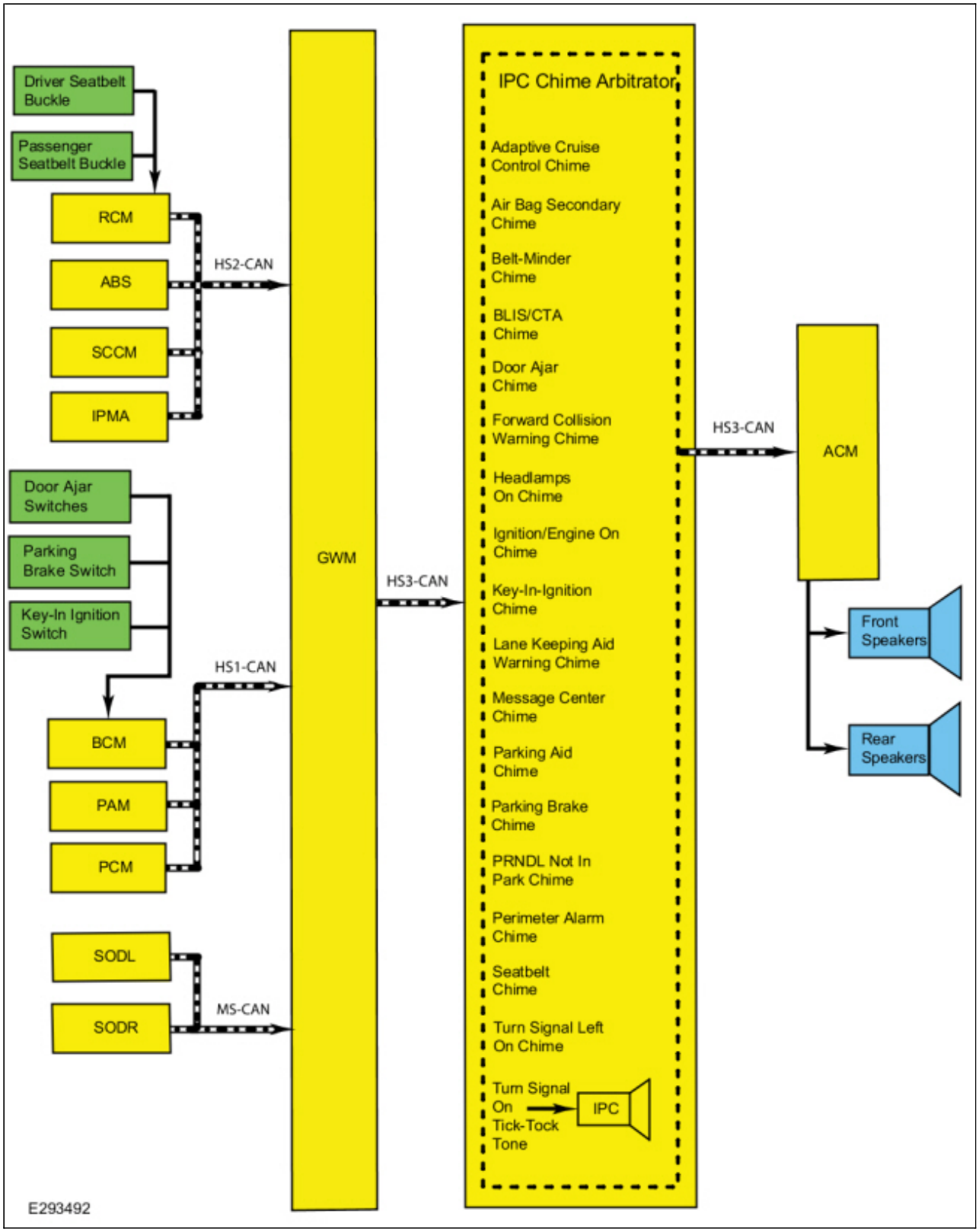
Warning Chimes - System Operation and Component Description

