



415-00A Information and Entertainment System - General Information -
Vehicles With: AM/FM/CD/SYNC
Description and Operation

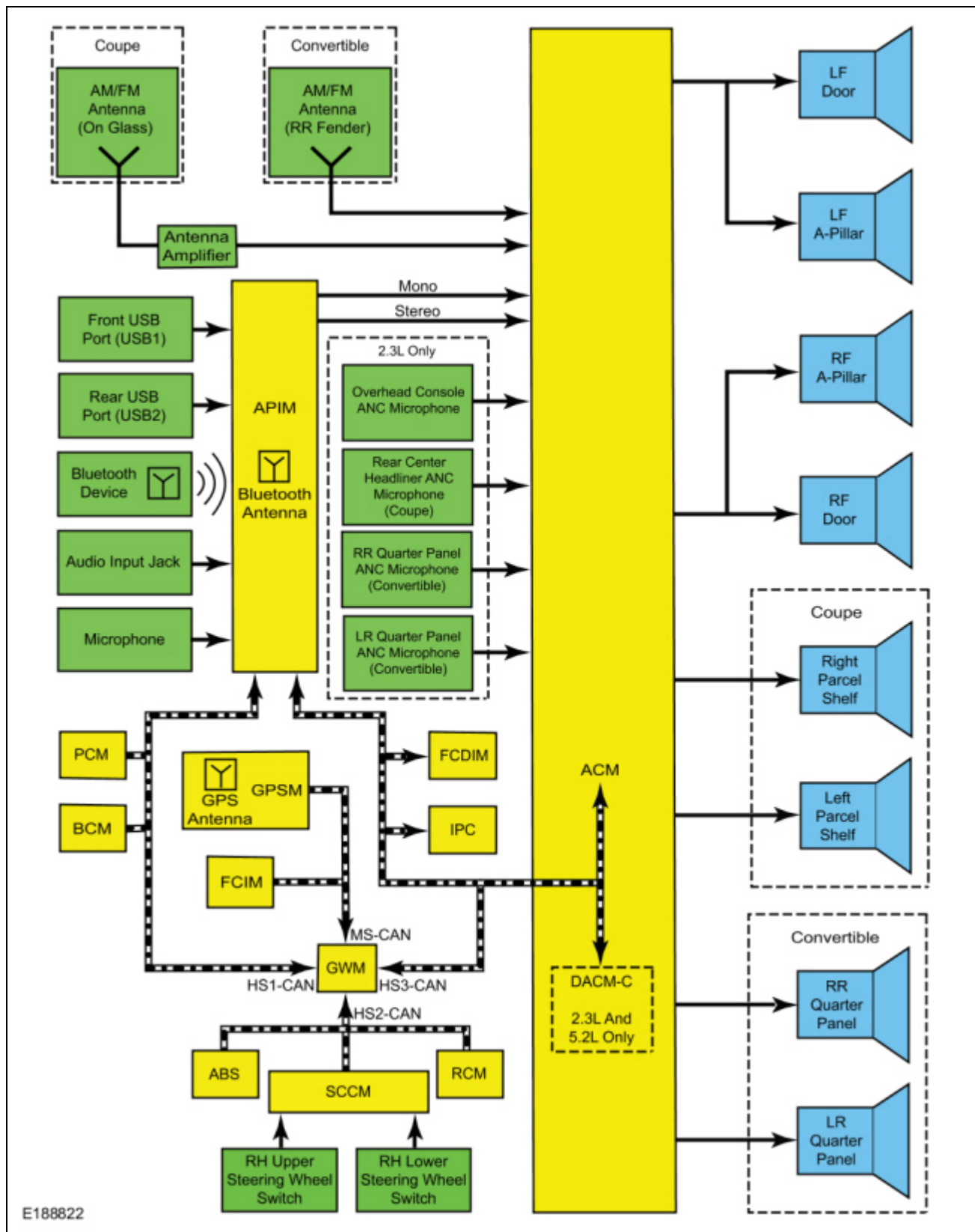
2016 Mustang

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03/5/2016

Information and Entertainment System - System Operation and Component Description

System Operation

System Diagram



E188822

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.

