

Technical Service Bulletin



91 HD radio technology overview for troubleshooting complaints

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Model(s)	Year	VIN Range	Vehicle-Specific Equipment
All	2010 - 2017	All	With HD radio

Condition

REVISION HISTORY		
Revision	Date	Purpose
5	-	Revised header data (Added model years) Revised <i>Technical Background</i> (Added information about radio text information)
4	7/10/2012	Revised header data (Added model year 2013)
3	10/5/2011	Revised header data (Added new A6)

This Technical Bulletin provides an overview of HD Radio technology and terminology. The following questions are addressed.

- What is HD radio?
- What is HD radio “multicasting” (HD2, HD3, etc.)?
- What is the technology behind the digital HD radio signal?
- Can HD radio be turned off?
- What is “blending”?
- What is audio level “alignment” and “misalignment”?
- What can affect HD radio reception?
- Why does the radio text information not show at times?

Technical Background

HD radio technology was developed by *iBiquity Digital Corporation*. They hold the HD radio patent and are responsible for providing licenses to radio stations nationwide to allow the stations to broadcast with HD radio technology.

What is HD radio?

HD radio is a digital rebroadcast of the same analog signal content coming from the source radio station and applies to HD 1 only. HD radio signals can be found on both AM and FM bands.

- AM stations broadcasting with HD radio technology will have the same or similar sound quality as an analog FM broadcast.
- FM stations broadcasting in HD radio technology will have the same or similar sound quality as a retail-purchased CD (burned CD sound quality can vary).

What is HD radio “multicasting” (HD2, HD3, etc.)?

Multicasting is when a radio station provides a digital only sub-station on HD2, HD3, etc. (Figure 1).

- There is no duplicate analog station for these multicast stations.
- FM station providers are able to offer this additional content because the digital conversion of the normal analog signal opens up a larger amount of available bandwidth.



Figure 1. Display of HD Radio station using multicasting.

What is the technology behind the digital HD radio signal?

- A digital HD radio signal is transmitted along with the analog signal, but is broadcasted at reduced signal strength. The two signals are overlaid with each other and sent at the same time.
- A digital HD radio signal area of coverage is approximately 90% of the area of coverage for the analog signal. The area of coverage can be affected by the environmental conditions and it is not a uniform area of coverage.

Can HD radio be turned off?

- The user can control whether or not the HD radio stations are shown in the MMI by turning the feature on or off in the Radio Settings or in the Setup menu of the MMI.
- Refer to TSB 2026657 for additional information regarding the effect of stored HD radio presets on this setting.

What is “blending”?

Blending is the switching back and forth of the analog and HD radio digital signals and is considered a normal condition. Blending will occur more frequently when the vehicle is driven in and around the fringe area of reception for the digital signal.

- Blending only takes place when the vehicle is driven in and out of the HD radio digital signal coverage area.

- Blending produces a change in sound, tone, and quality that can lead to customer complaints.
- Blending only occurs on the main HD1 station.
- Blending does not occur on the multicast sub-stations of HD2, HD3, etc. because there is no analog back-up for this programming. Instead, the audio will be muted when outside the area of coverage.

What are audio level “alignment” and “misalignment”?

- Audio level alignment is the syncing of the digital HD radio signal and analog signal. It is designed to make the blending process smooth.
- Misalignment is when the digital and analog signals are out of sync.
 - Echoing (which sounds like a time delay between the two signals) can occur during misalignment.
 - The volume level can change up or down when misalignment occurs. This happens during the switch between analog and digital signals. The radio station broadcasting the content is responsible for the alignment of the digital HD radio signal and analog signal audio levels.
 - Complaints caused by misalignment are not a vehicle issue and replacing parts will not resolve the concern. Report any of the above alignment conditions to the respective local radio station.

What can affect HD radio reception?

The reception of a digital HD radio can be interrupted when the vehicle is driven near high terrain, high buildings, bridges, tunnels, etc.

Why does the radio text information not show at times?

- The radio text information is digitally encoded in the digital broadcast. Occasionally, due to low signal strength, the radio text information may not be available in the “Now Playing” or main radio screen.
- The radio text information is controlled by the radio broadcast station, and it is possible that the broadcaster is not sending data or is sending invalid data.
- The radio text is automatically updated when new information is received. This may create a customer complaint of the radio text being incorrect because the radio will retain the older radio text information until new data is received.
- HD radio text information is not updated in the “Presets” menu. However, radio text can be seen in the “Presets” menu if the data was previously updated in the main radio menu because the data shown is the data that was last available in the main radio menu. To update the radio text information, the customer must navigate back to the main radio menu and allow the radio text to update before going back to the “Presets” menu. The “Presets” menu was not designed to be the main view for operating the radio.

Production Solution

Not applicable.

