Radio and Integrated Thin-Film Antenna Troubleshooting, and Field Service Updates

54-148

> FLA COE
> FLB COE
> FLD Conventional
> Business Class
> FLC 112 Conventional
> Century Class Conventional
> Argosy
> Cargo
> Columbia
> Coronado
> Business Class M2
> Cascadia
> 108SD/114SD
> New Cascadia

Freightliner Service Bulletin

Description of Revisions: *This bulletin replaces the version dated 10/01/2015. The New Cascadia has been added to the model list.*

General Information

Refer to **Table 1** for a list of radio troubleshooting topics in this bulletin.

Radio Diagnostics Troubleshooting		
Main Symptom Area		**Action**
Radio Fadeout, Radios With Built-In Fader Control		See **"Radio Fadeout, Radios With Built-In Fader Control"**
Radio/Electronics Failures		See **"Radio/Electronics Failures"**
Flashing Theft Deterrent LED		See **"Flashing Theft Deterrent LED Disabling"**
Radio Tuning		See **"Radio Tunes to Incorrect Frequency"**
Error Messages	"Comm Error"	See **Table 2**, **Error Message Diagnostics: "Comm Error"**
	"No CDX"	See **Table 3**, **Error Message Diagnostics: "No CDX"**
	"Focus"	See **Table 4**, **Error Message Diagnostics: "Focus"**
	"No CD"	If this error occurs when there are CDs in the CD changer, replace the CD changer.
	"ERR"	See **Table 5**, **Error Message Diagnostics: "ERR"**
	"Load"	Replace radio/CD player.
	"Tracking"	Check to see if the CD is inserted upside down. If not, replace the radio/CD player.
	"Bad Tape"	Try a known good cassette tape of less than 45 minutes per side. If this error message persists, replace the radio/cassette player.
	"TP Clean"	Clean the cassette tape deck, then reset the tape player timer to zero using the instructions in the owners manual.
Poor or Weak Reception		See **Table 6**, **Poor Reception Diagnostics**
Multiband Antenna Diagnostics		See **Table 7**, **Multiband Antenna Diagnostics**
Poor Reception Diagnostics - CB thin-film Antenna		See **Table 8**, **thin-film Antenna Diagnostics**
MP3 feature is not functioning.		Press the band button until the "EX AUDIO" message appears in the display.
J1939 connection is not working.		Refer to Service Bulletin 54-226, **Radio and J1939 Datalink Wiring for the Cascadia**.
Stereo Does Not Turn On or Stereo Tuns On, Then Immediately Turns Off		See **Table 10** and **Table 11**, **Stereo System Power Diagnostics**
Cassette Tape Player Inoperative or Cassette Tape Player Plays Weak or Slow		See **Table 12**, **Tape Deck Diagnostics**
No Audio From One or More Speakers		See **Table 13**, **Speaker Diagnostics**

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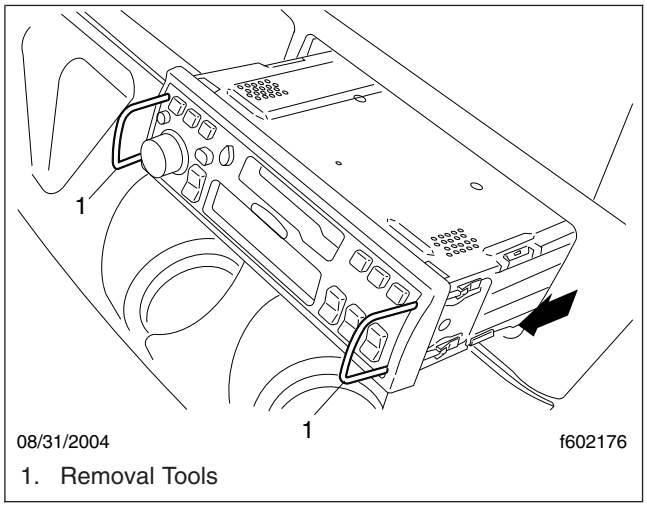
Radio Diagnostics Troubleshooting	
Main Symptom Area	**Action**
CD Player Skips or Mutes or CD Player Ejects CD Early	See **Table 14**, **CD Player Diagnostics**
CD Changer Skips or Mutes or CD Changer Does Not Eject or CD Changer Is Inoperative	See **Table 15**, **CD Changer Diagnostics**

Table 1, Radio Diagnostics and Troubleshooting

Using the Correct Tools for Radio Removal

Refer to the following instructions if removal of the radio is required for diagnostics and repair. Failure to use the correct tools when removing a radio can cause damage to the radio faceplate, which may result in a non-warranty chargeback.

1. Park the vehicle on a level surface, apply the parking brakes, shut down the engine, chock the tires, and disconnect the batteries at the negative terminals.
2. Install the removal tools into the holes in the radio faceplate. See **Fig. 1**. Push them in until they click.



1. Removal Tools

Fig. 1, Removing the Radio

3. Pull on the removal tools to remove the radio from the dash.
4. With the radio removed from the dash, disconnect the wiring.
5. Remove the tools from the radio by squeezing.

6. Install the new radio by first connecting the wiring, then pushing the radio into the dash. It will click on both sides when fully seated.

NOTE: The removal tools are not needed for installation.

7. Connect the batteries and remove the chocks from the tires.

Delco Radio Diagnostics Troubleshooting

Radio Fadeout, Radios With Built-In Fader Control

If an AM/FM radio designed for use with four speakers is installed in a vehicle with only two speakers, the fader control, which is intended to fade between front and rear pairs of speakers, will simply fade to silence. This can also occur if the fader control is accidently set to the rear speakers on a vehicle that is equipped only with front speakers. Fader control problems can occur in vehicles built since September 1990.

If a truck is experiencing this problem, turn the fader control all the way to the front speakers. If a more permanent solution is desired, plug in a jumper harness between the radio and the speaker wiring harness. The jumper harness shunts the fader control, negating its function. This part can be purchased through the direct ship program from PanaPacific. The part number is PSO PPC9003.

Radio/Electronics Failures

⚠ WARNING

Use care when installing aftermarket components. Aftermarket installation of components requiring drilling, cutting, brazing, soldering, or welding can create metal particles that can cause electrical shorts. This can cause electrical/electronic component malfunction or create a heat source that can cause a fire. It is not recommended that any aftermarket installation be performed. Use extreme care when performing any alteration to capture and remove from the vehicle entirely all metal or other electrically-conductive material. Failure to do this can result in component malfunction and/or fire, which could cause personal injury or property damage.

Aftermarket mounting of components requiring drilling or cutting of metal inside of the vehicle can cause unexpected electronics failures. Failures are caused by fine metal shavings entering unsealed electronic components through heat ventilation openings. Vibration from vehicle movement can cause the shavings to move around and cause an intermittent failure before an electronic component fails permanently.

If a customer complains of a radio or electronics failure after installation of an aftermarket component, inspect the component and the surrounding areas for metal shavings.

Take great care to capture all metal shavings, as even one may be enough to create a short between circuits on a printed circuit board. If installing aftermarket equipment, carefully cover all electronics including wiring and connectors or create a barrier around the work to capture all metal shavings. Use a vacuum cleaner to remove any shavings that may have spilled.

Flashing Theft Deterrent LED Disabling

The flashing theft deterrent LED on the face of the early generation Delco radios may disturb a driver sleeping in the bunk.

To disable the flashing LED, use the following instructions.

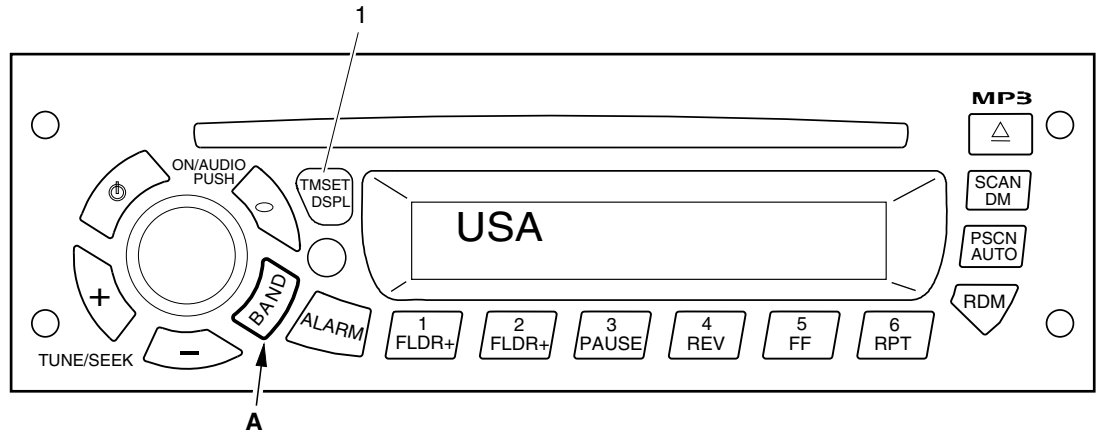
1. With the ignition ON and the radio OFF, press and hold the TM SET button for about two seconds until the hour digits flash.

2. Within five seconds, press and release the Preset #1 button until the display reads FLASHOFF.
3. After five seconds with no activity the display will return to normal.

Radio Tunes to Incorrect Frequency

The symptoms for the radio being set for the wrong country are any of: poor reception wrong frequencies displayed radio not tuning to known local stations.

1. Turn the key to ACC or IGN.
2. Turn the radio OFF.
3. Press the "SET DSPL" button for about 3 seconds until the hour digit of the clock begins flashing.
4. Press the "BAND" button to select the country that is correct for the region where the truck is operating. See **Fig. 2**.



A. Once the "SET DSPL" button is pressed for 3 seconds, the "BAND" button is used to set the country code. For example, USA is correct for Canada, Mexico, and the USA.
1. Set Display Button

Fig. 2, Setting the Country Code

5. After several seconds of inactivity, the radio will leave programming mode.

Error Message Diagnostics: "Comm Error"

Error Message Diagnostics: "Comm Error"			
Step	**Test Procedure**	**Test Result**	**Action**
1	Disconnect the CD changer harness from the radio. See **Fig. 16** and **Table 16**. Measure for AC voltage at the radio on connector A pin 30 using a known good ground. AC voltage will vary Is AC voltage detected?	Yes	Go to step 2.
		No	Replace the radio.

Error Message Diagnostics: "Comm Error"			
Step	**Test Procedure**	**Test Result**	**Action**
2	Connect the CD changer harness to the radio and disconnect it from the CD changer. See **Fig. 16** and **Table 16**. Measure for AC voltage at the CD on connector B pin 14 using a known good ground. AC voltage will vary. Is AC voltage detected?	Yes	Replace the CD player.
		No	Replace the CD player harness.