Module Network Input Messages - ACM

Broadcast Message	Originating Module	Message Purpose
Audio settings	<u>IPC</u>	Used to set the radio listening source (<u>AM/ FM</u>) from the steering wheel switch.
Belt-Minder® audio mute	<u>IPC</u>	Used to mute speaker output so the Belt-Minder® tone can be more easily heard. This message only applies to vehicles with a MyKey® enabled and in use. The audio system is muted until the safety belt(s) are buckled.
Day/night status	<u>BCM</u>	Used for day/night illumination status for the audio system.
Ignition status	<u>BCM</u>	Used to indicate the ignition state (OFF, ACCESSORY, RUN, and START) required for <u>ACM</u> operating modes and fault reporting.
Instrument panel cluster chime	<u>IPC</u>	Used to request a warning chime to be played through the audio system.
MyKey® volume limit status	<u>IPC</u>	Used to limit the maximum audio system volume when a MyKey® restricted key is in use.
Power mode	<u>IPC</u>	Used to disable the functionality of the <u>ACM</u> due to the load shedding feature.
Power up chime modules	<u>IPC</u>	Used to initiate the audio system as the chime source.

Broadcast Message	Originating Module	Message Purpose
Vehicle configuration data	<u>BCM</u>	Used to verify vehicle configuration data such as the <u>VIN</u> and system module configuration.

Module Network Input Messages - APIM

Broadcast Message	Originating Module	Message Purpose
Airbag deployment status	<u>RCM</u>	Used to monitor airbag deployment status for 911 Assist™.
eCall notification	<u>RCM</u>	Used to notify of a 911 Assist™ call being initiated due to airbag deployment.
<u>FCIM</u> bezel diagnostic status	<u>GWM</u>	Used to display the requested bezel diagnostics operations in the centerstack infotainment display.
<u>FCIM</u> button state	<u>FCIM</u>	Used to indicate when a button is pressed on the <u>FCIM</u> so the audio system can make the desired setting change.
Gear lever position	<u>IPC</u>	Used to verify the gear selector position for bezel diagnostics.
<u>GPS</u> data	<u>GPSM</u>	Used for vehicle positioning, heading, and direction for navigation and 911 Assist™.
Ignition key type	<u>BCM</u>	Used to determine if a MyKey® is enabled and in use.
Ignition status	<u>BCM</u>	Used to indicate the ignition state (OFF, ACCESSORY, RUN, and START) required for <u>APIM</u> operating modes and fault reporting.
MyKey® volume limit status	<u>IPC</u>	Used to limit the maximum audio system volume when a MyKey® restricted key is in use.
Navigation rolling wheel count and direction	<u>ABS</u> module	Used to provide more accurate vehicle position tracking when the <u>GPS</u> signal is temporarily unavailable.
Steering wheel switch status	<u>SCCM</u>	Used to indicate the button press status of the steering wheel switches.
Vehicle configuration data	<u>BCM</u>	Used to verify vehicle configuration data such as the <u>VIN</u> and system module configuration.
Vehicle speed	<u>PCM</u>	Used for navigation functionality.

Module Network Input Messages - DACMC (2.3L and 5.2L Only)