System Operation

System Diagram



Network Message Chart

Module Network Input Messages - IPC

Broadcast Message	Originating Module	Message Purpose
Accessory delay	BCM	Input used to control the overall chime function.
ACC warning request	IPMA	Input used to control the ACC warning chime.
Audio chime status	ACM	Input used to control the source of the chime based on ACM chime status.
Battery shed level request	BCM	Input used for the PRNDL not in park warning chime.
Cruise control status	PCM	Input used to control the ACC warning chime.
CTA left status	SODL	Input used to control the Blind Spot Information System (BLIS®)/ (CTA) chime.
CTA right status	SODR	Input used to control the Blind Spot Information System (BLIS®)/ (CTA) chime.
Driver door ajar status	BCM	• Input used for module wake up to initiate the chime. • Input used for the ignition-engine on warning chime. • Input used for the PRNDL not in park warning chime.
Driver seatbelt buckle status	RCM	Input used to control the Belt-Minder® and seatbelt warning chime.
Engine rpm data	PCM	Input used to control the chime volume.
Forward collision chime request	IPMA	Input used for the forward collision warning chime.
Front passenger detect status	RCM	Input used to control the Belt-Minder® chime.
Gear lever position	PCM	Input used to control the Belt-Minder® chime.
Headlamp on warning chime	BCM	Input used to control the headlamps on warning chime.
Ignition status	BCM	Ignition RUN, START and accessory states required for the IPC operating modes and fault reporting. Also used to control the PRNDL not in park warning chime.
Key-in-ignition status	BCM	Input used to control the key-in-ignition chime status.
Lane keeping system hands off display	IPMA	Input used to control the lane keeping system hands off the steering wheel warning chime.
Left turn lamp on request	BCM	Input used for the turn signal-hazard (tick-tock) chime.
Parking aid chime request	PAM	Input used to control the parking aid chime status.
Parking brake chime request	BCM	Input used to control the parking brake chime status.
Passenger seatbelt buckle status	RCM	Input used to control the Belt-Minder® chime.
Perimeter alarm chime request	BCM	Input used to control the perimeter alarm chime status.
Power pack status	PCM	Input used for the ignition-engine on warning chime.
Right turn lamp on request	BCM	Input used for the turn signal-hazard (tick-tock) chime.

Side obstacle sensor status-left	SODL	Input used to control the Blind Spot Information System (BLIS®)/ (CTA) chime.
Side obstacle sensor status-right	SODR	Input used to control the Blind Spot Information System (BLIS®)/ (CTA) chime.
Transmission gear display	PCM	Input used for the ignition-engine on warning chime and the PRNDL not in park warning chime.
Transmission gear display mode	PCM	Input used for the PRNDL not in park warning chime.
Transport mode	BCM	Input used to control the PRNDL not in park warning chime.
Turn signal switch status	SCCM	Input used for the turn signal left on chime.
Vehicle speed	PCM	Input used to control the Belt-Minder® chime, ignition-engine on warning chime, and the PRNDL not in park warning chime.

Module Network Input Messages - ACM

Broadcast Message	Originating Module	Message Purpose
Belt-Minder audio mute	IPC	Input from the IPC to control the Belt-Minder audio chime output.
Chime controls	IPC	• Input used to control the following chime operations: – chime priority. – chime volume level. – how long a chime tone sounds and how long a tone is off. – how often the chime tones. – which chime to sound. – which speakers (front/rear) sound specific chimes.
Chime power up	IPC	Input used to initiate the audio system as the chime source.
Chime source	IPC	Input used to configure the chime source (IPC or the audio system).
IPC chime request	IPC	Input from the IPC used to control the audio chime output.

Warning Chime Characteristics

The warning chimes use volume, chime frequency, length of time the chime sounds, decay of the chime tone and the number of chime tones to identify which chime is sounding. Most warning chimes have unique characteristics, however, there are chimes that do sound the same. The chime characteristics are defined by the different chime types:

- Information
- Soft-warning
- Hard-warning
- Tick-tock (on-off)

ACC Warning Chime

The ACC warning chime supplements the message center displays to draw the driver's attention to the need to intervene and take control of the vehicle. There are 2 levels of chime output (high priority and low priority) based upon the nature and urgency of the warning. The ACC warning chime sounds through the front speakers. The audio system sounds the appropriate warning chime when it receives the ACC warning request (high priority chime) or cruise control status (low priority chime) message from the CCM.