Table 2, Error Message Diagnostics: "Comm Error"

Error Message Diagnostics: "No CDX"

NOTE: Insure the CD changer harness is properly connected at the radio and the CD changer. See **Fig. 16** and **Fig. 17**

Error Message Diagnostics: "No CDX"			
Step	**Test Procedure**	**Test Result**	**Action**
1	With the keyswitch in the accessory position and the radio turned on, backprobe radio connector A, pin 31 (power) and pin 34 (ground). Is battery voltage present? Is battery voltage present?	Yes	Go to step 2.
		No	Replace the radio.
2	Backprobe CB changer connector B, pin 15 (power) and pin 13 (ground). Is battery voltage present?	Yes	Replace the CD changer.
		No	Repair or replace the CD changer wiring harness for an open circuit.

Table 3, Error Message Diagnostics: "No CDX"

Error Message Diagnostics: "Focus"

NOTE: Make sure that CDs are being installed properly.

Error Message Diagnostics: "Focus"			
Step	**Test Procedure**	**Test Result**	**Action**
1	Is the CD upside down in the CD changer?	Yes	Instruct the driver how to correctly install a CD.
		No	Go to step 2.
2	Is there moisture or condensation on the CD?	Yes	Inserting a cold CD into a warm CD player can cause condensation to form on the CD. A wet or contaminated CD can cause the CD player to malfunction. Go to step 3.
		No	Replace the CD player.

Error Message Diagnostics: "Focus"			
Step	**Test Procedure**	**Test Result**	**Action**
3	Will CDs play normally within one hour of warming and drying?	Yes	No action is required.
		No	Replace the CD player.

Table 4, Error Message Diagnostics: "Focus"

Error Message Diagnostics: "ERR"

Error Message Diagnostics: "ERR"			
Step	**Test Procedure**	**Test Result**	**Action**
1	Insert a CD that is known to play properly and that is clean and free from scratches. Does the CD player continue to display the ERR message?	Yes	Inserting a cold CD into a warm CD player can cause condensation to form on the CD. A wet or contaminated CD can cause the CD player to malfunction. Go to step 2.
		No	No action required.
2	Will CDs play normally within 1 hour of warming and drying?	Yes	No action required.
		No	Replace the CD player.

Table 5, Error Message Diagnostics: "ERR"

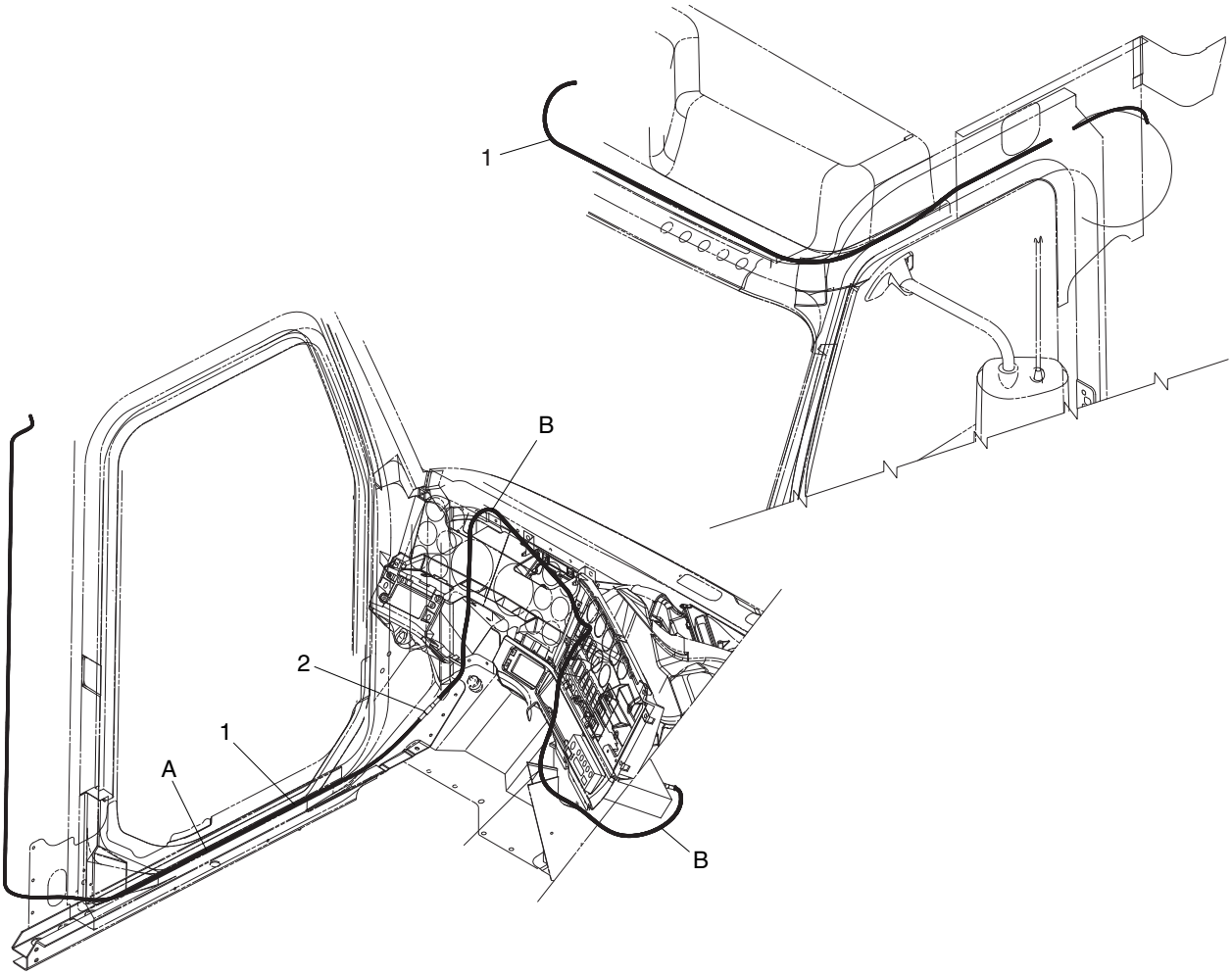
Poor Reception Diagnostics

Poor Reception Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
1	Poor reception may be caused by antenna problems, a defective radio, or radio frequency noise injected into the power or antenna circuits.	—	Interference may be caused by indoor lighting. These diagnostics may need to be performed outside and away from static sources, such as fluorescent lights and electric power tools. Go to step 2.
2	Tune the radio to a local station that exhibits poor reception (static, background noise, or interference). Disconnect the antenna coaxial cable from the back of the radio. See **Fig. 3**. Is there still noise?	Yes	The noise is not caused by the antenna system. Go to step 3.
		No	Go to step 6.

Poor Reception Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
3	Test for poor ground and power connections to the radio and cab. Wiggle the power and ground connections from the battery through connection points at the starter, cab, and frame while listening for changes in the static sounds. Does the static change when any of the connection points are wiggled?	Yes	Clean and repair the connection. Apply dielectric protection when the connection is restored.
		No	Go to step 4.
4	Check the voltage drop. Turn off all accessories and measure the voltage drop between the battery and the radio for both the power and ground circuits. Is the voltage drop greater than 0.25 VDC for either circuit?	Yes	Troubleshoot the wiring for the source of the resistance that is causing the voltage drop. Repair as appropriate.
		No	Go to step 5.
5	Install a known good radio set to the same station as the one in the truck. Is the problem still present?	Yes	The noise source is likely coming from the vehicle power system. Isolate the problem by disconnecting fuses and/or circuit breakers one by one until the source of the noise is isolated. Check the ground circuit to that component and repair as appropriate.
		No	Replace the radio.
6	If a substitute antenna is available, plug it into the radio to determine if the problem is still present. Is the problem still present with the test antenna?	Yes	Troubleshoot for interference sourced from other components or accessories on the vehicle. Isolate the problem by disconnecting fuses and/or circuit breakers one by one until the source of the noise is isolated. Check the ground circuit to that component and repair as appropriate.
		No	Go to step 7.
7	Is the antenna system a multiband system with a multiplexer box?	Yes	Continue to **Table 7**.
		No	Go to step 8.
8	With the antenna unplugged from the radio, measure the resistance between the antenna cable center pin and ground. Is the resistance greater than 10,000 ohms?	Yes	Go to step 9
		No	The antenna cable is shorted. Locate the short and replace the necessary cable.
9	Measure resistance between the center pin and the center conductor at the base of the antenna mast. Is the resistance less than 5 ohms?	Yes	Go to step 10.
		No	Repair a poor or corroded antenna cable connection; usually at the antenna base, or if the cable shows the resistance, replace the cable.

Poor Reception Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
10	Measure the resistance between the antenna cable outer shield from the radio end of the cable to the cab ground. Also, measure the resistance of the antenna cable shield from the connection at the radio end to the end at the antenna end. Is the resistance less than 5 ohms for both of these checks?	Yes	The antenna system is working properly. A possible solution applicable to some older model vehicles is to consider installing a RAMI or other multiband antenna system. See **Fig. 4**. This option is an upgrade and not covered by warranty.
		No	Repair a poor or corroded antenna cable connection; usually at the antenna base, or if the cable shows the resistance, replace the cable.