Service

- See the attached troubleshooting guide to aid in diagnosis.
- Contact the Technical Assistance Center if the troubleshooting guide does not help resolve issues with HD radio.
- To learn more about HD radio, visit <http://www.hdradio.com/>.
- Report station issues at: <https://www.ibiquity.com/which-station-are-you-tuning>

Warranty

This TSB is informational only and not applicable to any Audi warranty.

Additional Information

The following Technical Service Bulletin(s) may be necessary to complete this procedure:

- TSB 2026657, *HD radio presets*.

All parts and service references provided in this TSB (2026657) are subject to change and/or removal. Always check with your Parts Department and service manuals for the latest information.

Troubleshooting Guide for HD Radio Technology

Condition	Cause	Action Required
SOUND		
Delay in digital audio on HD1	Radio acquires analog station first and blends to digital signal.	This is intended behavior
Audio skip, stutter, or echo	Radio station has not properly aligned digital and analog audio.	Verify correct operation on another station. Report station with poor performance
Volume changing up/down	Radio station has not properly aligned digital and analog audio level.	Verify correct operation on another station, check www.hdradio.com for stations in the area. Report station with poor performance.
Sound fading in and out	Transition between Analog and Digital is taking place (Blending).	Verify transition performance on several stations in area. Report stations with poor alignment (Time / Volume).
Sound drops completely when on an HD2 or HD3 channel	Digital signal has been lost. This could be due to location (near edge or out of coverage area), or obstructions (terrain, buildings, bridges, etc). Station has gone off air.	Muting is intended behavior, as there is no analog back up on these channels. Verify correct operation on another station. (Correct operation - digital reception) Report station issue
Excessive blending (Transition between Analog and Digital)	Receiver is located near the edge of the digital coverage area.	Refer to hdradio.com to verify radio stations in your coverage area. Refer to owners manual for instructions to disable digital audio.
Delay in sound when accessing preset HD2/HD3	There is no analog signal available on the HD2/HD3 channels. Therefore there is a short delay while decoding the digital audio. Audio will begin playing when available. The HD2/HD3 channel is not currently available.	Verify correct operation on another station. Report station issue.
Digital audio not better than analog audio	Audio processing on the digital audio at station can potentially decrease digital audio sound quality. The addition of HD2/HD3 channels can lower the sound quality of the digital programming.	Verify correct operation on another station. Report station with poor performance. Verify correct operation on another station.
FUNCTIONAL		
Why do I keep losing my local stations?	Digital coverage is slightly less than the analog signal coverage. Shadowing (Urban / Terrain) can cause reduced digital coverage.	Verify correct operation on another station. This is expected behavior. Verify correct operation on another station.
Some data fields are blank	Text information is sent at the broadcaster's discretion.	Verify correct operation on another station. Report station issue.
Text information does not match the current audio	Station is not sending the correct information.	Verify correct operation on another station. Report station issue.
Why does my station name change when it goes to digital?	Station names are included in the HD Radio broadcast. However, other naming systems can be in use on the radio.	Refer to owners manual for enabling/disabling information displays.
Text information is truncated / appears to be more available	The display is limited to a fixed number of characters and more data is being sent than can be shown.	This is intended behavior. Refer to owners manual for ability to access addition text.
Can not access digital HD2/HD3 channels	HD Radio function is turned off. Broadcaster's digital signal is off the air. Station is only broadcasting HD1 in digital, there are no HD2/HD3 channels. User does not understand digital tuning.	Enable HD Radio, refer to owners manual. Verify correct operation on another station. Report station issue. This is intended behavior. Refer to owners manual for proper HD Radio operation.
HD2/HD3 indicator shown but no audio on station	Radio station technical issue.	Verify correct operation on another station. Report station issue.
Radio changes channel on its own	Radio is set to revert to main channel after extended loss of HD2/HD3 broadcast.	This is intended behavior.
AM reception changes at night	AM stations are required by the government (FCC) to lower their power at night.	This is intended behavior.
FAQ		
How much do the digital stations cost?		Once you purchase an HD Radio equipped vehicle or receiver there is no cost to listen to new and exciting, crystal clear digital audio being sent by your local broadcasters.
How do I go to my free digital stations?		Simply tune to your favorite station, if the station is broadcasting with HD Radio technology, then the radio will automatically pick up the digital signal, and begin playing the crystal clear, subscription free audio. Refer to your owners manual to determine how your particular receiver indicates HD Radio reception and how to transition from the main program to the multicast program(s).
Can I preset HD2 and HD3 channels?		Refer to Owners Manual to determine if your specific receiver allows this function.
Why don't I get multicasting on AM		The lower frequency of AM radio reduces the total available bandwidth. This reduces the total available amount of digital information that can be sent. On AM only enough information to make one audio stream sound great is available, unlike FM where there is enough for 2 or 3 separate audio streams.