

When the voice steering wheel switch is pressed, an audible prompt originating from the APIM is heard from the speakers. Based on the customer's setting, audible prompts will either be a voice or a simple tone. When interaction mode is set to standard, detailed voice guidance is provided. When interaction mode is set to advanced, most prompts are tones only, and minimal voice guidance is provided. The microphone receives the voice commands and sends them to the APIM. Refer to the Owner's Literature for more information on voice recognition.

DESCRIPTION AND OPERATION > INFORMATION AND ENTERTAINMENT SYSTEM - SYSTEM OPERATION AND COMPONENT DESCRIPTION > COMPONENT DESCRIPTION

ACM

The ACM can be operated with the ignition in RUN, ACC, or OFF.

The ACM receives radio waves containing audio from the antenna coaxial cables and converts them into fluctuating AC voltage. The ACM receives stereo audio signals from the APIM in the form of fluctuating AC voltage. The ACM processes all inputs, and sends stereo analog audio signals to the audio DSP module as fluctuating AC voltage. The audio DSP module processes the audio signals and sends them to the speakers as fluctuating AC voltage.

The ACM receives radio waves containing satellite radio and HD Radio ® data through the antenna coaxial cables. The data is sent to be displayed on the centerstack infotainment display.

The ACM contains the DACMC for vehicles with the 2.7L or 3.5L.

The ACM and DACMC require separate PMI procedures when the ACM is replaced.

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. The ACM transmits these radio waves to the audio DSP module where they are amplified.

The HD Radio ® uses the fixed-mast fender-mounted AM/ FM antenna to receive radio waves containing digital audio and data. The radio waves are sent through the AM/ FM antenna coaxial cable to the HD Radio ® receiver built into the ACM. The radio waves containing digital audio are amplified to improve reception.

The satellite radio uses the roof-mounted satellite radio antenna to receive signals containing digital audio and data. These signals are sent through the satellite radio antenna coaxial cable to the satellite radio receiver built into the ACM.

APIM

The APIM can be operated with the ignition in RUN, ACC, or OFF.

The APIM receives stereo and mono inputs. Stereo inputs include audio from the USB ports, SD card slot, audio input jack, and connected Bluetooth media device. Mono inputs include audio from the outside device during a phone call and inputs from the SYNC ® microphone.

The APIM sends stereo audio signals to the ACM and mono audio signals to the audio DSP module as fluctuating AC voltage. Stereo outputs include audio from the USB ports, SD card slot, audio input jack,

connected Bluetooth media device, ringback tone, outside device during a phone call, and voice or tone prompts initiated from the steering wheel switches. Mono outputs include audio from the TTS feature, incoming call ringtone, voice or tone prompts initiated from the infotainment centerstack, route guidance voice or tone prompts (if equipped with Navigation or SYNC ® Services), and SYNC ® system instructions.

The TTS setting allows the customer to hear incoming caller information and incoming text messages through the audio system speakers so it does not have to be read from the centerstack infotainment display and/or device while driving.

The APIM consists of two internal modules: the CIP and the VIP. The modules are not replaceable individually, but can be programmed independently if required.

The CIP interfaces with all of the customer inputs to the APIM. It contains an analog-to-digital-to-analog converter, as well as the Bluetooth chipset. Any Application upgrades that are available to the customer are loaded directly to the CIP through the USB port.

The VIP provides an interface between the CIP and the vehicle inputs. Its main functions are controlling the APIM power management and translating inbound and outbound CAN signals. In addition, the VIP queries the modules on the network to retrieve any DTCs when a Vehicle Health Report is requested.

The Touchscreen Calibration must be performed every time the APIM is separated from the FDIM.

The APIM requires programming when it is replaced.

Audio DSP Module

The audio DSP module can be operated with the ignition in RUN, ACC, or OFF.

The audio DSP module enhances the input audio signal sound quality from the ACM.

The ACM outputs voltage through the enable circuit to enable the audio DSP module amplifier. When the ACM removes voltage from this circuit, the audio will be muted. When the ACM applies the correct amount of voltage to this circuit, the audio will be unmuted. In the event of an amplifier overload, the audio DSP module reduces audio levels on the left and right audio output channels to prevent clipping and speaker damage.

