? → **Yes** The system is OK. → **No** GO to **A4**.

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
A4 CHECK THE VOLTAGE TO THE AUDIO UNIT	
	3 Measure the voltages between audio unit C213 Pin 9, Circuit 729 (RD/WH), and ground; and between audio unit C213 Pin 10, Circuit 137 (YE/BK), and ground. • Are the voltages greater than 10 volts? → **Yes** GO to **A5**. → **No** REPAIR the circuit(s) in question. TEST the system for normal operation.
A5 CHECK CIRCUIT 694 (BK/LG) FOR OPEN	
	1 Measure the resistance between audio unit C213 Pin 16, Circuit 694 (BK/LG), and ground. • Is the resistance less than 5 ohms? → **Yes** GO to **A6**. → **No** REPAIR the circuit. TEST the system for normal operation.

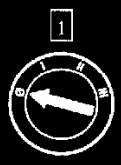
TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
A6 CHECK CIRCUIT 57 (BK) FOR OPEN	
	2 Measure the resistance between audio unit C213 Pin 2, Circuit 57 (BK), and ground. • Is the resistance less than 5 ohms? → **Yes** REMOVE the audio unit and SEND to an authorized Ford audio system repair facility. TEST the system for normal operation. → **No** REPAIR the circuit. TEST the system for normal operation.

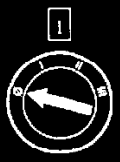
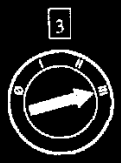
A6

B: Noisy Reception

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
B1 CHECK ANTENNA CABLE CONNECTIONS	
1  2  GK6487-A	2 **NOTE:** If antenna lead-in cable connections are loose, check all three contact tips for compression. Check the antenna lead-in cable connections. • Are the connections clean, secure, and in metal-to-metal contact? → **Yes** GO to **B2**. → **No** CLEAN and SECURE the antenna lead-in cable connections, as required. If necessary, bend the contact tips outward to obtain a more secure fit. If the contact tips are broken or damaged beyond repair, INSTALL a new antenna lead-in cable. TEST the system for normal operation.
B2 CHECK ANTENNA MOUNTING CONNECTIONS	
1 	2 Check to make sure the antenna is securely mounted to the vehicle body at ground points, and the screws are not stripped. • Are the contacts clean, secure, and in metal-to-metal contact? → **Yes** GO to **B3**. → **No** CLEAN and SECURE the antenna, as required. TEST the system for normal operation.

B1 - B2

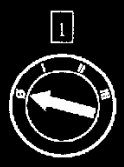
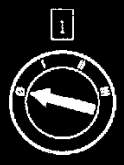
TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
B3 CHECK SUPPRESSION EQUIPMENT	
1 	2 Check all required suppression equipment and radio grounding strap for security, cleanliness and metal-to-metal contact. For suppression capacitors and ground strap locations, refer to **Locations, and / or Noise Filter.** • Are the contacts clean, secure and in metal-to-metal contact? → **Yes** GO to **B4**. → **No** REPAIR or INSTALL new radio suppression equipment or grounding strap as necessary. TEST the system for normal operation.
B4 CHECK MOUNTING AND CONNECTING CIRCUITS	
1 	2 **NOTE:** The capacitor mounting points are used to complete the electrical circuit and must be mounted securely to clean surfaces. Check the mounting and connecting circuits of the radio ignition interference capacitors for security, cleanliness and metal-to-metal contact. • Are the contacts clean, secure and in metal-to-metal contact? → **Yes** GO to **B5**. → **No** CLEAN and SECURE the connections, as required. TEST the system for normal operation.

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
B5 CHECK RADIO IGNITION INTERFERENCE CAPACITOR(S)	
1  3 	2 Check the operation of the radio ignition interference capacitors by replacing with a known good component. 4 Turn on the radio and check the radio reception. • Is the noise eliminated? → **Yes** INSTALL a new radio ignition interference capacitor(s), as required. TEST the system for normal operation. → **No** GO to **B6**.
B6 CHECK GENERATOR	
1  3 	2 Check the generator by disconnecting the wiring harness from the voltage regulator. 4 Turn on the radio and check the radio reception. • Is the noise eliminated? → **Yes** INSTALL a new generator. → **No** GO to **B7**.

TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
B7 CHECK IGNITION CIRCUITS	
1 	2 Check the ignition circuits for correct routing, grounding and security of connections. • Are the circuits OK? → **Yes** GO to **B8**. → **No** REPAIR the circuits as required. TEST the system for normal operation.
B8 CHECK IGNITION SYSTEM	
1 	2 Test the ignition system. • Is the ignition system OK? → **Yes** GO to **B9**. → **No** REPAIR the ignition system as required. TEST the system for normal operation.