Table 6, Poor Reception Diagnostics



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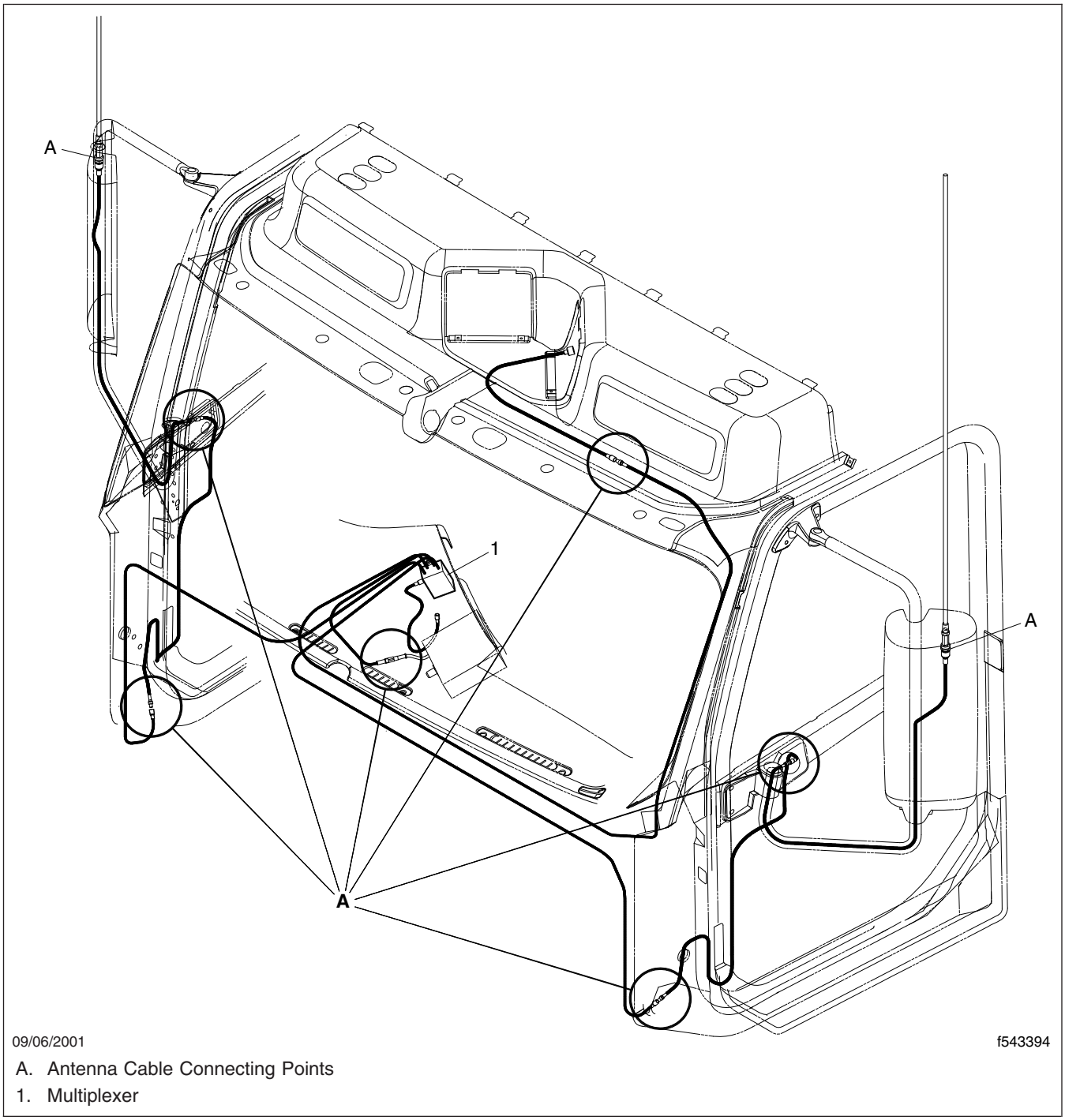
A. Follow air line routing.
B. Follow main cab harness routing.
1. Antenna Coaxial Cable
2. Antenna Coaxial Connector

Fig. 3, Antenna Coaxial Cable Routing



A. Antenna Cable Connecting Points
1. Multiplexer

Fig. 4, RAMI Antenna Cable Routing

Antenna Diagnostics

Multiband Antenna Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
1	Remove the antenna masts from their mounting bases. Remove the cap at the top of the antenna masts. Inspect the solder joint/ connection at the bottom of the antenna masts and measure the resistance of the antenna from bottom to top. Flex and twist the mast while making the measurement. NOTE: A small cut may be needed in the shrinkable wrap at the top of the mast to expose the wire. Use care that the wire does not come out of the slot and uncoil. The wire is coated with a dielectric material. It can be lightly sanded to expose the conductor. Does the resistance remain at less than 5 ohms?	Yes	Go to step 2.
		No	Replace the defective antenna mast.
2	Disconnect all radios from the multiband splitter box. Measure the resistance from the bracket to the center standoff nut. Is the resistance greater than 10,000 ohms?	Yes	Go to step 3.
		No	Locate and repair the shorted antenna cable or mount.
3	Measure the resistance from the bracket to a solid cab ground. Is the resistance less than 5 ohms?	Yes	Go to step 4.
		No	Repair the poorly grounded antenna mount.
4	Measure the resistance from the center standoff nut of each antenna base to the center conductor at the multiplexer connector. Is the resistance of either cable greater than 5 ohms?	Yes	Replace the damaged antenna cable.
		No	Go to step 5.

Multiband Antenna Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
5	With the multiplexer box disconnected from all radios and antennas, measure the resistance from the following: • Each antenna cable center conductor to the AM/FM radio cable center conductor. • Each antenna cable outside shell to the AM/FM radio cable outside shell. Did any of these measurements show resistance greater than 1 ohm?	Yes	Replace the multiplexer box.
		No	Go to step 6.
6	Measure the resistance from the antenna cable center conductor to the AM/FM radio cable outside shell. Is the resistance greater than 10,000 ohms?	Yes	The antenna system is performing properly. No further action is necessary.
		No	Replace the multiplexer box.

Table 7, Multiband Antenna Diagnostics

NOTE: It may be necessary to remove the headliner for steps 3 through 5 in this troubleshooting routine.

CB Thin-Film Antenna Diagnostics			
Step	**Test Procedure***	**Test Result**	**Action**
1	Disconnect the CB antenna connector from the back of the CB radio. Measure the resistance between the center pin and the metal shell of the PL-259 connector. Is the resistance greater than 10,000 ohms?	Yes	Go to step 2.
		No	There is a short circuit in one of the antenna cables. Locate and replace the shorted cable.
2	Measure the resistance between the center pin of the CB antenna PL-259 connector and the lower rivet on the antenna assembly (where the cable is riveted to the film). See **Fig. 5**. Is the resistance less than 5 ohms?	Yes	Go to step 3.
		No	There is an open circuit in the center conductor in one of the coaxial cables. Locate and replace the open cable.

CB Thin-Film Antenna Diagnostics			
Step	**Test Procedure***	**Test Result**	**Action**
3	Measure the resistance between the metal shell of the CB antenna PL-259 connector and cab ground. Is the resistance less than 5 ohms?	Yes	Go to step 4.
		No	There is a poor ground connection. Check the inline connections for corrosion, and make sure that they are connected together. Check the ground wire on the antenna to make sure that it is securely screwed to ground.
4	Make sure that no roof insulation is contacting the antenna, and that the antenna is properly adhered to the roof. Is the antenna loose, or is there any foreign material in contact with the antenna?	Yes	Clear any insulation away from the antenna and secure it so that it does not come loose during normal vehicle operation. Foreign material contacting the antenna will affect reception, and could damage the CB radio. If the antenna does not adhere to the roof, replace the antenna.
		No	Go to step 5.
5	On the CB thin-film antenna, measure the resistance between the two rivets, where the antenna wire attaches to the antenna film. See **Fig. 6**. This is a resistance test of the fuse. The fuse opens when too much wattage attempts to transmit through the antenna. Is the resistance less than 2 ohms?	Yes	All antenna tests pass. Test the CB radio.
		No	Replace the open fuse with Littelfuse LF 0454 750 (750 mA Time Delay).

* Refer to CB antenna installation diagram for location of antenna and cables.

Table 8, CB Thin-Film Antenna Diagnostics

AM/FM Thin-Film Antenna Diagnostics			
Step	**Test Procedure***	**Test Result**	**Action**
1	Disconnect the AM/FM antenna connector from the back of the radio. Measure the resistance between the center pin and the metal shell of the antenna connector. Is the resistance greater than 10,000 Ohms?	Yes	Go to step 2.
		No	There is a short circuit in one of the antenna cables. Locate short and replace the cable.
2	With the antenna disconnected from the radio, measure the resistance between the metal shell of the antenna connector and cab ground. Is the resistance less than 5 Ohms?	Yes	Go to step 3.
		No	The ground connection is bad, or missing. Check the inline connections for corrosion, and to make sure that they are connected together. Check the ground wire on the antenna to make sure that it is securely screwed to ground.

AM/FM Thin-Film Antenna Diagnostics			
Step	**Test Procedure***	**Test Result**	**Action**
3	Measure the resistance between the center pin of the AM/FM antenna connector and the rivet on the antenna assembly (where the cable is riveted on the film). Is the resistance less than 5 Ohms?	Yes	Replace the antenna and cable assembly.
		No	There is an open circuit in the center conductor in one of the coaxial cables. Locate open circuit and replace cable.

* Refer to AM/FM antenna installation diagram for location of antenna and cables.

Table 9, AM/FM Thin-Film Antenna Diagnostics

Integrated Thin-Film Antenna Replacement

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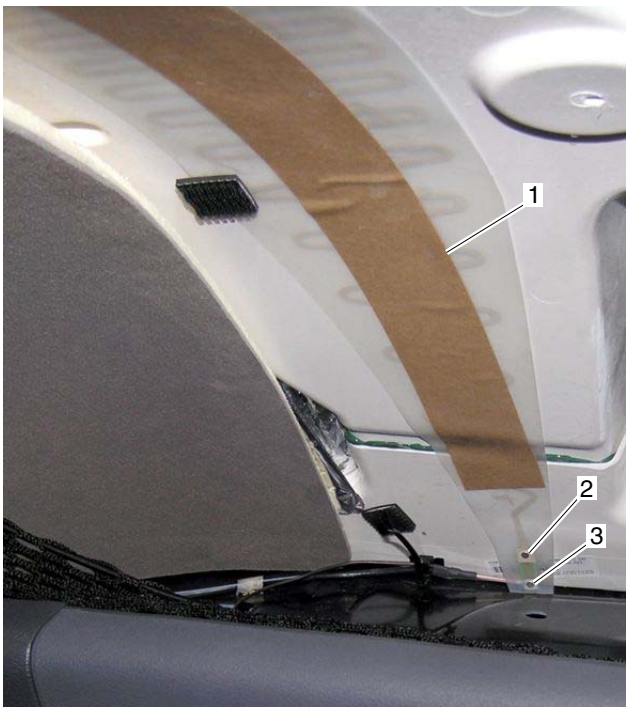
Fig. 5, Measuring the Resistance on the Thin-Film Antenna Lower Rivet



