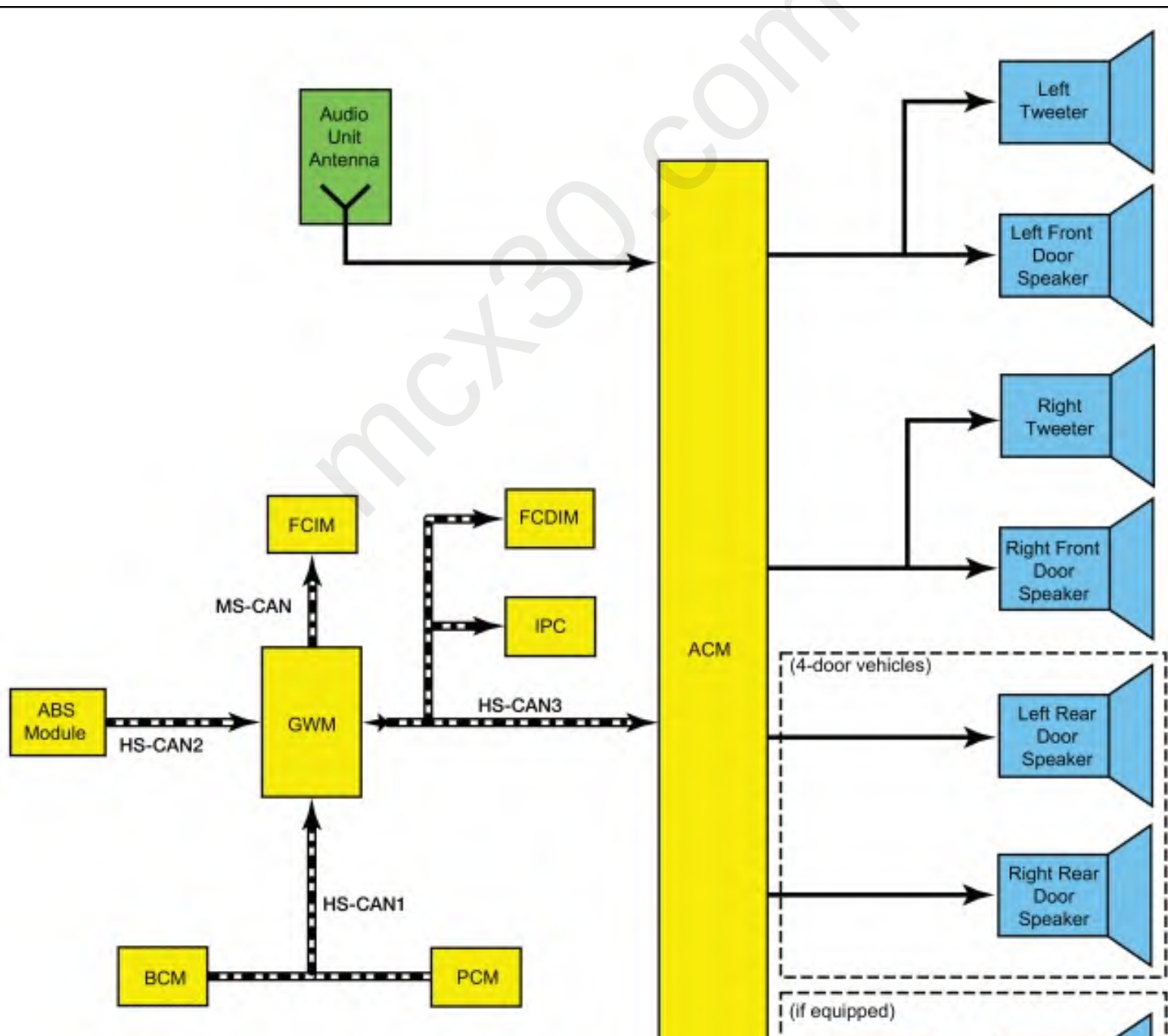
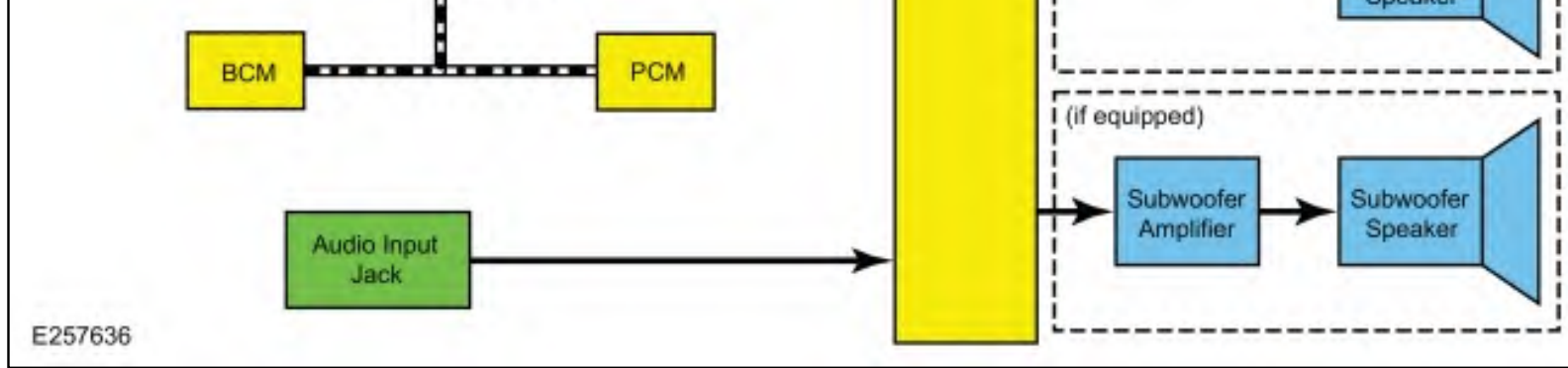