Broadcast Message	Originating Module	Message Purpose
Accelerator pedal position	<u>PCM</u>	Used to determine the throttle position status for the <u>ANC</u> system operation.
Driver's door ajar status	<u>BCM</u>	Used to enable the <u>ANC</u> system if the driver's door (and all other doors and luggage compartment lid) is closed, or to disable the <u>ANC</u> system if the driver's door is ajar.
Engine <u>RPM</u> data	<u>PCM</u>	Used to determine the engine rotation speed for the <u>ANC</u> system operation.
Engine status	<u>PCM</u>	Used to enable the <u>ANC</u> system if the engine is ON, or to disable the <u>ANC</u> system if the engine is OFF or Auto-Stopped.
Engine torque	<u>PCM</u>	Used for <u>ANC</u> system operation by indicating the amount of engine torque being produced (in Nm).
Ignition status	<u>GWM</u>	Used to indicate the ignition state (OFF, ACCESSORY, CRANK, RUN, and START) required for <u>DACMC</u> operating modes and fault reporting.
Luggage compartment lid ajar status	<u>BCM</u>	Used to enable the <u>ANC</u> system if the luggage compartment lid (and all other doors) is closed, or to disable the <u>ANC</u> system if the luggage compartment lid is ajar.
Passenger door ajar status	<u>BCM</u>	Used to enable the <u>ANC</u> system if the front passenger door (and all other doors and luggage compartment lid) is closed, or to disable the <u>ANC</u> system if the front passenger door is ajar.
Power up chime modules	<u>IPC</u>	Used to initiate the audio system as the chime source.

Module Network Input Messages - FCDIM

Broadcast Message	Originating Module	Message Purpose
<u>ACM CD</u> data	<u>ACM</u>	Used to display <u>CD</u> data on the <u>FCDIM</u> .
<u>ACM</u> configuration	<u>ACM</u>	Used to verify that the correct configuration and modules are installed.
<u>ACM</u> radio functions	<u>ACM</u>	Used to display the <u>ACM</u> radio functions such as seek, tune and <u>AM/ FM</u> stations on the <u>FCDIM</u> .
<u>ACM</u> volume and mode status	<u>ACM</u>	Used to display audio volume and mode status on the <u>FCDIM</u> .

Broadcast Message	Originating Module	Message Purpose
Audio source status	<u>ACM</u>	Used to display the selected audio source on the <u>FCDIM</u> .
<u>CD</u> load/eject	<u>ACM</u>	Used to display the loaded or ejected <u>CD</u> status on the <u>FCDIM</u> .
Date and time	<u>IPC</u>	Used to display the current date and time on the <u>FCDIM</u> .
Display language selection	<u>IPC</u>	Used to display information on the <u>FCDIM</u> in the selected language.
Door ajar status	<u>BCM</u>	Used to determine the door ajar status for the accessory delay feature.
Ignition status	<u>IPC</u>	Used to indicate the ignition state (OFF, ACCESSORY, RUN, and START) required for <u>FCDIM</u> operating modes and fault reporting.
Illumination dimming level	<u>BCM</u>	Used to control the backlight intensity of the <u>FCDIM</u> based on the dimmer switch input.
Phone call data	<u>APIM</u>	Used to send phone call data to the <u>FCDIM</u> .
Radio broadcast band selection	<u>ACM</u>	Used to display the selected radio tuner band on the <u>FCDIM</u> .
Transport Mode	<u>IPC</u>	Used to disable the functionality of the <u>FCDIM</u> until taken out of transport mode.
Vehicle configuration/information	<u>IPC</u>	Used to send vehicle configuration information to the <u>FCDIM</u> .
Vehicle speed	<u>PCM</u>	Used to determine the appropriate temperature display update rate.

Module Network Input Messages - FCIM

Broadcast Message	Originating Module	Message Purpose
Audio source selection	<u>ACM</u>	Used to indicate the selected audio system source.
Day/night status	<u>BCM</u>	Used for day/night illumination status for the <u>FCIM</u> .
Ignition status	<u>BCM</u>	Used to indicate the ignition state (OFF, ACCESSORY, RUN, and START) required for <u>FCIM</u> operating modes and fault reporting.
Power mode	<u>IPC</u>	Used to disable the functionality of the <u>FCIM</u> due to the load shedding feature.

Broadcast Message	Originating Module	Message Purpose
Vehicle configuration data	<u>BCM</u>	Used to verify vehicle configuration data such as the <u>VIN</u> and system module configuration.