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
B9 CHECK AUDIO UNIT MOUNTING POINTS	
1 	2 Check the audio unit mounting points for security, cleanliness, and metal-to-metal contact. • Are the mounting points clean, secure, and in metal-to-metal contact? → **Yes** GO to **B10**. → **No** CLEAN and SECURE the connections, as required. TEST the system for normal operation.
B10 SUBSTITUTE RADIO ANTENNA MAST	
1  3 	2 Substitute the radio antenna mast with a known good radio antenna mast. 4 Verify the operation of the audio unit. • Is the noise eliminated? → **Yes** INSTALL a new radio antenna mast. → **No** GO to **B11**.

TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
B11 SUBSTITUTE ANTENNA CABLE	
1 	
	2 Substitute a known good radio antenna lead-in cable.
3 	
	4 Verify the operation of the audio unit. • Is the noise eliminated? → **Yes** ISNTALL a new radio antenna lead in cable. TEST the system for normal operation. → **No** REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility. TEST the system for normal operation.

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
C1 CHECK ANTENNA CABLE CONNECTIONS	
	[2] Check the radio antenna lead-in cable connections. • Are the connections clean, secure, and in metal-to-metal contact? → **Yes** GO to **C2**. → **No** CLEAN and SECURE the radio antenna lead-in cable connections, as required. TEST the system for normal operation.
C2 CHECK ANTENNA MOUNTING CONNECTIONS	
	[2] Check to make sure the radio antenna mast is securely mounted to the vehicle body at ground points. • Are the contacts clean, secure, and in metal-to-metal contact? → **Yes** GO to **C3**. → **No** CLEAN and SECURE the radio antenna mast as required. TEST the system for normal operation.

C1 - C2

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
C3 SUBSTITUTE RADIO ANTENNA MAST	
 	2 Substitute the radio antenna mast with a known good radio antenna mast. TEST the system for normal operation. 4 Verify the operation of the audio unit. • Is the noise eliminated? → **Yes** INSTALL a new radio antenna mast. → **No** GO to **C4**.
C4 SUBSTITUTE ANTENNA CABLE	
 	2 Substitute a known good radio antenna lead-in cable. 4 Verify the operation of the audio unit. • Is the noise eliminated? → **Yes** INSTALL a new radio antenna lead-in cable. TEST the system for normal operation. → **No** REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility. TEST the system for normal operation.

C3 - C4

D: Poor Quality Sound One or More Speakers (Not All)

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
D1 ISOLATE CONCERN	
1 	2 Turn on the radio and check all of the radio speakers for distortion. • Do all of the radio speakers have poor sound quality? → **Yes** GO to Pinpoint Test E. → **No** GO to **D2**.
D2 CHECK FOR RADIO SPEAKER CONCERNS	
1 	2 Check for loose trim panels or attachments that might cause rattles in the area of the radio speaker in question. 3 Check for pinched or broken circuits at or near the audio unit or radio speakers in question. 4 Check for foreign material in the radio speaker cone. • Are there any visible radio speaker concerns? → **Yes** REPAIR the concerns as required. TEST the system for normal operation. → **No** GO to **D3**.

D1 - D2

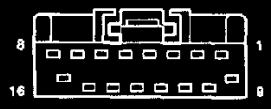
TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
D3 CHECK SPEAKER CIRCUITS	

1 2 3

Audio Unit C213

Poor Sounding Radio Speaker(s)

4



GK6152-A

4 Measure the resistance between audio unit C213 and the poor sounding radio speaker(s); and between audio unit C213 and ground as follows:

Speakers		Audio Unit	
Speaker	Speaker Circuit	C213 Pin	Circuit
LH Front	804 (OG/LG)	14	804 (OG/LG)
LH Front	813 (LB/WH)	15	813 (LB/WH)
RH Front	811 (DG/OG)	8	811 (DG/OG)
RH Front	805 (WH/LG)	7	805 (WH/LG)
LH Mid	801 (TN/YE)	13	801 (TN/YE)
LH Mid	800 (GY/LB)	12	800 (GY/LB)
RH Mid	802 (OG/RD)	5	802 (OG/RD)
RH Mid	803 (BN/PK)	6	803 (BN/PK)
LH Rear	801 (TN/YE)	13	801 (TN/YE)
LH Rear	800 (GY/LB)	12	800 (GY/LB)
RH Rear	802 (OG/RD)	5	802 (OG/RD)
RH Rear	803 (BN/PK)	6	803 (BN/PK)

- Is the resistance less than 5 ohms between the audio unit and the poor sounding radio speaker(s) and greater than 10,000 ohms between the audio unit and ground?

→ **Yes**
GO to **D4**.

→ **No**
REPAIR the circuit(s) in question. TEST the system for normal operation.

TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
D4 SUBSTITUTE SPEAKER	
1  3 	2 Substitute a known good radio speaker for each radio speaker with poor sound. 4 Turn on the radio. • Does the known good radio speaker have poor sound quality? → **Yes** REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility. TEST the system for normal operation. → **No** INSTALL new radio speakers as required. TEST the system for normal operation.