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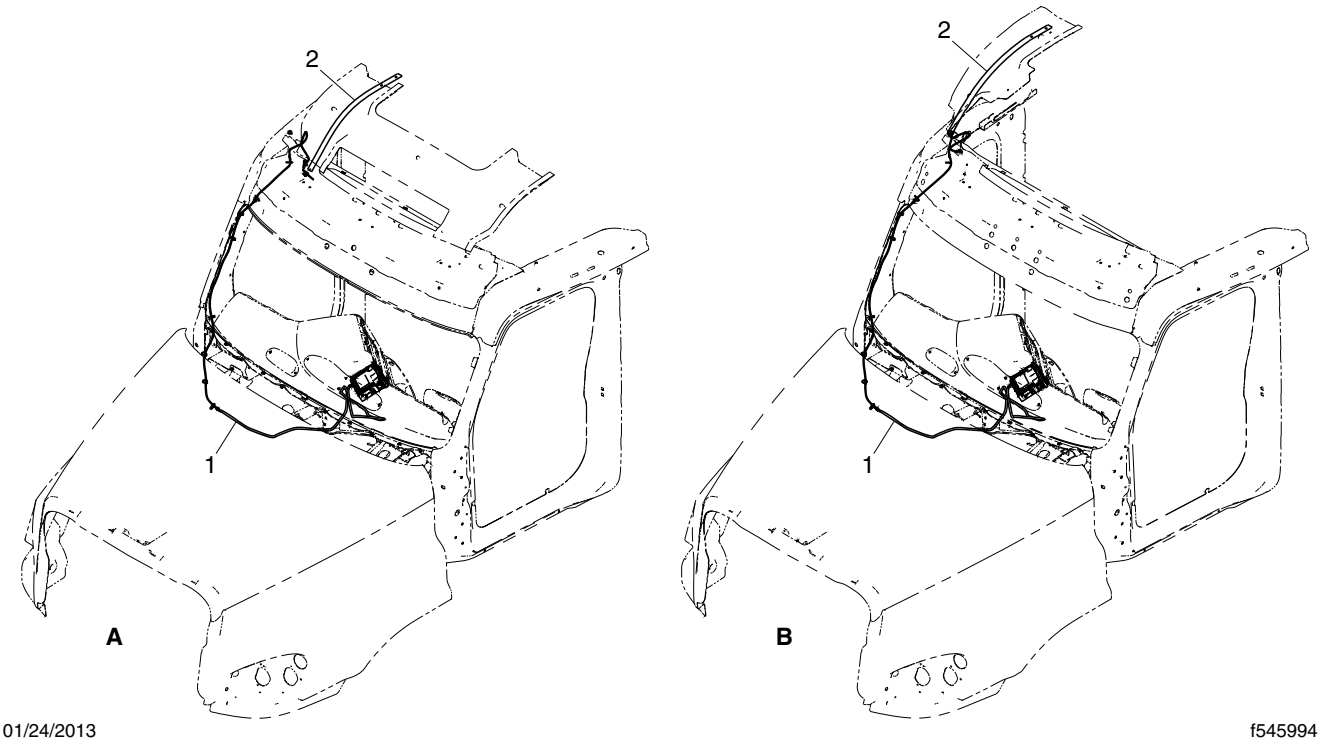
1. CB Antenna
2. Upper Rivet
3. Lower Rivet

Fig. 6, Thin-Film Antenna Fuse (headliner removed)

1. Remove the headliner.

NOTE: The antenna for CB radios is located on the driver-side roof. The antenna for AM/FM radios is located on the passenger-side roof.

2. Disconnect the antenna, and peel it off of the roof.
    - See **Fig. 7** for vehicles with AM/FM radio antennas.
    - See **Fig. 8** for CB radio antennas mounted on vehicles with a raised roof.
    - See **Fig. 9** for CB radio antennas mounted on vehicles without a raised roof.



A. Antenna mounting on vehicles without a raised roof.
1. Antenna Cable
B. Antenna mounting on vehicles with a raised roof.
2. AM/FM Radio Thin-Film Antenna

Fig. 7, Thin-Film Antenna, Vehicles with an AM/FM Radio

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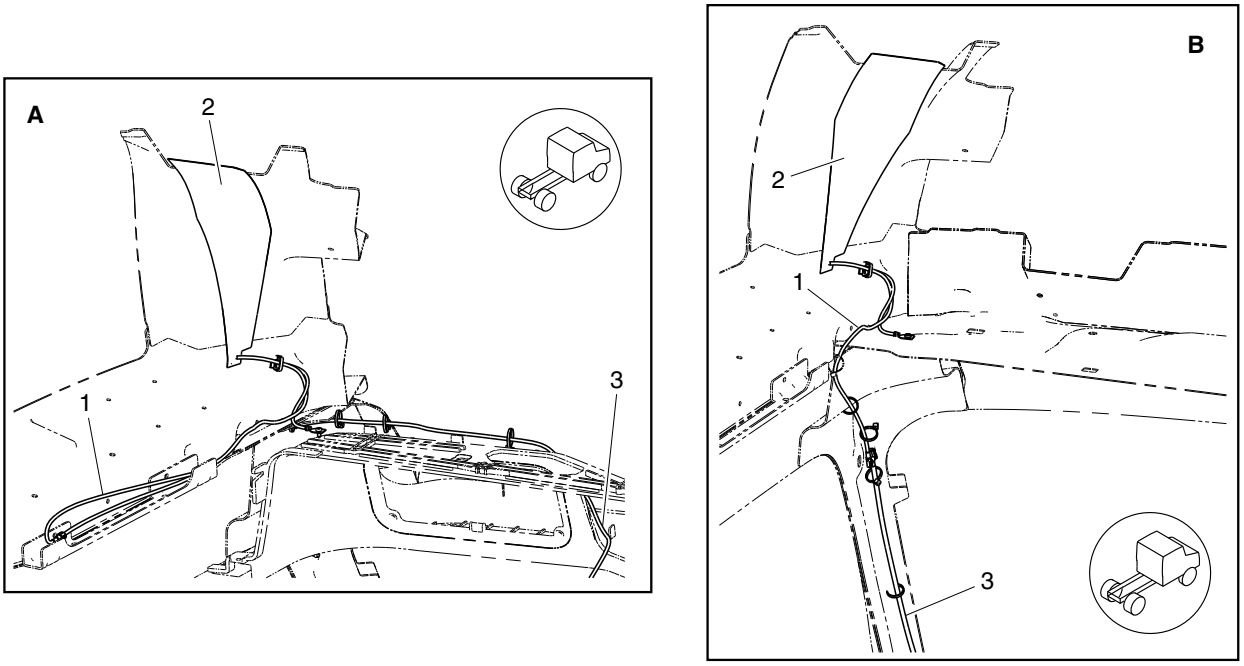

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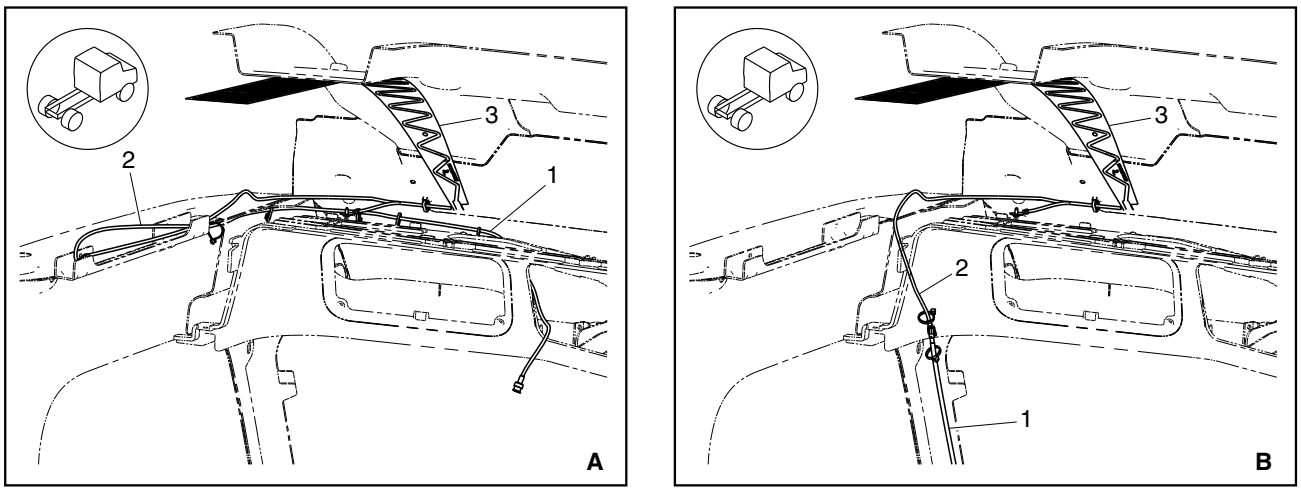
A. Antenna configuration with a CB radio mounted in the overhead console.
B. Antenna configuration with a CB radio mounted on the dash.

1. Cable Bundles in the Headliner
2. CB Radio Thin-Film Antenna
3. Cable Bundles in the Overhead Console or A-Pillar

Fig. 8, Thin-Film Antenna, CB Radio on Vehicles with a Raised Roof



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A. Antenna configuration with a CB radio mounted in the overhead console.
B. Antenna configuration with a CB radio mounted on the dash.

1. Cable Bundles in the Overhead Console or A-Pillar
2. Cable Bundles in the Headliner
3. CB Radio Thin-Film Antenna

Fig. 9, Thin-Film Antenna, CB Radio on Vehicles without a Raised Roof

3. Position the new antenna on the roof, then peel off the antenna's roof-side adhesive liner and stick the antenna to the center of the roof cap reinforcement.
4. Bundle and stow the excess antenna cable using wire ties.
5. Screw the ring terminal into the header assembly.
6. Turn on the radio and test the reception.
7. Install the headliner.

Antenna Cable Replacement

1. Remove the dash panels to access the antenna cable.
    - To access the CB cable, remove the driver-side A-pillar, the instrumentation control unit, and the auxiliary instrument panel. See **Fig. 10**.
    - To access the AM/FM radio antenna, remove the passenger-side A-pillar, the doghouse panel, and the auxiliary instrument panel. See **Fig. 11**.

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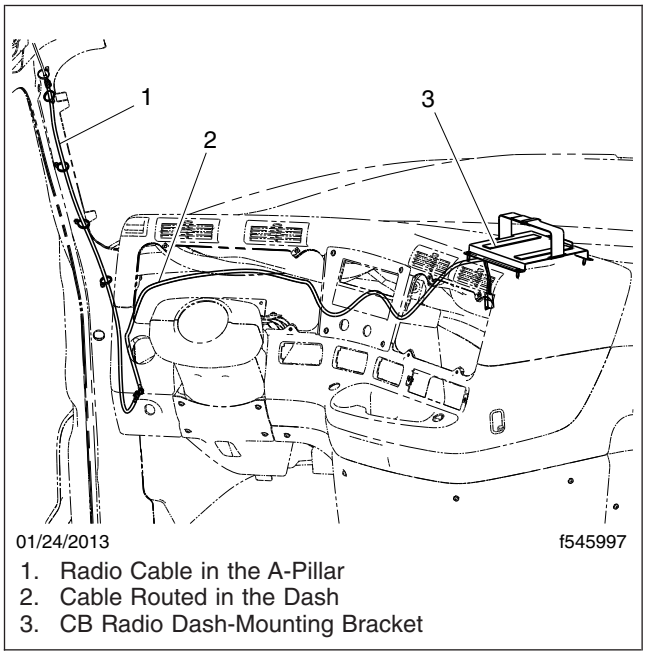
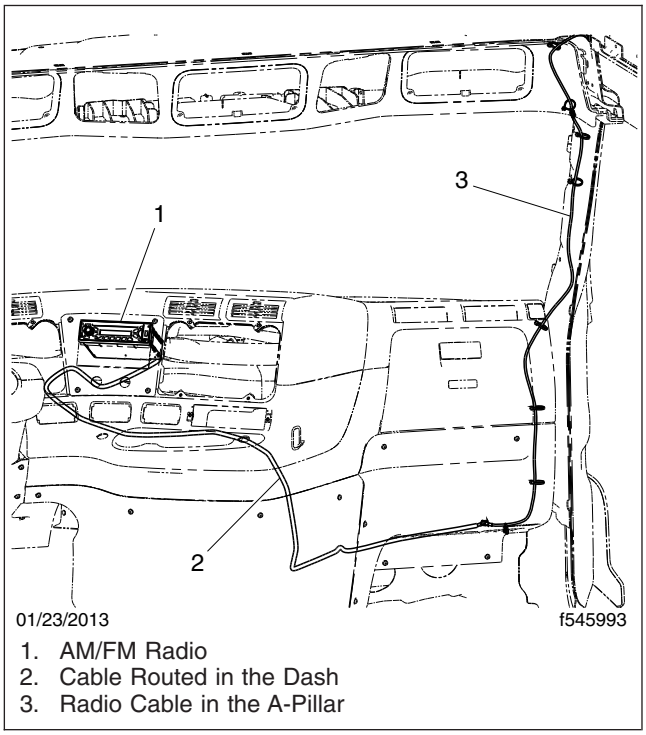