Information and Entertainment System - System Operation and Component Description

System Operation

System Diagram





Network Message Chart

A missing network message is indicated by a U-code DTC and can be the result of intermittent concerns such as damaged wiring or low battery voltage occurrences. Additionally, vehicle repair procedures such as module reprogramming can set these Diagnostic Trouble Codes (DTCs). When a missing message DTC (U-code) sets, it is important to look for symptoms present in the audio system and throughout the vehicle, and to review the complete message list to determine which other modules rely on the same message.

Refer to: Communications Network (418-00 Module Communications Network) .

See CAN Multiplex Messages.

When the other modules have been identified, run the self-test for those modules. If the same message is missing from those modules, the identical, or similar lost communication Diagnostic Trouble Codes (DTCs) may be set in those modules. Confirmation of missing messages common to multiple modules can indicate that the originating module is the source of the concern, or that the communication network may be at fault.

It is very important to understand the following:

- Where the input originates
- All of the information necessary for a feature to operate
- Which module(s) receive(s) the input or command message
- Which module controls the output of the feature
- If the module that receives the input controls the output of the feature, or whether it outputs a message over the CAN to another module.

ACM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Battery saver status	BCM	Used to disable the functionality of the ACM due to the load shedding feature.
Chime request	IPC	Used to control the priority, characteristics, volume, and speaker output of the warning chime tones played through the audio system speakers.

Chime source	IPC	Used to set the audio system or IPC as the source for the chime tones.
Day/night status	BCM	Used to adjust the AM radio reception sensitivity when using the seek button.
FCIM button state	FCIM	Used to indicate when a button is pressed on the FCIM so the audio system can make the desired setting change.
Ignition status	BCM	Used to indicate the ignition state (OFF, ACCESSORY, CRANK, RUN, and START) required for ACM operating modes.
Vehicle configuration data	BCM	Used to verify vehicle configuration data such as the VIN and system module configuration.
Vehicle speed	PCM	Used for the speed compensated volume function.

FCDIM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
ACM configuration	ACM	Used to verify that the correct configuration and modules are installed.
Audio status	ACM	Used to display the audio information on the FCDIM.
Date and time	BCM	Used to display the current date and time on the FCDIM.
Display language selection	IPC	Used to display information on the FCDIM in the selected language.
Ignition status	BCM	Used to indicate the ignition state (OFF, ACCESSORY, RUN, and START) required for FCDIM operating modes.
Illumination dimming level	BCM	Used to control the backlight intensity of the FCDIM based on the dimmer switch input.
Radio broadcast band selection	ACM	Used to display the selected radio tuner band on the FCDIM.
Transport Mode	BCM	Used to disable the functionality of the FCDIM until taken out of transport mode.
Vehicle configuration/information	BCM	Used to send vehicle configuration information to the FCDIM.

FCIM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Ignition status	BCM	Used to indicate the ignition state (OFF, ACCESSORY, RUN, and START) required for FCIM operating modes.
Illumination dimming level	BCM	Used for day/night illumination status for the FCIM.
Power mode	BCM	Used to disable the functionality of the FCIM due to the load shedding feature.
Vehicle configuration data	BCM	Used to verify vehicle configuration data such as the VIN and system module configuration.

IPC Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Audio source selection	ACM	Used to display the selected audio source on the IPC.

Accessory Delay Feature

The accessory delay feature is a BCM -controlled-function that allows the audio system to be operated for a preset period of time after the ignition is turned off and a front door has not been opened.

AM/ FM Radio

The AM/ FM fender-mounted antenna receives analog radio waves and sends them through the AM/ FM antenna coaxial cable to the ACM. The radio waves are converted into fluctuating AC voltage and sent as left and right analog audio signals to the speakers.