The low priority ACC warning chime is a single-tone, 1-second chime that sounds to alert the driver the ACC system has shut itself off due to low vehicle speed (approximately 32 km/h [20 mph]) and the driver needs to intervene if further braking is required or to resume the ACC operation.

The high priority ACC warning chime is a 0.25-second chime that sounds 12 times. The chime alerts the driver the vehicle is approaching the vehicle ahead at a faster rate than the ACC system can brake the vehicle and the driver needs to apply the brakes to slow the vehicle down.

The IPC receives the cruise control status and the ACC warning request messages from the GWM over the HS-CAN3.

The GWM receives the cruise control status message from the PCM over the HS-CAN1.

The GWM receives the ACC warning request message from the IPMA over the HS-CAN2.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Airbag Secondary Warning Chime

The airbag secondary warning chime warns the airbag warning indicator LED is inoperative. The airbag secondary warning chime sounds through the front speakers. If the IPC detects a fault with the airbag warning indicator LED during the bulb prove out, the airbag secondary warning chime sounds. If the IPC detects a fault in the airbag warning indicator when a SRS fault condition exists and the RCM has sent the IPC the airbag indicator request, the airbag secondary warning chime sounds. The airbag chime is a 0.5-second chime that sounds 5 times.

When a fault condition is detected, the IPC sends the IPC chime request message to the ACM to sound the chime.

Belt-Minder® Feature

NOTE: *Whenever the vehicle is operated using MyKey®, the IPC enables the Belt-Minder®.*

The Belt-Minder® is configurable on or off.
Refer to: Seatbelt Minder Deactivating/Activating (413-01 Instrumentation, Message Center and Warning Chimes, General Procedures).

The Belt-Minder® feature supplements the current seatbelt warning function and is enabled after the current seatbelt warning is complete. The Belt-Minder® reminds the driver that the driver or front passenger seatbelt is unbuckled by intermittently sounding a chime and simultaneously illuminating the seatbelt warning indicator through the front speakers. The Belt-Minder® begins once the current seatbelt warning has ended and the vehicle speed has exceeded 10 km/h (6 mph) with the driver or front passenger seatbelt unbuckled. While activated, the Belt-Minder® chime provides a series of chimes/seatbelt warning indicator flash sequences.

If the vehicle speed drops below 5 km/h (3 mph) once the Belt-Minder® chime has activated, the chime turns off and the seatbelt warning indicator remains on. When the vehicle speed exceeds 10 km/h (6 mph) again, the Belt-Minder® chime resumes.

When MyKey® is in use, the driver cannot configure the Belt-Minder® off. Once the Belt-Minder® is activated,

the Belt-Minder® continues to chime periodically (does not time out after 5 minutes) and the audio system is muted until the driver and passenger seatbelts are fastened.

To control the Belt-Minder®, the IPC receives the vehicle speed, gear lever position, driver and passenger seatbelt buckle status messages from the GWM over the HS-CAN3.

The GWM receives the vehicle speed and gear lever position messages from the PCM over the HS-CAN1.

The IPC receives the driver and passenger seatbelt status messages from the RCM over the HS-CAN2.

When the conditions require the Belt-Minder® chime, the IPC sends the IPC chime request message to the ACM to sound the chime.

Blind Spot Information System (BLIS®)/ CTA Warning Chime

The Blind Spot Information System (BLIS®)/ CTA warning chime sounds to alert the driver that a vehicle has been detected or that there is a system fault. The Blind Spot Information System (BLIS®)/ CTA warning chime sounds a 0.25-second chime continuously until the request is ended. The chime sounds through the rear speakers.

The IPC receives the CTA left status, CTA right status, side obstacle sensor status-left and the side obstacle sensor status-right request messages from the GWM over the HS-CAN3.

The GWM receives the CTA left status, CTA right status, side obstacle sensor status-left and the side obstacle sensor status-right request messages from the SODL and SODR over the MS-CAN.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Door Ajar Warning Chime

The door ajar warning chime warns that a door is ajar and sounds the chime through the front speakers. When a door becomes ajar while the ignition is in RUN with vehicle speed greater than 5 km/h (3 mph), the IPC displays the appropriate door ajar warning message and sounds a single chime tone for each door opened. The door ajar chime only sounds once for each time the door is opened, and only repeats the chime if the door is closed then reopened.