Module Network Input Messages - GPSM

Broadcast Message	Originating Module	Message Purpose
Ignition status	<u>BCM</u>	Used to indicate the ignition state (OFF, ACCESSORY, RUN, and START) required for <u>GPSM</u> operating modes and fault reporting.
Vehicle configuration data	<u>BCM</u>	Used to verify vehicle configuration data such as the <u>VIN</u> and system module configuration.
Vehicle yaw rate	<u>RCM</u>	Used to verify the vehicle acceleration data for navigation.
Wheel rotation count	<u>BCM</u>	Used to provide more accurate vehicle position tracking when the <u>GPS</u> signal is temporarily unavailable.
Wheel rotation direction	<u>BCM</u>	Used to determine wheel rotation direction for navigation.

Module Network Input Messages - IPC

Broadcast Message	Originating Module	Message Purpose
Audio source selection	<u>ACM</u>	Used to display the selected audio source on the <u>IPC</u> .
Display language request	<u>APIM</u>	Used to display information on the <u>IPC</u> in the selected language.
Multimedia player total play time status	<u>APIM</u>	Used to indicate the total play time of the audio track being played.

Module Network Input Messages - RCM

Broadcast Message	Originating Module	Message Purpose
eCall confirmation	<u>APIM</u>	Used to confirm the configuration of the 911 Assist™ feature, and to confirm the status of the 911 Assist™ phone call.

Accessory Delay Feature

The accessory delay feature is a BCM-controlled software 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 on-glass antenna grid (coupe) or fender-mounted antenna (convertible) receives analog radio waves and sends them through the AM/ FM antenna amplifier (coupe) and 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.

ANC - 2.3L

ANC is an audio system feature that eliminates a certain range of low frequency engine noise within the passenger compartment typically induced under wide open throttle or heavy part-throttle conditions. The system uses two (coupe) or three (convertible) microphones, a DACMC (contained within the ACM), and the audio system speakers. The DACMC determines the noise frequency to be canceled based upon engine rotation speed data, engine torque data, and accelerator pedal position data from the PCM, as well as microphone input signals.

While the engine is running, the ANC microphones located in the overhead console and center rear of the headliner (coupe), or overhead console, RHR quarter panel, and LHR quarter panel (convertible) monitor the engine noise resonating in the passenger compartment. The microphones transmit this noise as analog signals to the DACMC (contained within the ACM), where they are converted into digital signals by the integrated analog/digital converter. The digital signals are processed and an inverted phase sound wave with the same amplitude as the original sound is created. This new sound is converted into an analog audio signal, transmitted to the DACMC internal tone generator, and output by the ACM to the LHF and RHF door midwoofer speakers, and left and right parcel shelf full-range speakers (coupe) or RHR and LHR quarter panel full-range speakers (convertible) as fluctuating AC voltage.

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 with 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 transmitted 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 FCDIM to notify the driver that battery protection actions are active. To clear the load shed state, start the vehicle.

Bluetooth Mode

Bluetooth is a secure, short-range radio frequency that allows devices to communicate wirelessly through radio waves. The operating range of a Bluetooth signal is application specific, but will have a minimum range of 10 meters (33 feet).

The APIM Bluetooth chipset supports multiple Bluetooth profiles, allowing the SYNC® system to interact with both Bluetooth-enabled phones and Bluetooth-enabled media devices.

Any Bluetooth-enabled device used with the SYNC® system must first be paired with the APIM Bluetooth chipset before it can become operational. Pairing a Bluetooth-enabled device is accomplished through the "Add Device" selection of the phone menu. When pairing a device, the SYNC® system generates a unique PIN that must be entered on the Bluetooth-enabled device in order for the pairing process to be successful. There are also some device-specific actions that must take place. For information on the pairing process, refer to the Owner's Literature.

Multiple Bluetooth-enabled phones and Bluetooth-enabled media devices can be paired to the APIM at the same time. The APIM supports an active connection with one Bluetooth-enabled phone and one Bluetooth-enabled media device at a time. If an additional device of either type is paired and made active, the APIM ends any active connection with an already-paired device, and establishes an active connection with the new device.