D4

TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
E1 CHECK VOLUME RANGE FOR DISTORTION	
1 	2 Turn on the radio. Vary the volume level of the radio. • Is the distortion only at high volume levels? → **Yes** The system is OK. → **No** REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility. TEST the system for normal operation.

E1

F: No Sound From One or More Speakers - Not All Speakers

TEST CONDITIONS	TEST DETAILS/RESULTS/ACTIONS
F1 ISOLATE CONDITION	
1 	2 Turn on the radio, center the FADE and BALANCE controls (if equipped) and check all the radio speakers for sound. • Are all the radio speakers without sound? → **Yes** GO to Pinpoint Test G. → **No** GO to **F2**.

F1

TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
F2 CHECK RADIO SPEAKER CIRCUIT(S)	

1

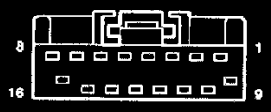
2

Audio Unit C213

3

Silent Radio Speaker(s)

4



GK6152-A

4 Measure the resistance between audio unit C213 and the silent radio speaker connector; and between audio unit C213 and ground as follows:

Speakers		Audio Unit	
Speaker	Speaker Circuit	C213 Pin	Circuit
LH Front	804 (OG/LG)	14	804 (OG/LG)
LH Front	813 (LB/WH)	15	813 (LB/WH)
RH Front	811 (DG/OG)	8	811 (DG/OG)
RH Front	805 (WH/LG)	7	805 (WH/LG)
LH Mid	801 (TN/YE)	13	801 (TN/YE)
LH Mid	800 (GY/LB)	12	800 (GY/LB)
RH Mid	802 (OG/RD)	5	802 (OG/RD)
RH Mid	803 (BN/PK)	6	803 (BN/PK)
LH Rear	801 (TN/YE)	13	801 (TN/YE)
LH Rear	800 (GY/LB)	12	800 (GY/LB)
RH Rear	802 (OG/RD)	5	802 (OG/RD)
RH Rear	803 (BN/PK)	6	803 (BN/PK)

- Is the resistance less than 5 ohms between the audio unit and the silent radio speaker connector; and less than 10,000 ohms between the audio unit and ground?

→ **Yes**
GO to **F3**.

→ **No**
REPAIR the circuit(s) in question. TEST the system for normal operation.

TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
F3 SUBSTITUTE SPEAKER	
	
	2 Substitute a known good radio speaker for each silent radio speaker.
	
	4 Turn on the radio. • Are the known good radio speakers silent? → **Yes** REMOVE the audio unit and SEND it to an authorized Ford audio repair facility. TEST the system for normal operation. → **No** INSTALL new radio speakers as required. TEST the system for normal operation.

F3

TEST CONDITIONS	TESTDETAILS/RESULTS/ACTIONS
G1 CHECK FOR AUDIO UNIT POWER	
	
	2 Turn on the audio unit. • Does the audio unit illuminate? → **Yes** REMOVE the audio unit and SEND it to an authorized Ford audio repair facility. TEST the system for normal operation. → **No** GO to Pinpoint Test A.

G1

Condition	Possible Source	Action
• The radio is inoperative/does not operate correctly	• CJB Fuse 3 (15A). • CJB Fuse 22 (15A). • Circuitry. • Audio unit. • Ignition switch.	• GO to Pinpoint Test A.
• The cassette player is inoperative/does not operate correctly	• Audio unit.	• REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility. TEST the system for normal operation.
• The radio does not operate correctly — display is blank	• CJB Fuse 3 (15A). • CJB Fuse 22 (15A). • Circuitry. • Audio unit.	• REMOVE the audio unit and SEND it to an authorized Ford audio system repair facility. TEST the system for normal operation.
• Noisy reception	• Antenna. • Antenna connections. • Noise suppression equipment. • Audio unit. • Connections at battery, antenna, speaker leads or audio unit.	• GO to Pinpoint Test B.
• Continuous seek/scan in AM/FM	• Antenna. • Antenna connections. • Audio unit.	• GO to Pinpoint Test C.
• Noisy reception — FM only	• FM signal out of range.	• INFORM the customer of methods for obtaining the best reception.
• Poor quality/distorted sound from one or more speakers (not all speakers)	• Speaker(s). • Circuitry. • Audio unit.	• GO to Pinpoint Test D.
• Poor quality/distorted sound from all of the speakers	• Speaker(s). • Circuitry. • Audio unit.	• GO to Pinpoint Test E.
• No sound from one or more of the speakers — not all speakers	• Speaker(s). • Circuitry. • Audio unit. • Antenna system.	• GO to Pinpoint Test F.
• No sound from all of the speakers	• Speaker(s). • Circuitry. • Audio unit.	• GO to Pinpoint Test G.
• Loud pops when cycling the ignition switch — from START to RUN	• CJB Fuse 27 (5A). • Circuitry. • Audio unit.	• REPAIR Circuit 1000 (RD/BK). TEST the system for normal operation.