

PUBLISHED: 16-APR-2020
2020.0 DEFENDER (LE), 415-01

INFORMATION AND ENTERTAINMENT SYSTEM

AUDIO SYSTEM (G2345153)

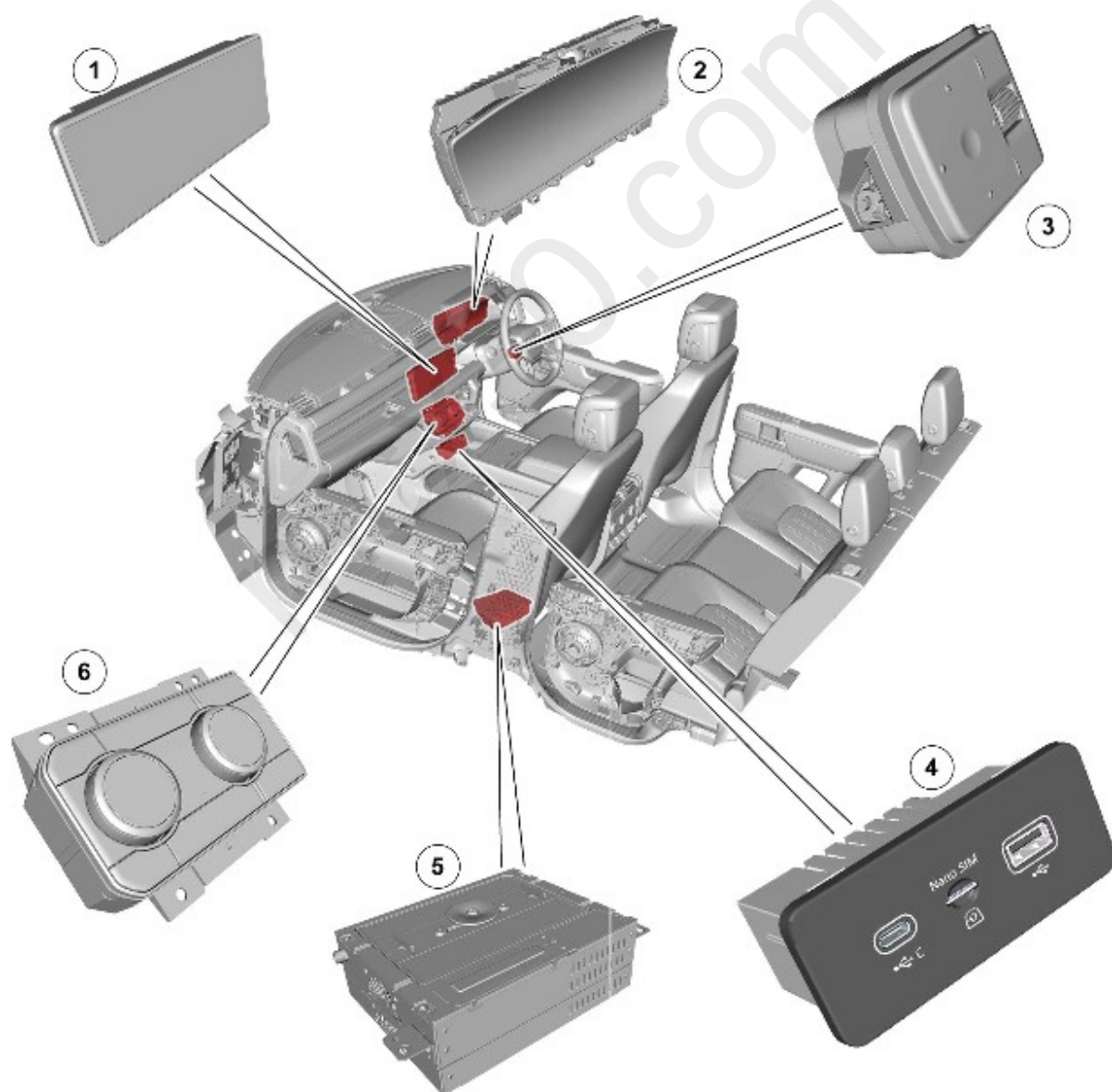
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COMPONENT LOCATION

COMPONENT LOCATION - 1 OF 2

 NOTES:

- Right Hand Drive (RHD) vehicle is shown. Left Hand Drive (LHD) vehicle is similar.
- Vehicle with 5 doors is shown. Vehicle with 3 doors is similar.