The audio DSP module receives stereo audio signals from the ACM in the form of fluctuating AC voltage. The audio DSP module processes and amplifies these inputs and sends left and right analog audio signals to the speakers as fluctuating AC voltage.

The audio DSP module receives mono audio signals from the APIM in the form of fluctuating AC voltage. The audio DSP module processes the audio signals and sends them to the speakers as fluctuating AC voltage.

When the engine is running, the audio DSP module receives the ESE frequency signal from the ACM in the form of fluctuating AC voltage. The audio DSP module sends the signal to the LHF and RHF door woofer speakers as fluctuating AC voltage. When the engine is running and the audio system is in use, the audio DSP module fluctuating AC voltage output signals to the LHF and RHF door woofer speakers as fluctuating AC voltage contain a mixture of the ESE frequency with the audio signals from the ACM or APIM.

The audio DSP module requires PMI when it is replaced.

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 APIM.

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

DACMC

The DACMC ESE functions only operate while the engine is running and all doors are closed.

The DACMC is a digital signal processor that consists of an internal analog/digital converter and tone generator.

The DACMC uses engine rotation speed data, engine torque data, and accelerator pedal position data from the PCM to calculate the targeted frequency needed to enhance engine noise within the passenger compartment. The DACMC ESE frequency signal is output by the ACM to the audio DSP module as fluctuating AC voltage. The audio DSP module sends the signal to the LHF and RHF door woofer speakers as fluctuating AC voltage.

The DACMC is contained within the ACM.

The DACMC and ACM require separate PMI procedures when the ACM is replaced.

FCIM

The FCIM audio functions can be operated with the ignition in RUN, ACC, or OFF.

The FCIM audio system buttons provide one of the methods with which the customer interacts with the infotainment system.

The FCIM is separate from the ACM.

The FCIM requires PMI when it is replaced.

FDIM

The FDIM can be operated with the ignition in RUN, ACC, or OFF.

The FDIM touchscreen provides one of the methods with which the customer interacts with the infotainment system.

The FDIM plugs directly into the APIM, and therefore does not communicate directly on any network, and no external circuits are connected.

The Touchscreen Calibration must be performed every time the FDIM is separated from the APIM.

GPSM

For vehicles equipped with SYNC Services ® or SIRIUS Data Services, the GPSM provides vehicle location information for real-time traffic reports and for traffic avoidance re-routing.

The GPS antenna integral to the GPSM is used to acquire the compass heading. The compass heading is sent over the CAN to be displayed on the centerstack infotainment display.

The GPSM provides vehicle location information for identifying the vehicle location in the event of a collision.

For vehicles with navigation, the GPSM acts as the antenna for the navigation system.

The GPSM requires PMI when it is replaced.

Media Hub

The media hub allows for various audio devices to play content through the vehicle speakers. The media hub contains:

- 2 USB ports
 - Data is sent from the USB ports to the APIM through the USB cable.
 - Although there are two USB ports, there is only one USB cable connecting the media hub to the APIM.
 - The USB ports are powered through circuits from the APIM, and can be used to power and/or charge a device if the device supports this feature. If the device does not support this feature, an external power source is needed in order to power the device.
- 1 SD card slot
 - SD card data is sent to the APIM through the USB cable.
- 1 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 APIM through the audio circuits.

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.

Steering Wheel Switches

The RH steering wheel switches contain series of resistors. Each steering wheel switch function corresponds with a specific resistance value within the switch.

The SCCM sends a 5-volt reference voltage to the RH steering wheel switches on the input circuit. When a switch is pressed, the voltage is routed through the corresponding resistor(s), through the return circuit, and then to ground through the SCCM. The SCCM monitors the resultant voltage drop to determine which switch was pressed. The voltage drop varies depending upon the resistance of the specific switch pressed.

The volume +/-, seek +/-, and audio mode steering wheel switch inputs are sent as network messages from the SCCM to the ACM to control audio functions.

The mute, voice, send/receive call, and end call steering wheel switch inputs are sent as network messages from the SCCM to the APIM to control SYNC ® functions.

SYNC ® Microphone

The SYNC ® microphone receives SYNC ® system voice commands and outgoing audio during a phone call. The monitored sounds are converted into analog signals by the microphone and sent to the APIM.