1. Radio Cable in the A-Pillar
2. Cable Routed in the Dash
3. CB Radio Dash-Mounting Bracket

Fig. 10, Cable Routing, CB Radio



1. AM/FM Radio
2. Cable Routed in the Dash
3. Radio Cable in the A-Pillar

Fig. 11, Cable Routing, AM/FM Radio

2. Remove the cable where the short is occurring.
3. Route the new cable and tie strap it to the overhead commodity harness every 12 inches (30 cm).
4. Turn on the radio and test the reception.
5. Install the dash panels.

Thin-Film Antenna Fuse Replacement

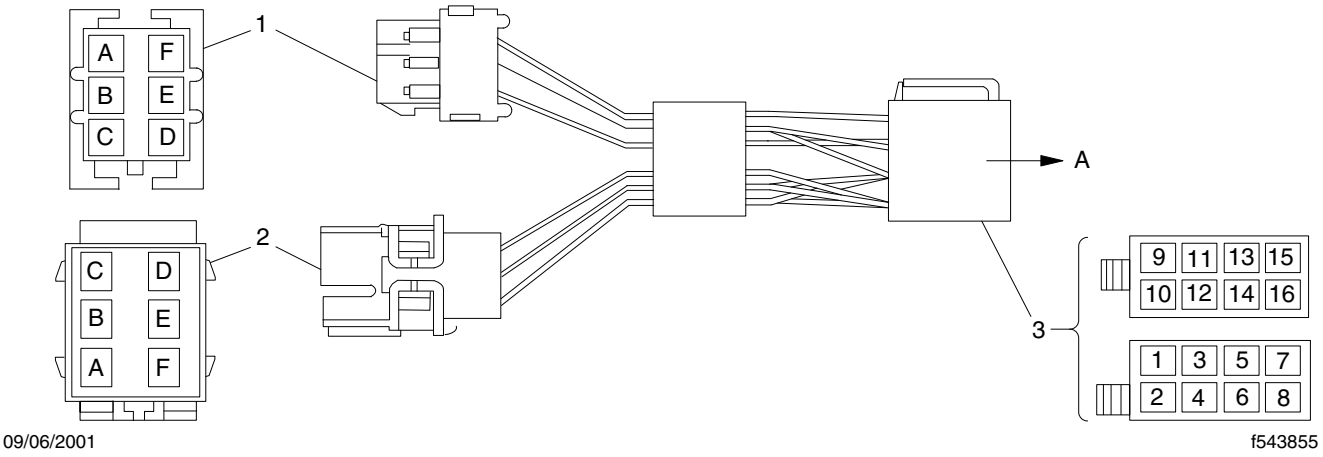
NOTE: The CB antenna is located on the driver-side of the vehicle. The AM/FM radio antenna is located on the passenger side of the vehicle.

1. Remove the headliner and the overhead console uphostery insert to access the fuse.
2. Locate the fuse at the base of the antenna, in between the two rivets. See **Fig. 5**.
3. Using a removal tool, lift the fuse out of the fuse holder.
4. Insert a new fuse (LF 0454 750) in the fuse holder.
5. Turn on the radio and test the reception.
6. Install the headliner and the overhead storage bin upholstery insert.

Stereo System Power Diagnostics

Stereo System Power Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
1	Turn the keyswitch to the accessory position and press the power button to turn the radio on. Does the radio display remain on?	Yes	The power supply is working properly. Continue troubleshooting with the other diagnostic tables.
		No	If the display immediately turns off or does not come on at all, there is a problem with the power (+ or –) supply to the radio. Go to step 2.
2	Measure the voltage at the radio 16 pin connector A. With the keyswitch in the accessory position measure for battery voltage at pins 4 (ignition) and 7 (battery) with the negative lead at pin 8 (ground). Is battery voltage present on both pins 4 and 7?	Both	Replace the radio.
		Neither	Measure again with a known good ground. If voltage is now present, use vehicle schematics to locate and repair a fault with the ground circuit. Otherwise, follow the instructions below for pins 4 or 7 fault action.
		Only pin 4 or pin 7	Check the appropriate fuse or circuit breaker and use vehicle schematics to locate and repair a fault with the wiring from the power distribution device to the radio.

Table 10, Stereo System Power Diagnostics



NOTE: See **Table 11** for stereo jumper harness connectors pinout information.

A. To the radio.

1. Connector B (viewed from the terminal end)
2. Connector C (viewed from the terminal end)
3. Connector A (viewed from the wire insertion end)

Fig. 12, Stereo Jumper Harness

Stereo Jumper Harness Connectors				
Connector B, 6-Pin	**Connector C, 6-Pin**	**Connector A, 16-Pin**	**Wire Color**	**Circuit Description**
—	—	1	—	—
—	—	2	—	—
—	—	3	—	—
D	—	4	Red	Ignition

Stereo Jumper Harness Connectors				
Connector B, 6-Pin	Connector C, 6-Pin	Connector A, 16-Pin	Wire Color	Circuit Description
—	—	5	—	—
D	—	6	Orange/White	Dimmer
A	—	7	Yellow	Battery
—	A	8	Black	Ground
—	C	9	Violet	Right Rear (+)
—	D	10	Violet/Black	Right Rear (-)
C	—	11	Dark Gray	Right Front (+)
E	—	12	Gray/Black	Right Front (-)
B	—	13	White	Left Front (+)
F	—	14	White/Black	Left Front (-)
—	B	15	Dark Green	Left Rear (+)
—	E	16	Green/Black	Left Rear (-)

Table 11, Stereo Jumper Harness Connectors

Tape Deck Diagnostics

Tape Deck Diagnostics			
Step	Test Procedure	Test Result	Action
1	Visually inspect inside the tape deck. Are foreign objects visible?	Yes	The objects need to be removed. The tape deck may need cleaning when cleared. These operations are not covered under warranty.
		No	Go to step 2.
2	Insert a known good tape that is no longer than 45 minutes per side. Does the tape play correctly?	Yes	The customers tape is faulty. No further action is necessary.
		No	Go to step 3.
3	Insert a cleaning cassette to clean the tape head and drive mechanisms. Retest with a known good tape after cleaning is complete. Is the problem still present?	Yes	Replace the radio/tape deck.
		No	The cassette deck needed cleaning. No further repair is necessary.

Table 12, Tape Deck Diagnostics

Speaker Diagnostics

Speaker Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
1	After finishing the speaker test, reset the balance, fader, treble and bass controls to their settings at the start of the test or to the center (zero) position. Which speakers are not functioning?	All Speakers	Check for a speaker lead shorted to ground. This causes all audio to stop functioning. If one of the speaker leads is shorted to ground for an extended period, the radio audio will go in to shutdown mode. If a short is found and corrected, and there is still no audio, give the radio ample time to cool (come out of shutdown mode). If there is still no audio, replace the radio.
		Subwoofer(s)	Go to step 2.
		Front Speakers	Go to step 11.
		Rear Speakers	Go to step 14.
2	Verify operation of the subwoofers. Turn on the radio and verify operation of the subwoofers. Which subwoofer is not working?	Both	Go to step 3.
		Left or Right Only	Go to step 6.
3	Check amplifier voltage. Check between pin A12 of the amplifier harness and cab ground for battery power. See **Fig. 13**, **Fig. 14**, and **Fig. 15**. The voltage should be within 0.5 volts of battery voltage. Is the voltage correct?	Yes	Go to step 4.
		No	Check the circuit breaker and the amplifier power leads. Repair or replace as required.
4	Verify operation of the speakers. Turn on the radio and verify operation of the speakers. Are the rear speakers working?	Yes	Go to step 5.
		No	Check the speaker leads. If they are OK, replace the radio.
5	Check the resistance. Check the subwoofer speaker resistance. A good speaker should have a resistance value of 2 to 10 ohms. Measure the resistance across the speaker input terminals. Is the resistance OK?	Yes	Go to step 8.
		No	Replace the speaker.

Speaker Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
6	Check amplifier output. Tune the radio to a frequency with no active radio station, then set the volume to a comfortable level. Remove the pins from the connector for the subwoofer speaker that is not functioning (pins B11 and B12 for the right subwoofer, pins B9 and B10 for the left subwoofer). See **Fig. 13** and **Fig. 14**. With the connector attached to the amplifier, check the AC voltage between the disconnected pins and a known good ground. Be sure the balance and fader controls are set to the center (0) position. Are all output readings the same?	Yes	Check the speaker leads and repair or replace as necessary.
		No	Replace the amplifier.
7	Check for AC voltage output from the amplifier. Tune the radio to a frequency with no active radio station, then set the volume to a comfortable level. Remove the pins from the connector for the subwoofer speaker that is not functioning (pins B11 and B12 for the right subwoofer, pins B9 and B10 for the left subwoofer). See **Fig. 13** and **Fig. 14**. With the connector attached to the amplifier, check the AC voltage between the disconnected pins and a known good ground. Be sure the balance and fader controls are set to the center (0) position. Is AC voltage present?	Yes	Check the speaker leads. Repair or replace as necessary.
		No	Replace the amplifier.
8	Verify operation of the rear speakers. Turn on the radio and verify the operation of the rear speakers. Are the rear speakers working?	Yes	Replace the amplifier.
		No	Check the speaker leads. Repair or replace as necessary. If OK, replace the radio.