It is important to understand that while most Bluetooth-enabled devices can pair with the SYNC® system, not all Bluetooth-enabled devices have the same level of available features when interacting with the SYNC® system. To determine if a Bluetooth-enabled device or feature is supported, review the device compatibility list. Refer to: owner.ford.com/how-tos/sync-technology/all/phone-setup/how-your-device-works-with-sync.html or es.owner.ford.com/how-tos/sync-technology/all/phone-setup/how-your-device-works-with-sync.html

For more information, refer to "Bluetooth" in the Owner's Literature.

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 such as tone, tone length, number of repetitions, and time between tones
- Chime output volume
- Priority of the chime request
- Which speakers (all, front, or rear) will 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 more information,

Refer to: [Warning Chimes - Overview](#) (413-01 Instrumentation, Message Center and Warning Chimes,

Description and Operation).

For even more information, Refer to: Warning Chimes (413-01 Instrumentation, Message Center and Warning Chimes) .

Compass

The GPS antenna integral to the GPSM is used to acquire the compass heading. The compass heading is sent through the CAN to the APIM. The APIM uses this data in addition to wheel speed and wheel rotation direction CAN messages from the ABS module to calculate and provide accurate vehicle tracking. The APIM processes the data and transmits it to be displayed on the FCDIM. In the event that the GPS fix or signal is temporarily lost, the APIM will continue to use the CAN messages from the ABS module to provide accurate vehicle tracking.

ESE - 2.3L And 5.2L

ESE is an audio system feature that enhances certain engine tones typically induced under wide open throttle or heavy part-throttle conditions. The system uses a DACMC (contained within the ACM) and the audio system speakers.

The DACMC determines the engine tone to enhance based upon engine rotation speed data, engine torque data, and accelerator pedal position data from the PCM. The data from the PCM is processed and converted into an analog audio signal, transmitted to the DACMC internal tone generator, and output by the ACM to the LHF and RHF door midwoofer speakers as fluctuating AC voltage.

MyKey® Audio Operation

- The following MyKey® features are always enabled when a MyKey® is in use, and are not configurable on/off with an administrator key:
 - Belt-Minder®: The audio system is muted, and "MyKey Buckle Up to Unmute Audio" is displayed in the information display until the safety belts are buckled.
- The following MyKey® features are configurable with an administrator key:
 - 911 Assist™: If the administrator has selected "Always On" in the MyKey® menu, 911 Assist™ is enabled and cannot be disabled.
 - Do Not Disturb: If the administrator has selected "Always On" in the MyKey® menu, the Do Not Disturb feature is enabled and cannot be disabled.
 - Speed Compensated Volume: If the administrator has enabled the Volume Limiter feature, the speed compensated volume feature will be disabled.
 - Speed Limiter: If the administrator has enabled the Speed Limiter feature, the audio volume level is temporarily reduced so the top speed alert chime can be heard when the preselected top vehicle speed is reached.
 - Speed Minder: If the administrator has enabled the Speed Minder feature, the audio volume level is temporarily reduced so the speed alert chime can be heard when the preselected Speed Minder vehicle speed is exceeded.
 - Volume Limiter: If the administrator has enabled the Volume Limiter feature, the audio system volume is limited to 45%. In an attempt to exceed the limited volume, "MyKey® VOLUME LIMITED" is displayed on the information display.

For more information, refer to "MyKey®" in the Owner's Literature.

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 PTY (Program Type) can be chosen. Once the customer has chosen a single PTY such as Sports, Rock, Religious Music, or Weather, the SEEK or SCAN button is pressed, and the ACM only tunes channels within the selected category. If a channel within the selected category is not found, the ACM will continually seek or scan.

Speed Compensated Volume

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

When a MyKey® is in use and the MyKey® Volume Limiter is enabled, the speed compensated volume is disabled.

Steering Wheel Switch Functions

The RH steering wheel switches consist of an upper 5-way switch, and a lower 4-way switch. The upper 5-way steering wheel switch operates the volume +/-, seek +/-, and the audio mode. The lower 4-way steering wheel switch operates the voice, send/receive call, end call, and mute functions.