The IPC receives the driver door ajar status, passenger door ajar status, left rear door ajar status or right rear door ajar status message from the GWM over the HS-CAN3. The GWM receives the driver door ajar status, passenger door ajar status, left rear door ajar status or right rear door ajar status messages from the BCM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM and to sound the chime.

Forward Collision Warning Chime

The forward collision warning chime warns that a forward collision potential has been detected or the CCM detects a forward collision warning system concern. Once the forward collision system detects a possible forward collision, the CCM sends a message to the IPMA over a private CAN. The IPMA sends a message to the IPC through the GWM to flash the forward collision warning. The IPMA sends a forward collision warning chime request to the IPC through the GWM to sound a 0.25-second chime tone 12 times.

The forward collision warning system and chime can be disabled or turned off using the message center. When MyKey® is in use, the driver cannot configure the forward collision warning system or chime off. When the driver disables the forward collision warning chime, the IPMA sends the IPC the forward collision chime

request through the GWM to sound a 0.25-second chime tone 12 times at 50% volume. The forward collision warning chime and confirmation chime are both sounded through the front speakers.

The IPC receives the forward collision warning message request and the forward collision chime request from the GWM over the HS-CAN3.

The GWM receives the forward collision warning message request and the forward collision chime request from the IPMA over the HS-CAN2.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Headlamps On Warning Chime

The headlamps on warning chime warns the headlamps are on when exiting the vehicle. When the driver exits the vehicle with the driver door ajar, the headlamp switch is in the PARK or HEADLAMP position and the ignition is OFF, the BCM sends the headlamp switch status message to the IPC through the GWM to sound the headlamps on chime. The headlamps on chime sounds a 1-second chime tone continuously.

The IPC receives the headlamp on warning chime request from the GWM over the HS-CAN3.

The GWM receives the headlamp on warning chime request from the BCM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Ignition-Engine On Warning Chime

The ignition-engine on chime informs the driver they are exiting the vehicle when the ignition has been left on (engine off) or the engine is running. When the driver exits the vehicle with the ignition on or with the engine running, the ignition-engine on warning chime sounds five 1-second chime tones. The ignition-engine on warning chime sounds through the front speakers. The IPC uses driver door ajar status, transmission gear display and vehicle speed messaged inputs to control the ignition-engine on warning chime.

The IPC receives all required messages from the GWM over the HS-CAN3.

The GWM receives the driver door ajar status message from the BCM over the HS-CAN1.

The GWM receives the transmission gear display and vehicle speed messages from the PCM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Key-In-Ignition Warning Chime

The key-in-ignition warning chime warns the key is still in the ignition lock cylinder or the ignition is in ACC when the driver door is ajar. The key-in-ignition warning chime sounds repetitive 0.5-second chime tones from the front speakers until either the key is removed from the lock cylinder, the ignition is in RUN or the driver door is closed.

The IPC receives the key-in-ignition status from the GWM over the HS-CAN3.

The GWM receives the key-in-ignition status from the BCM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Lane Keeping Alert Warning System Chime

The lane keeping alert warning chime alerts the driver they have removed their hands from the steering wheel. The lane keeping alert warning chime sounds three 0.25-second chime tones through the front speakers.

The IPC receives the lane keeping system hands off display request from the GWM over the HS-CAN3.

The GWM receives the lane keeping system hands off display request from the IPMA over the HS-CAN2.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Message Center Warning Chime

The message center warning chime feature draws the driver's attention to the message center display to view new warning messages. There are 3 different message center warning chime types that are defined by the length of the chime tone, which are designed to create a greater sense of urgency based on the nature of the condition and message displayed in the message center.

- Informational (1-second chime)
- Soft warning (0.5-second chime)
- Hard warning (0.25-second chime)

When a new message request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Parking Aid Chime

The parking aid system uses a visual display in the centerstack infotainment display and a chime to alert the driver objects are close to the vehicle. The parking aid chime sounds a repetitive chime tone that decreases the time off between chime tones as objects get closer to the sensor until a continuous tone is heard through the rear speakers.