Speaker Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
9	Verify operation of the front speakers. Check the speaker lead resistance at the radio connector. Disconnect connector A from the back of the radio. Measure the resistance across each pair of pins at connector A corresponding to the speaker(s) not working. Resistance should be 3 to 10 Ohms. See **Fig. 14** and **Fig. 15**. What is the resistance?	3 to 10 Ohms	Go to test 12.
		Less Than 3 Ohms	Speaker leads are shorted. Repair or replace as necessary.
		More Than 10 Ohms	Go to test 13.
10	Check for speaker output at the radio. Tune the radio to a frequency that does not have an active radio station. Set the volume to a comfortable level. Backprobe the pins of the affected speaker output(s) at the radio connector. The AC voltage output will range from 0 to 1 volt, depending on the volume level. Is AC voltage present?	Yes	Check the speaker for physical damage. Replace the speakers as necessary.
		No	Replace the radio.
11	Check the speaker resistance. A good speaker should have a resistance value of 3 to 10 ohms. Measure the resistance across the input terminals of the speaker. Is the resistance OK?	Yes	Repair or replace the speaker leads.
		No	Replace the speaker.
12	Verify operation of the rear speakers. Check the speaker lead resistance from the auxiliary volume control to the speaker. Unplug the connector at the auxiliary volume control that leads to the rear speakers. See **Fig. 14** and **Fig. 15**. Locate the pair(s) of pins in the connector that correspond to the affected speaker(s) and measure the resistance across the pins. Circuits 95 AL- and 95 AL+ are for the left side speaker, and circuits 95 AR- and 95 AR+ are for the right side speaker. What is the resistance?	More Than 10 Ohms	Go to test 15.
		3 to 10 Ohms	Go to test 16.
		Less Than 3 Ohms	The speaker leads are shorted. Repair or replace as necessary.

Speaker Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
13	Check the speaker resistance. A good speaker should have a resistance value of 3 to 10 ohms. Measure the resistance across the input terminals of the speaker. Is the resistance within range?	Yes	Repair or replace the speaker leads.
		No	Replace the speaker.
14	Check for AC voltage at the auxiliary control panel. Tune the radio to a frequency that does not have an active radio station. Set the volume to a comfortable level. Check for AC voltage at the inputs to the auxiliary control panel. See **Fig. 13** and **Fig. 14**. Circuits 95 AL- and 95 AL+ are for the left side speaker, and circuits 95 AR- and 95 AR+ are for the right side speaker. The AC voltages for these inputs should be approximately the same. The AC voltage output will range from 0 to 1 volt depending on volume level. Is AC voltage present?	Yes	Check the speaker and speaker leads. Check the auxiliary volume control. Repair as necessary.
		No	Go to test 15.
15	Check for speaker output at the radio. Tune the radio to a frequency that does not have an active radio station. Set the volume to a comfortable level. Backprobe the pins of the affected speaker output(s) at the radio connector. See **Fig. 13** and **Fig. 14**. The AC voltage output will range from 0 to 1 volt, depending on volume level. Is AC voltage present?	Yes	Check the speaker leads between the radio and the auxiliary volume control. Repair or replace as necessary.
		No	Replace the radio.

Table 13, Speaker Diagnostics

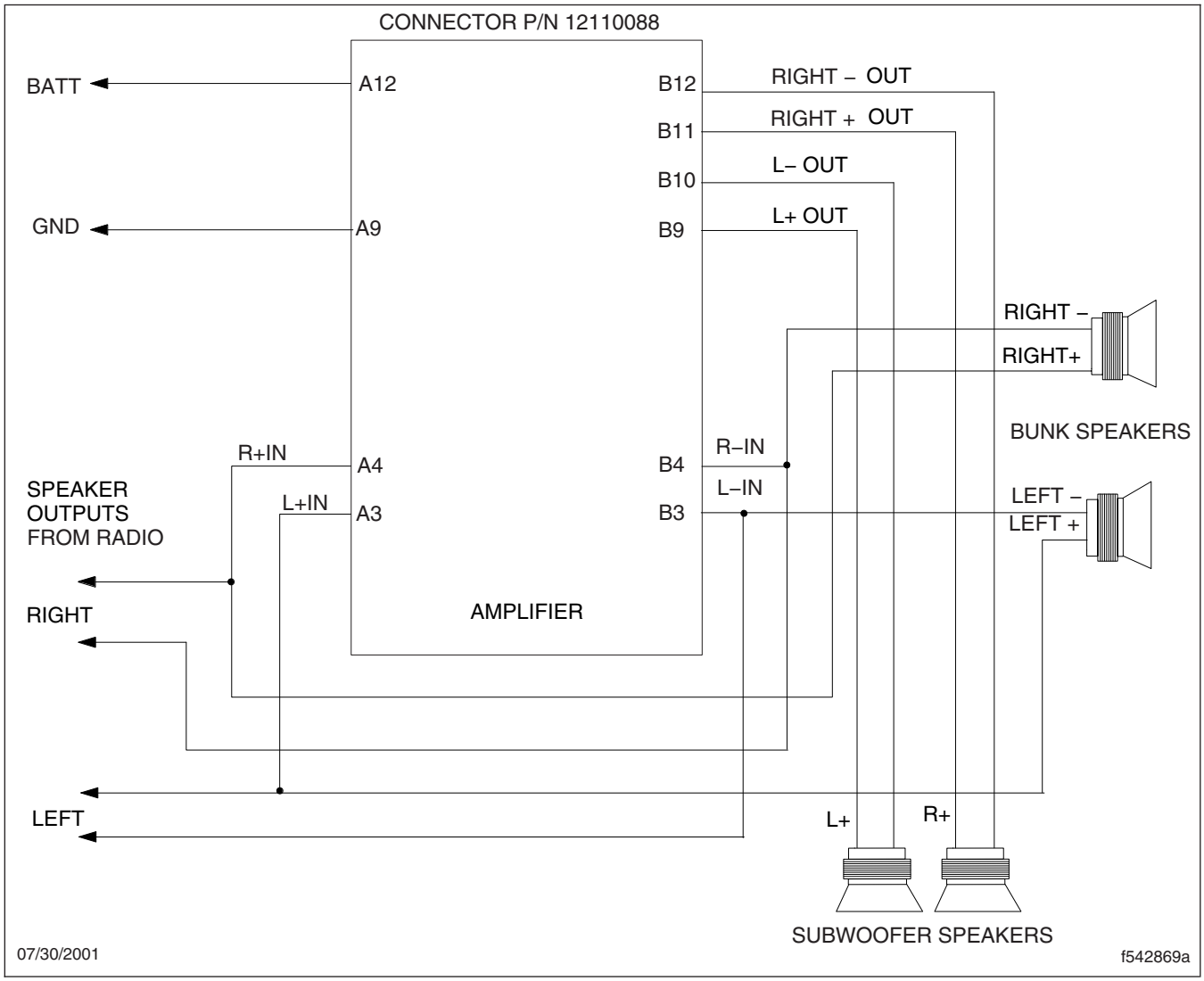
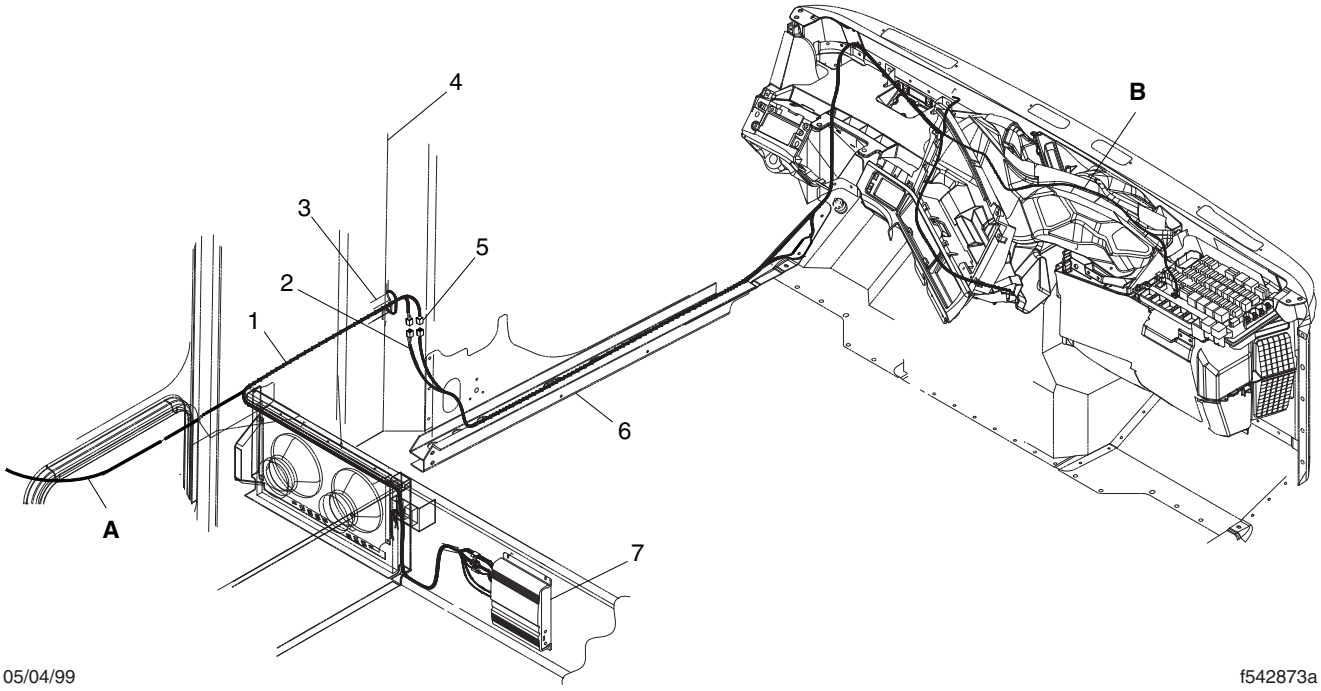


Fig. 13, Amplifier Wiring Diagram

Freightliner Service Bulletin

> FLA COE
> FLB COE
> FLD Conventional
> Business Class
> FLC 112 Conventional
> Century Class Conventional
> Argosy
> Cargo
> Columbia
> Coronado
> Business Class M2
> Cascadia
> 108SD/114SD
> New Cascadia



A. To the Rear Speakers Auxiliary Volume Control
B. To the PDM
1. Bunk Amplifier Harness
2. Main Cab Amplifier Harness
3. Sidewall Wire Trough
4. B-Pillar
5. Amplifier Power Harness Connection
6. Outer Side-Sill
7. Speaker Amplifier