SYNC® AppLink™

SYNC® AppLink™ allows Applications installed on the customer's device to be controlled using the steering wheel switches and/or FCIM.

All devices must be paired with the SYNC® system via Bluetooth, and Apple® devices must also be connected to a USB port.

Data is transmitted back and forth between the customer's device and the APIM through Bluetooth, or through the USB port with Apple® devices.

For more information, refer to "AppLink" in the Owner's Literature.

SYNC® System

The SYNC® system uses audio input jack, Bluetooth, USB, microphone, and CAN message APIM inputs to control the entertainment system and phone.

The SYNC® system provides the following abilities:

- Send and receive phone calls via a paired Bluetooth-enabled phone
- Send and receive text messages via a paired Bluetooth-enabled phone
- Connect media devices (such as an iPod®, USB device, or Bluetooth-enabled audio device) in order to play audio files
- Initiate an emergency assistance call (911 Assist™) when the airbags deploy (for more information, refer to "911 Assist™" in the Owner's Literature)

All SYNC® system features are not available with every phone/device. To determine if the APIM supports a particular phone, tablet, or media player, or feature of one of those devices, review the device compatibility list. Refer to: owner.ford.com/how-tos/sync-technology/all/phone-setup/how-your-device-works-with-sync.html or es.owner.ford.com/how-tos/sync-technology/all/phone-setup/how-your-device-works-with-sync.html

The customer can update the CIP by using a USB flash drive. For more information, refer to owner.ford.com.

For more information on the SYNC® system, refer to “SYNC” in the Owner's Literature.

USB Audio Mode

When a portable media device, such as an iPod® with its available cable or portable mass storage such as a USB flash drive, is connected to the vehicle audio system through the USB ports, audio from the device can be played through the vehicle speakers. Functions such as volume, seek, fast forward, pause, etc. can be controlled with the vehicle's audio controls.

When playing media files stored on a mass storage device such as a USB flash drive, the SYNC® system only plays supported file types that do not have DRM protection, and are contained on a properly formatted device. For more information, refer to “Supported Media Players, Formats and Metadata Information” in the Owner's Literature.

In addition to audio information (track length, track number, etc.), metadata (information such as artist, album title, song title, and genre) may also be sent to the APIM from a device connected to the USB ports. The APIM uses the metadata to create indexes that can be used to sort for particular music based on the customer's preferences. Not all USB devices can send metadata to the APIM. When a new media device is connected to the SYNC® system, the APIM automatically indexes the information. This may take several minutes depending on the amount of data on the device, and is considered normal operation. When a device that was previously connected to the SYNC® system is reconnected, the APIM updates the index rather than creating a new one. This reduces the time needed to index the device.

Voice Recognition

Voice recognition allows certain phone and audio system functions to be controlled with voice commands to reduce or eliminate the need to interact with the FCIM, FCDIM, and/or device while driving.

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. For more information, refer to “voice recognition” in the Owner's Literature.

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 cable(s) and converts them into fluctuating AC voltage. The ACM receives stereo and mono audio signals from the APIM in the form of fluctuating AC voltage. The ACM processes all inputs, and depending on the input received, sends stereo or mono analog audio signals to the speakers as fluctuating AC voltage.

The ACM contains the CD player.

The ACM contains the DACMC for vehicles with the 2.3L or 5.2L.

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

AM/ FM Antenna Amplifier - Coupe

The AM/ FM antenna amplifier receives AM/ FM radio waves from the on-glass antenna grid. The AM/ FM antenna amplifier is powered by the ACM and amplifies AM audio signals to improve reception. The AM/ FM radio waves are sent through the AM/ FM antenna coaxial cable to the ACM.

ANC Microphones - 2.3L

For a coupe, two ANC microphones (overhead console-mounted and center rear headliner-mounted) measure the amplitude and phase of the engine noise inside the passenger compartment. For a convertible, three ANC microphones (overhead console-mounted, RHR quarter panel, and LHR quarter panel) measure the amplitude and phase of the engine noise inside the passenger compartment. The monitored sounds are converted into analog signals by the microphones and sent to the DACMC (contained within the ACM).

