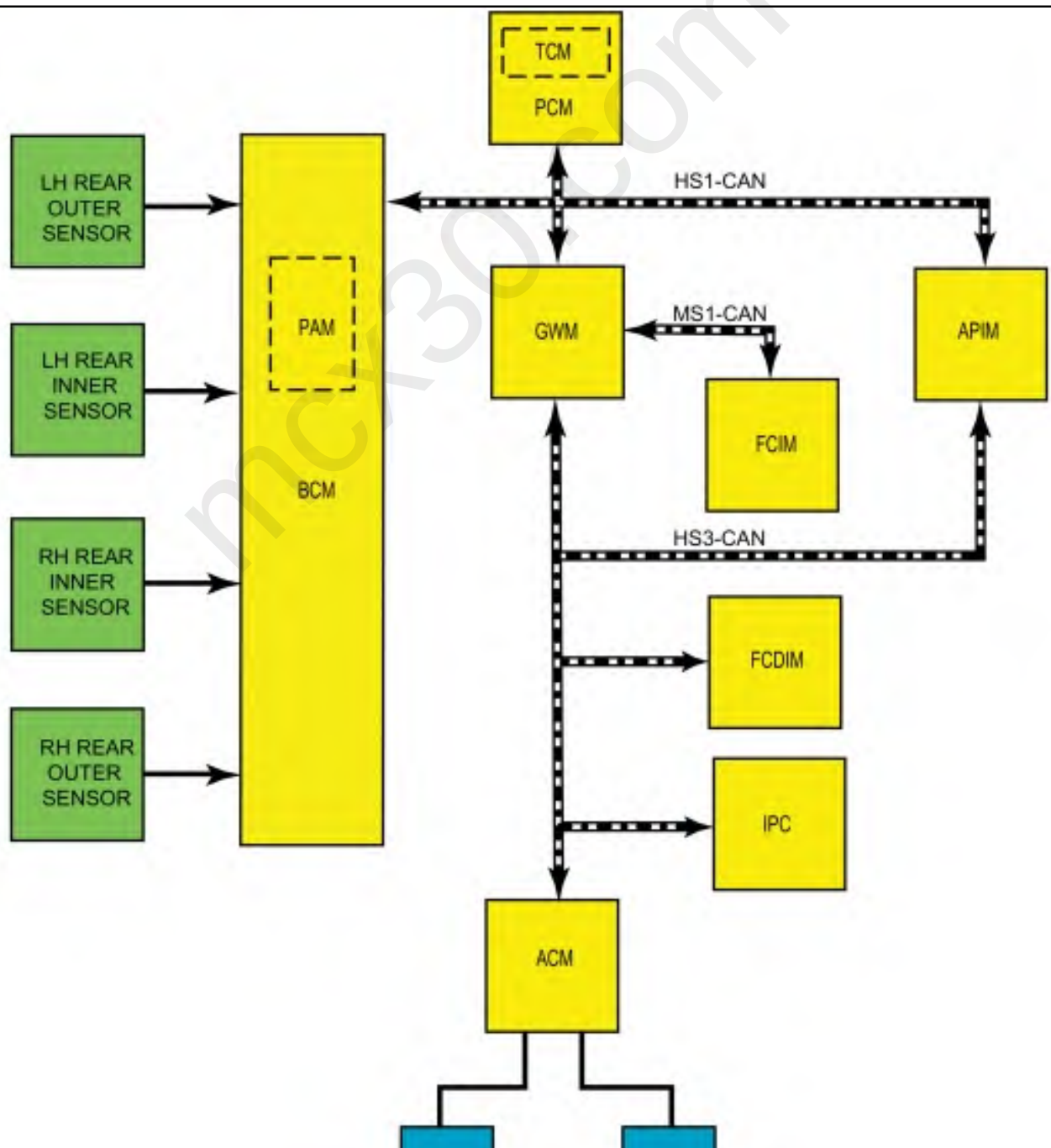


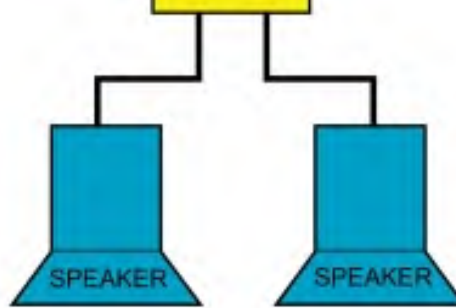
Parking Aid - System Operation and Component Description