Fig. 14, Rear Speaker Harness Routing

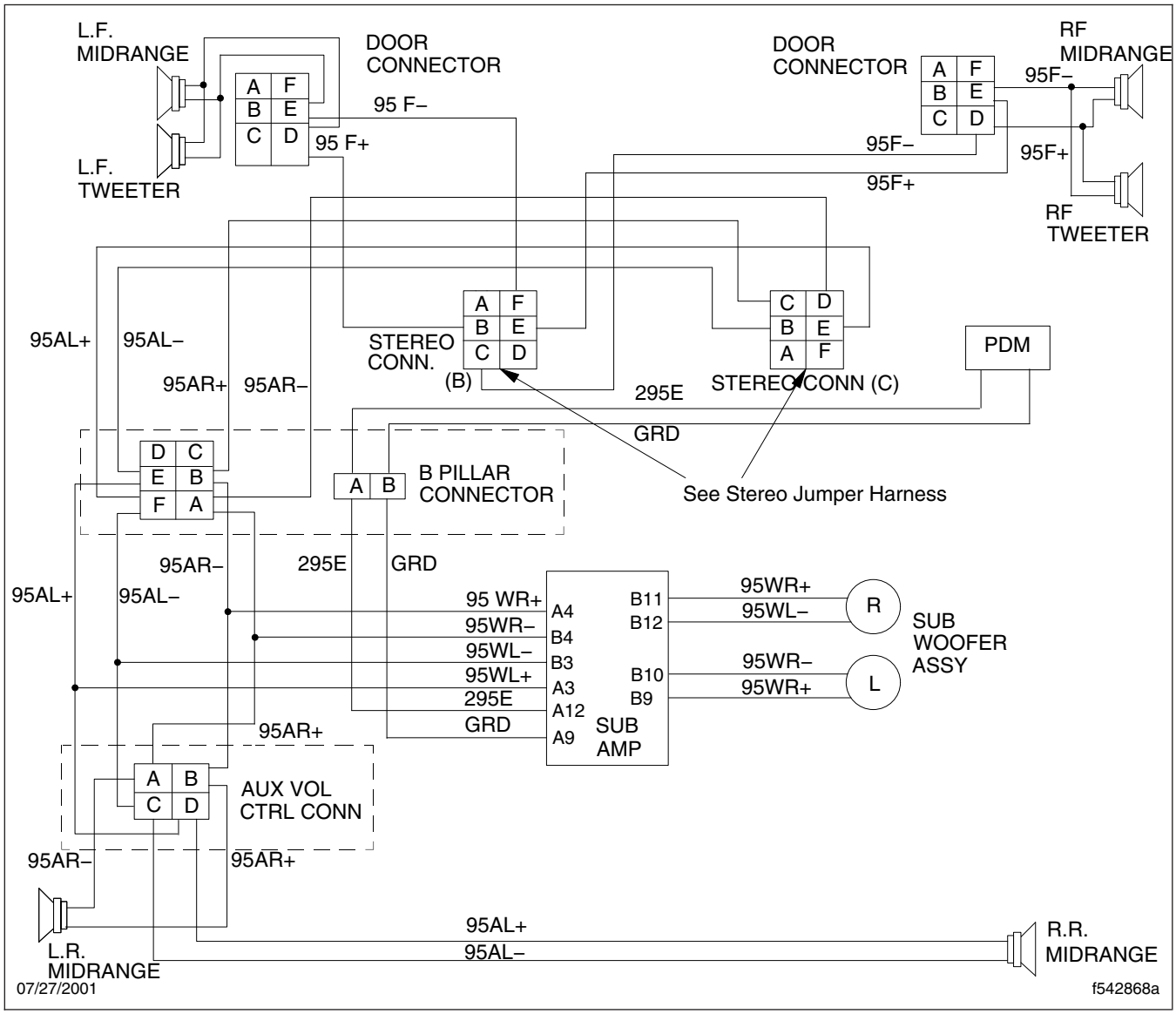


Fig. 15, Stereo System Wiring Diagram

CD Player Diagnostics

CD Player Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
1	Verify the problem with the CD player. Insert a CD in to the player to determine the problem with the CD player. What is the problem with the CD player?	The CD Player Skips or Mutes	Go to step 2.
		Unwanted CD Ejection	If the CD continues to eject before the CD is finished player, replace the radio/CD player.
2	Check the CD player operation with a known good CD. Use an audio CD known to function properly in another CD player. Inspect the data surface (the side opposite the label) for scratches, fingerprints, or other evidence of damage. Only a CD free of scratches and damage should be used. Does the the CD player continue to skip or mute?	Yes	Replace the radio/CD player.
		No	No action required.

Table 14, CD Player Diagnostics

CD Changer Diagnostics

CD Changer Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
1	Verify operation of the CD changer. Place CDs in the changer, and test the operation of the changer. Does the CD changer skip?	Yes	Go to step 2.
		No	Go to step 4.
2	Check the CD changer damper setting. The CD changer is equipped with a damping system with three settings: Vertical, Horizontal, and 45 degree angle. The adjustments for the setting are located on each side of the CD changer. The positions are labeled V, H, and 45. The damper must be set to the position that matches the orientation of the CD changer. Is the damper setting correct for the installation?	Yes	Go to step 3.
		No	Set the damper to match the changer installation position.

CD Changer Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
3	Check whether or not the CD changer continues to skip or mute. Check whether the CD changer skips or mutes when using a known good CD. Use an audio CD known to function properly in another CD player. Inspect the data surface (the side opposite the label) for scratches, fingerprints, or other evidence of damage. Use only a CD free of scratches and damage. Does the CD changer continue to skip or mute?	Yes	Replace the CD changer.
		No	No action required.
4	Verify that the CD changer can eject. Attempt to eject the CD changer. Will the CD changer eject?	Yes	Go to step 5.
		No	Check for power to the CD changer. See **Fig. 16**. Use a known good ground and check Pin 15 at the B connector for battery voltage. The B-connector plugs into the CD changer.
5	Check for battery voltage at the CD changer. Is battery voltage present?	Yes	Go to step 6.
		No	Go to step 7.
6	Check the ground at the CD changer. Make sure the power to the stereo is off. Check the resistance between the ground wire (pin 13 of connector B) of the CD changer connector, and a known good ground. See **Fig. 16**. Is the ground circuit OK? Is battery voltage present?	Yes	Replace the CD changer.
		No	Repair the CD changer ground circuit.
7	Check for voltage output from the stereo. Check at pin 31 of the A connector for battery voltage. See **Fig. 16**. The A connector plugs in to the stereo.	Yes	Repair the CD changer power circuit.
		No	Replace the radio.
8	Verify that the speakers emit audio when a CD is played. When a CD is played, does sound come from the speakers?	Yes	No action necessary.
		No	Go to step 9.

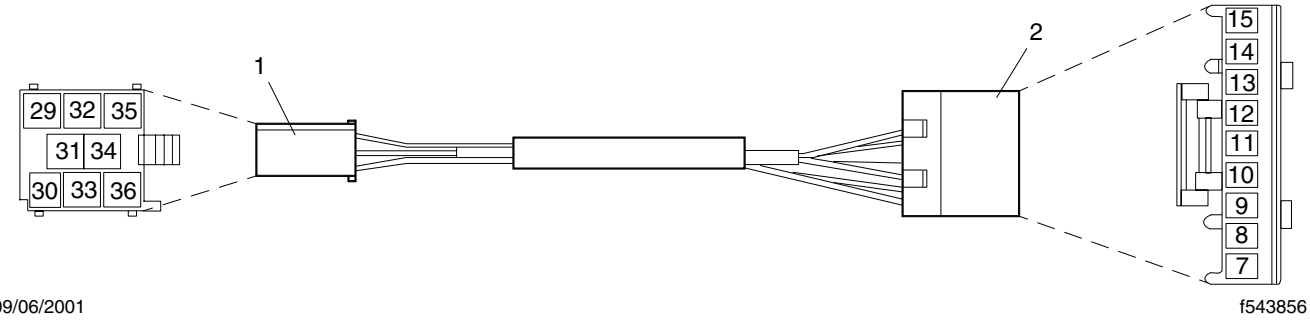
CD Changer Diagnostics			
Step	**Test Procedure**	**Test Result**	**Action**
9	Check for AC voltage. Check for AC voltage from pin 29 and 32 at the stereo end of the CD changer harness, and a known good ground. See **Fig. 16**. Check for AC voltage from pin 29 and 32 at the stereo end of the CD changer harness, and a known good ground. See **Fig. 16**. Check the voltage while a CD is playing. A counter will appear on the display to indicate that the disc is playing. AC voltage will vary. Is there AC voltage at both pins?	Yes	Replace the radio.
		No	Go to step 10.
10	Check for AC voltage at both pins. Remove pins 10 and 11 from the connector, then check the voltage while a CD is playing. Check for AC voltage between pins 10 and 11 at the CD changer end of the harness, and a known good ground. AC voltage will vary. Is there AC voltage at both pins?	Yes	Repair or replace the CD changer harness.
		No	Replace the CD changer.

Table 15, CD Changer Diagnostics

NOTE: See **Table 16** for CD changer wiring harness connector pinout information.

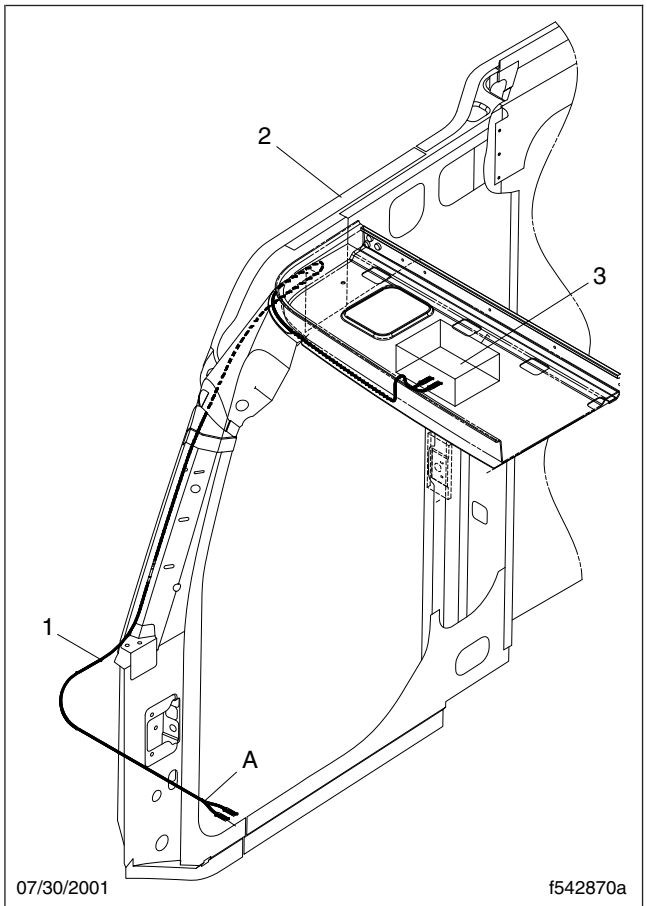
CD Changer Wiring Harness Connectors			
Connector A, 8-Pin	**Wire Color**	**Circuit Description**	**Connector B, 9-Pin**
—	—	—	7
—	—	—	8
—	—	Shield Guard	9
32	White	Right Audio	10
29	Yellow	Left Audio	11
35	Gray	Audio Common	12
34	Black	Ground	13
30	Purple	E and C Data	14
31	Red	Battery	15