The IPC receives the parking aid chime request from the GWM over the HS-CAN3.

The GWM receives the parking aid chime request from the PAM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Parking Brake Warning Chime

The parking brake warning chime warns the parking brake is engaged when the vehicle is in motion. The parking brake warning chime sounds if the ignition is in RUN, the parking brake is engaged, and the vehicle speed is greater than 5 km/h (3 mph). The parking brake warning chime stops sounding and resets if the parking brake is released, the ignition is not in RUN, the vehicle speed is less than 5 km/h (3 mph), or after 90 seconds from the time the chime is activated. The parking brake warning chime sounds a repetitive 0.5 second chime tone through the front speakers.

The IPC receives the parking brake chime request from the GWM over the HS-CAN3.

The GWM receives the parking brake chime request from the BCM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Perimeter Alarm Warning Chime

The perimeter alarm warning chime alerts the driver the perimeter alarm is armed when the driver door is unlocked before disarming the alarm. The IPC displays a perimeter alarm message in the message center and the perimeter alarm warning chime sounds for 12 1-second chime tones when the driver door is opened. The perimeter alarm warning chime turns off when the perimeter alarm is disarmed (either by using the key fob or turning the key to the ON position). After the twelve second warning chime duration, the warning chime stops sounding and the perimeter alarm activates, sounding the horn and flashing the turn signal lamps.

The IPC receives the perimeter alarm warning chime request from the GWM over the HS-CAN3.

The GWM receives the perimeter alarm warning chime request from the BCM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

PRNDL Not In Park Warning Chime

The IPC provides a PRNDL not in park warning chime that sounds along with the transmission not in park message center warning message to inform the driver the vehicle is not in PARK (P). The IPC displays the shift to park message and the PRNDL not in park warning chime sounds three 0.5-second chime tones if the selector lever is not in PARK (P), the ignition is OFF and the driver door is open or ajar. The IPC requires the transmission gear display mode, transport mode, vehicle speed, driver door ajar and ignition status to control the PRNDL not in park warning chime.

Refer to Shift To Park Message Display for message details.
Refer to: Message Center - System Operation and Component Description (413-01 Instrumentation, Message Center and Warning Chimes, Description and Operation).

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.

Seatbelt Warning Chime

The seatbelt warning chime warns the seatbelt is not fastened. The seatbelt warning chime sounds a repetitive 1-second chime tone for 6 seconds through the front speakers when the driver seatbelt is not fastened and the ignition is transitioned from OFF or ACC to ON or START. The seatbelt warning chime stops sounding when the seatbelt is fastened, when the ignition is transitioned from ON or START to OFF or ACC, or when the chime has sounded for 6 seconds.

The IPC receives the driver seatbelt buckle status and passenger seatbelt buckle messages from the GWM over the HS-CAN3.

The GWM receives the driver seatbelt buckle status and passenger seatbelt buckle status messages from the RCM over the HS-CAN2.

When the conditions require the seatbelt warning chime, the IPC sends the IPC chime request message to the ACM to sound the chime.

Turn Signal On Chime Tone

The IPC provides a repetitive 1-second on/off tick-tock chime tone along with visual RH or LH turn indicators to inform the driver the turn signal or hazard lamp function is on.

The IPC receives the left turn lamp on request and right turn lamp on request messages from the GWM over the HS-CAN3.

The GWM receives the left turn lamp on request and right turn lamp on request messages from the BCM over the HS-CAN1.

Turn Signal Left On Chime

The turn signal left on or turn signal minder chime uses both odometer and turn signal status messages. The turn signal left on chime sounds a repetitive 1-second chime through the front speakers when the vehicle is driven with the turn signal on for more than 3.2 km (2.0 miles).

The IPC receives the turn signal switch status and odometer count from the GWM over the HS-CAN3.

The GWM receives the turn signal switch status from the BCM over the HS-CAN1.

The GWM receives the odometer count from the PCM over the HS-CAN1.

When a chime request is received, the IPC sends the IPC chime request message to the ACM to sound the chime.