System Operation

Parking Aid - Audible

System Diagram





E195199

Network Message Chart

PAM Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Parking Aid Mode Request	PAM	Used to generate a fault message in the IPC message center.
Parking Aid System Fault	APIM	Used to communicate parking aid mode requests.
Center Stack Display Configuration	FCDIM	Used to communicate center stack display configuration with the visual parking aid system.
Ignition key type	BCM	Used to disable the parking aid menus if a MyKey® is in use.
Outside air temperature	FCIM	Used to temperature compensate the parking aid sensor signal using HVAC Ambient Temperature input.
Power mode	BCM	Used to communicate the ignition switch state.
Parking aid enable status	IPC	Used to enable or disable the parking aid system.
Gear lever position	TCM (part of the PCM)	Used to enable the parking aid only when the gear lever is in reverse gear position.
Vehicle speed	PCM	Used to disable the parking aid if the vehicle speed exceeds the preset threshold.
Wheel counts	ABS module	Used to detect whether the vehicle is moving or in standstill.
Trailer connected status	TRM	Used to disable the rear parking aid when a trailer is electrically to the vehicle.

IPC Network Input Messages

Broadcast Message	Originating Module	Message Purpose
Parking aid tone request	PAM	Used to command parking aid warning tones through the audio system speakers.
Fault Status	PAM	Used to generate a fault message in the IPC.
Sector Zone Status	PAM	Used to command which sensors are displayed on the visual display.

Parking Aid System Operation

The rear parking aid system is activated by the PAM when the transmission is shifted into reverse. The PAM calculates the distance to an object within a 170 degree semicircular area (azimuth) around the rear of the vehicle. The parking aid system calculates the distance to an object around the rear of the vehicle using 4 ultrasonic sensors.

The rear outer parking aid sensors can detect objects approximately 60 cm (24 in) from the rear of the vehicle, or 30 cm (12 in) to the side of the rear bumper. The rear inner parking aid sensors can detect objects approximately 180 cm (71 in) from the rear of the vehicle. Objects must be at least 30 cm (12 in) above the ground to be detected by the parking aid system.

The rear sensors are only active when the transmission is in reverse (R), as the vehicle moves closer to the obstacle. The frequency of the audible warning increases. The warning sounds continuously when the obstacle is less than 30 cm (12 in) away. If a stationary or receding object is detected farther than 30 cm (12 in) from the side your vehicle the tone sounds for only three seconds. Once the system detects an object approaching, the warning sounds again.

The system detects certain objects while the transmission is in reverse (R) and the vehicle is:

- Moving toward a stationary object
- Not moving and a moving object is approaching the vehicle
- Moving and a moving object is approaching the vehicle

The parking aid system can be deactivated using the display menu, or the pop-up message displayed in the message center after the transmission is shifted into reverse gear. The parking aid system cannot be disabled in this manner if a MyKey® is in use. The parking aid system is disabled and cannot be activated on vehicles equipped with a trailer towing package whenever a trailer is electrically coupled to the vehicle.

Parking Aid Alert

When an object is detected by the parking aid system and the transmission is in reverse, the IPC performs an arbitration function to prioritize the tone. The IPC built in logic determines when to mute the audio, and then sends a tone request message to the ACM to reduce the current audio volume and sound the parking aid tone through the rear audio system speakers. The alert tone frequency increases as the vehicle gets closer to an obstacle. When an object is detected within 30 cm (12 in) of the sensors, the alert tone becomes continuous. Objects detected outside the continuous tone area to the side of the vehicle generate a warning tone for 3 seconds. The warning tones are prioritized to the closest object.

The rear parking aid system standstill strategy provides audio warnings when the vehicle is stationary, with the transmission in reverse, and the detected obstacle is less than 30 cm (12 in) away from the rear bumper.

NOTE: *If the IPC detects a fault in the audio system, the parking aid chime will come from the IPC speaker.*

NOTE: *Certain add-on devices can block the normal detection zone of the system and may create false audible alerts.*

Component Description

Parking Aid Sensors

The parking aid sensors are wide beam ultrasonic sensors. The sensors continuously send out ultrasonic signals to detect objects and communicate the information back to the PAM. The PAM supplies the ultrasonic sensors with voltage and ground from a common source, and monitors the signal return circuit from each sensor.

Only objects that reflect a sufficient amount of sound waves are detected by the parking aid sensors. The surface properties, size and composition of an object affect the ability of the parking aid system to detect the object.

Other things which affect sensor operation are:

- Incorrect sensor alignment or installation
- Dirt or ice covered sensors
- Heavy rain, or snow

PAM

The PAM calculates and reports (via audio system tones) the distance between the rear bumper of the vehicle and an object. The PAM is integral to the BCM and requires PMI when replaced. The PAM communicates as a separate node on the HS-CAN1.