Table 16, CD Changer Wiring Harness Connectors



1. Connector A (viewed from the terminal end)
2. Connector B (viewed from the wire end)

Fig. 16, CD Changer Wiring Harness



A. Route along main dash harness channel to radio.
1. CD Changer Harness
2. Overhead Storage Liner
3. CD Changer

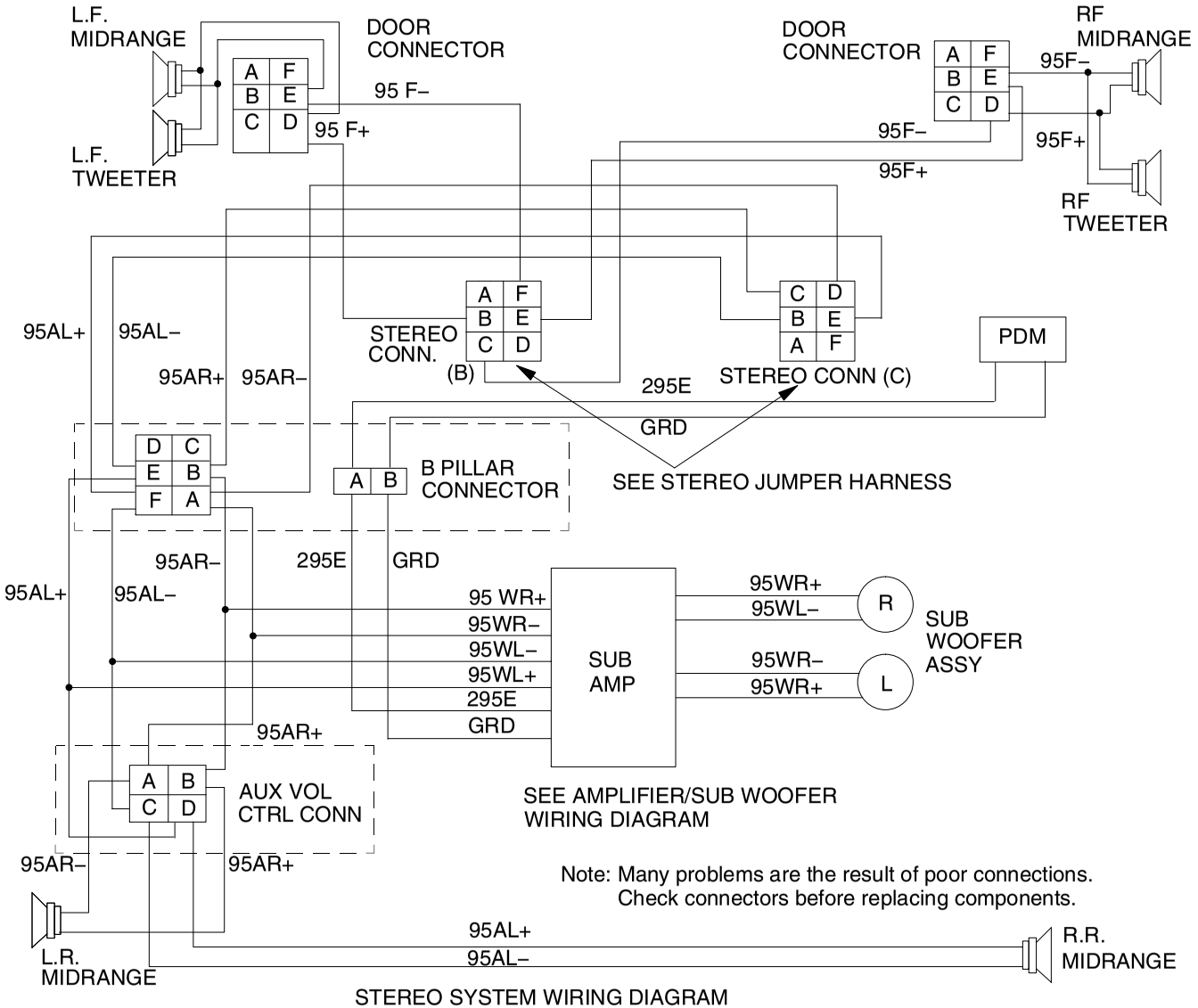
Fig. 17, CD Changer Harness Routing

Warranty

This is an informational bulletin only; warranty does not apply.

Attachment (Quick Reference Sheets)

See attached Quick Reference Sheets **Stereo System Wiring Diagram** and **Troubleshooting Symptoms**.



STEREO SYSTEM WIRING DIAGRAM

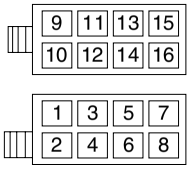
08/03/2001

f542868b

Symptom:	Possible Cause:
Poor Reception	• Poor ground between antenna and radio. • Improper coax cable, incorrect cable routing, loose connections, or faulty coax cable. • High resistance in radio ground circuit. • Non–OEM antenna installed. • Faulty multiplexer (RAMI antenna only). • Weak radio signal in area where poor reception occurs. • Faulty antenna. • Faulty radio.
Radio Does Not Turn On (OR Turns On Then Quickly Turns Off)	• Faulty circuit breaker or wiring supplying voltage to the radio. • Faulty radio ground circuit. • Faulty radio.
Front Speaker(s) Not Working	• Faulty speaker wiring (open or shorted together). • Faulty Speaker. • Faulty radio.
Rear Speaker(s) Not Working	• Faulty speaker wiring (open or shorted together). • Faulty Speaker. • Faulty auxiliary volume control. • Faulty radio.
All Speakers Not Working	• Speaker lead(s) shorted to ground. If a fault is found, give the radio ample time to cool and restore audio output. • Faulty radio.
Subwoofer(s) Not Working	• Faulty circuit breaker or wiring supplying voltage to amplifier. • Faulty speaker leads. • Faulty Speaker. • Faulty rear speaker audio input wiring to amplifier. • Faulty amplifier. • Faulty radio.
CD Changer Skips	• Incorrect damping setting for mounting location. • Faulty CD or CD changer.
"Comm Error" Message	• Faulty E&C data wiring. • Faulty radio. • Faulty CD changer.
"No CDX" Message	• CD changer harness not plugged in properly. • No power to CD changer from radio. • Faulty CD changer ground circuit. • Faulty radio. • Faulty CD changer.
"Focus" Message	CD inserted upside–down in CD changer. • Condensation on CD. • Faulty CD changer.

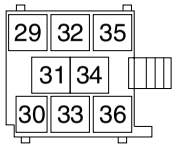
Symptom:	Possible Cause:
"No CD" Message	• No CD in CD changer. • Faulty CD changer.
CD Changer Does Not Eject OR Does Not Initialize When the CD is Reinstalled	• No power to CD changer from radio. • Faulty CD changer ground circuit. • Faulty radio. • Faulty CD changer.
CD Player Ejects Unexpectedly	• CD has played all the way through. • Faulty CD player if CD ejects • immediately after inserting.
CD Player Skips OR Mutes	• Faulty CD. • Faulty CD player.
"ERR" Message	• Faulty CD. • CD too cold, condensation forms.
"Load" Message	• Faulty CD player.
"Tracking" Message	• CD inserted upside–down. • Faulty CD player.
"Bad Tape" Message	• Faulty cassett tape. • Faulty cassett player.
"TP Clean" Message	• Cassette player requires cleaning.
Tape Plays Weak OR Slow	• Faulty cassett tape. • Cassette player requires cleaning. • Faulty cassett player.
Tape Player Inoperative OR Obstructed	• Faulty cassett tape. • Faulty cassett player. •

Circuit Tests:	Acceptable Range:
Speaker Resistance	3–10 Ω
Subwoofer Speaker Resistance	2–10 Ω
Front OR Rear Speaker Output Voltage (backprobing speaker outputs at back of radio connector with a blank station and comfortable volume)	0–1 VAC
E&C Databus Voltage	Variable VAC
Ground Voltage Drop (radio metal case to negative battery post with radio on)	0 to 0.25 VDC (Max)
Antenna cable resistance at back of radio (center pin to outer ring)	Greater than 10,000 Ohms
Antenna cable resistance at back of radio with radio ground disconnected (measured from metal case of radio to good ground)	Less than 0.2 Ohms
Coax cable resistance entire length (center pin to center pin)	0 to 3.5 Ohms (Max)



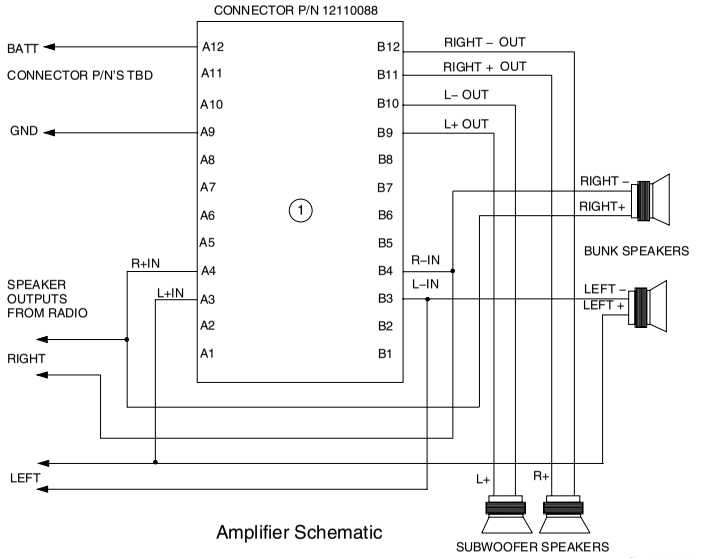
RADIO CONNECTOR
(VIEW TOWARD BACK OF RADIO)

Pin	Desc	Pin	Desc
1–3	Not Used	10	Right Rear Speaker –
4	+12V Ignition	11	Right Front Speaker +
5	Not Used	12	Right Front Speaker –
6	Dimmer Input	13	Left Front Speaker +
7	+12V Battery	14	Left Front Speaker –
8	Ground	15	Left Rear Speaker +
9	Right Rear Speaker +	16	Left Rear Speaker –



CD CHANGER RADIO CONNECTOR
(VIEW TOWARD BACK OF RADIO)

Pin	Desc
29	Left Audio
30	E & C Data (databus)
31	+12V Battery
32	Right Audio
33	Not Used
34	Ground
35	Audio Common
36	Not Used



Amplifier Schematic

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