Antenna

The AM/ FM radio uses the on-glass (coupe) AM/ FM antenna grid or fender-mounted (convertible) AM/ FM antenna to receive analog radio waves. The radio waves are sent through the AM/ FM antenna amplifier (coupe) or amplifier integrated into the antenna base (convertible) and AM/ FM antenna coaxial cable to the ACM, where they are further amplified.

To compensate for AM signal strength loss as the radio waves are transmitted from the antenna to the ACM, battery voltage is applied to the antenna to boost the AM radio signal. This allows the AM radio waves entering the ACM to be approximately the same strength as they were before amplification at the antenna.

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, audio input jack, connected Bluetooth media device, and outside device during a phone call. The mono input includes signals from the SYNC® microphone.

Stereo outputs include audio from the USB ports, audio input jack, and connected Bluetooth-enabled media device. Mono outputs include audio from the TTS feature, incoming call ringtone, ringback tone, outside device during a phone call, voice or tone prompts initiated from the voice steering wheel switch and FCIM, and SYNC® system instructions.

The TTS feature allows the customer to hear information through the audio system speakers so it does not have to be read from the FCDIM and/or device while driving. Examples include incoming text message sender information, text messages, and metadata from audio being played via USB or Bluetooth.

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.

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.

The APIM requires programming 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 - 2.3L Or 5.2L

The DACMC ANC and ESE functions only operate while the engine is running, and the luggage compartment lid and all doors are closed.

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

For ANC, the DACMC uses engine rotation speed data, engine torque data, accelerator pedal position data, and ANC microphone input signals to calculate the targeted frequency needed to cancel engine noise within the passenger compartment. For ESE, 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 engine noise cancellation signals are output by the ACM to the LHF and RHF door midwoofer speakers, and left and right parcel shelf full-range speakers (coupe) or RHR and LHR quarter panel full-range speakers (convertible) as fluctuating AC voltage. The DACMC ESE frequency signals are output by the ACM to the LHF and RHF door midwoofer speakers as fluctuating AC voltage.

When the engine is running and the audio system is in use, the ACM fluctuating AC voltage output signals to the LHF and RHF door midwoofer speakers, and left and right parcel shelf full-range speakers (coupe) or RHR and LHR quarter panel full-range speakers (convertible) contain a mixture of the engine noise cancellation and ESE frequency with the audio signals.

The DACMC is contained within the ACM.

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

FCDIM

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

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 will be inoperative. For more information, Refer to: [Information and Entertainment System - System Operation and Component Description](#) (415-00A Information and Entertainment System - General Information - Vehicles With: AM/FM/CD/SYNC, Description and Operation).

See Module Network Input Messages - FCDIM.

The FCDIM requires PMI when it 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 through which the customer interacts with the infotainment system.

The FCIM is separate from the ACM.

The FCIM requires PMI when it is replaced.

GPSM

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 FCDIM.

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

The GPSM 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.

Steering Wheel Switches

The RH upper and lower 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 upper and lower 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 steering wheel switch inputs are sent as network messages from the FCDIM to the APIM to control SYNC® functions, or to the ACM to control audio functions.

The RH upper steering wheel switch inputs are sent as network messages from the SCCM to the ACM to control audio functions.

The RH lower steering wheel switch inputs are sent as network messages from the SCCM to the APIM to control SYNC® functions, or to the ACM to control audio functions.

SYNC® Microphone

The SYNC® microphone is powered by the APIM.

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 as fluctuating AC voltage.

USB Ports/Cables

Data is sent from the front USB port (USB1) to the APIM (USB cable with black end) through the front USB cable. Data is sent from the rear USB port (USB2) to the APIM (USB cable with grey end) through the rear

USB cable.

The USB ports are part of the USB cables, and cannot be replaced separately.

The USB ports are powered through the USB cables by 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.

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