Audio Extended Play (if equipped)

This software feature allows the audio system to operate with the ignition OFF, regardless of door latch position. When the power button on the FCIM is pressed, audio system functionality is enabled and remains active for a period of 20-60 minutes, depending on configuration settings. Audio extended play does not function if the battery load shed is active. To turn the audio system off, press the FCIM power button.

Audio Input Jack Mode

When a portable audio device, such as an iPod® with its available cable, is connected to the vehicle audio system

through the audio input jack, audio from the device can be played through the vehicle speakers. Only the volume can be controlled by the vehicle audio controls. All other functions such as seek, fast forward, pause, etc. must be carried out on the device itself.

No metadata (information such as artist, album title, song title, and genre) is transferred when a device is connected to the audio input jack.

Battery Load Shed

The BCM uses the battery current sensor to monitor the battery state of charge. The battery current sensor is attached to the battery ground cable. With the ignition in RUN, ACC, or OFF, a load shed message is sent over the CAN when the BCM determines that the battery state of charge is below 40%, 45 minutes have elapsed, or 10% of the charge has been drained. This message turns off the audio system to save the remaining battery charge. Under this condition, "Battery Saver - System Off" is displayed on the center stack infotainment display to notify the driver that battery protection actions are active. To clear the load shed state, start the vehicle.

Chimes

Various vehicle systems send chime requests over the CAN to the IPC. The following are determined as the IPC processes these requests:

- Chime characteristics (tone, tone length, number of repetitions, time between tones, etc.)
- Chime output volume
- Priority of the chime request
- Which speakers to play the specific chime

The IPC sends the processed requests over the CAN to the ACM. The ACM outputs the left and right analog chime tones to the appropriate audio system speakers as fluctuating AC voltage.

For additional information on chimes, Refer to: Instrumentation, Message Center and Warning Chimes (413-01 Instrumentation, Message Center and Warning Chimes) .

RDS

RDS allows metadata (information such as station call letters, artist, song title, and genre) to be contained within FM radio waves. If the RDS feature is turned on, a program type can be chosen. Once the program type is chosen (such as Sports, Rock, Religious Music or Weather), the ACM only tunes channels within the selected category when the SEEK or SCAN button is pressed. If a channel within the selected category is not found, the ACM continually seeks or scans.

Speed Compensated Volume

The ACM compensates for wind and road noise by adjusting the audio system volume based on the VSS signal and the speed volume setting.

Component Description

Antenna

The AM/ FM radio uses the fixed-mast fender-mounted AM/ FM antenna to receive analog radio waves. The radio waves are sent through the AM/ FM antenna coaxial cable to the ACM, where they are amplified.

Audio Input Jack

The audio input jack can be used to play audio files from an audio device connected through the 1/8-inch (3.5 mm) audio jack.

Audio signals are sent from the audio input jack to the ACM.

There are no power or ground circuits to the audio input jack.

FCDIM

The FCDIM displays infotainment data received from various modules over the CAN. If the FCDIM loses the signal from any of these modules, only those specific displays are inoperative. For more information, Refer to: Information and Entertainment System (415-00 Information and Entertainment System - General Information - Vehicles Without: SYNC) .
See Module Network Input Messages - FCDIM.

The FCDIM requires PMI when it is replaced.

FCIM

The FCIM audio system buttons provide one of the methods to interact with the infotainment system.

The FCIM is separate from the ACM.

The FCIM requires PMI when it is replaced.

Noise Suppression Equipment

The radio frequency suppression equipment reduces interference transmitted through the speakers by the engine, ignition, and electrical systems. When installing any new radio suppression equipment components, make sure that a good contact is made at all connections.

Subwoofer Speaker and Amplifier (if equipped)

The subwoofer speaker and subwoofer enclosure are serviced as an assembly. The subwoofer amplifier is serviced separately.

The ACM outputs voltage through the enable circuit to enable the subwoofer amplifier. The ACM also uses this circuit to detect an amplifier overload condition. In the event of an amplifier overload, the subwoofer amplifier modifies the voltage signal from the ACM to increase the voltage on the enable circuit to a higher level than provided by the ACM. This higher voltage level causes the ACM to momentarily reduce the audio levels on the audio output channels to the subwoofer amplifier to prevent clipping and subwoofer speaker damage.

The subwoofer amplifier receives audio signals from the ACM in the form of fluctuating AC voltage. The subwoofer amplifier processes and amplifies these inputs and sends analog audio signals to the subwoofer speaker as fluctuating AC voltage.

ACM

The ACM receives radio waves containing audio from the antenna coaxial cable and converts them into fluctuating AC voltage. The ACM processes these inputs, and sends stereo analog audio signals to the speakers as fluctuating AC voltage.

The ACM requires PMI when it is replaced

BCM

The BCM contains the clock software and sends the date/time data information to other modules via the CAN.

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