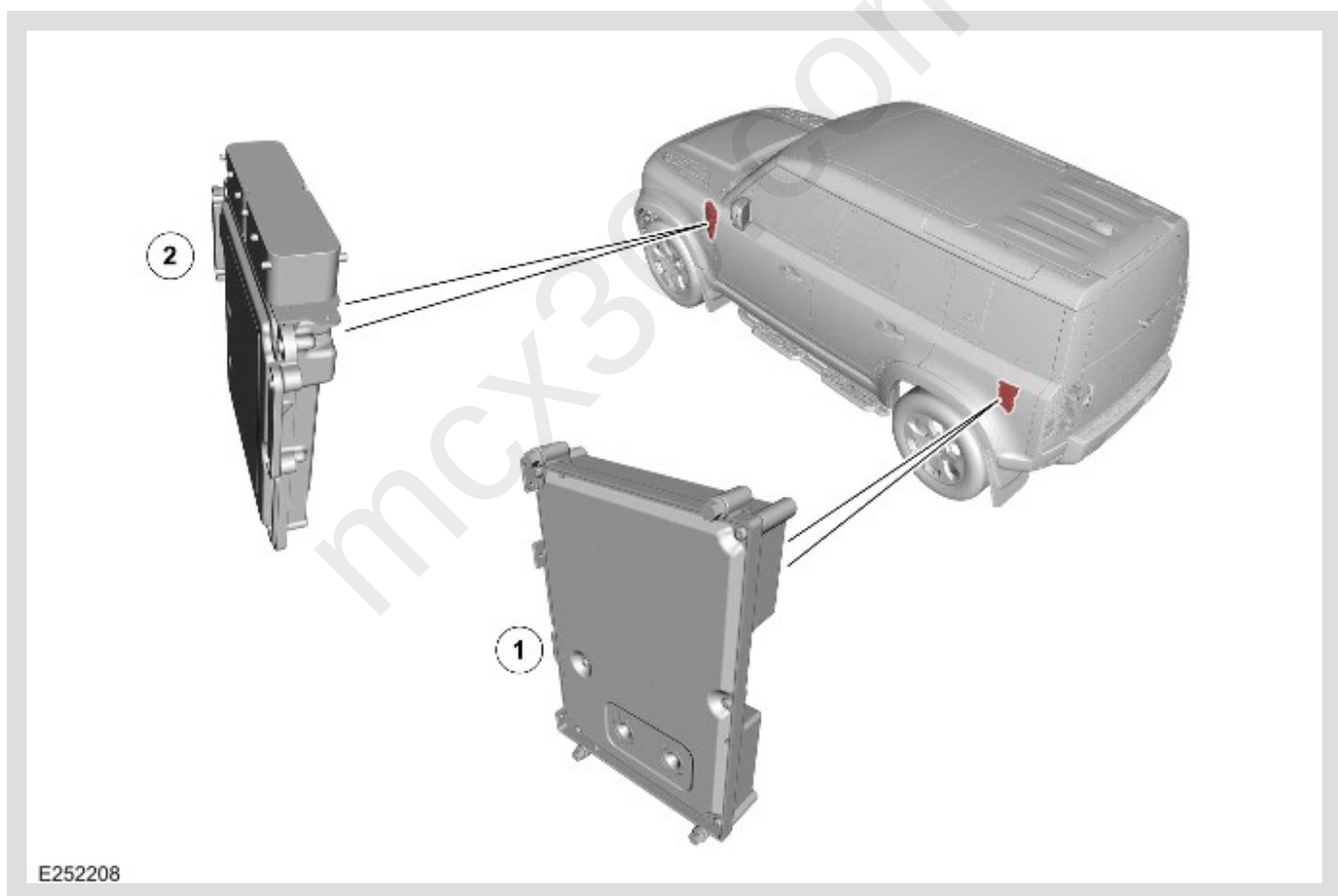


ITEM	DESCRIPTION
1	Touch Screen (FCDIM)
2	Instrument Panel Cluster (IPC)
3	Left steering wheel switch
4	Front portable media interface panel
5	Front Infotainment Control Module (IGM / ICCM)
6	Integrated Control Panel (FCIM)

COMPONENT LOCATION - 2 OF 2

NOTE:

Vehicle with 5 doors is shown. Vehicle with 3 doors is similar.



ITEM	DESCRIPTION
1	Audio Amplifier Control Module (AAM)
2	Powertrain Control Module (PCM)

The audio system is available in 3 options. The 3 systems all have an AAM. The 3 systems are:

- Sound system with 7 speakers
- Sound system with 11 speakers
- Surround system with 15 speakers.

For additional information, refer to: [Speakers](#) (415-01 Information and Entertainment System, Description and Operation).

The systems are controlled using the FCDIM, the FCIM and the left steering wheel switch.

The portable media interface panel allows wired connectivity. The level of connectivity is dependent upon the vehicle infotainment equipment option.

The front portable media interface panel contains:

- Universal Serial Bus (USB) 2.0 socket
- Type-C socket
- The nano Subscriber Identification Module (SIM) card socket (if equipped).

Primary user control of the audio system is through the FCDIM and FCIM. Control signals from the FCDIM are relayed on an Automotive Pixel Link 2 (APIX2) connection to the IGM / ICCM. The IGM / ICCM relays the control signals to the rest of the audio system. The signals are sent through High Speed (HS) Controller Area Network (CAN) Human Machine Interface (HMI) systems bus.

Wireless connectivity is made using the Bluetooth® antenna.

ACTIVE SOUND DESIGN

Active sound design provides the vehicle occupants with an enhanced engine sound, digitally reproduced over the infotainment system speakers.

Audio systems with an AAM receive an engine speed input from the PCM. The engine speed input allows the audio system to provide a digital audio enhancement of the engine sound. The enhanced engine sound is output over the audio speakers as an overlay to current audio system output.

The system is invisible to the vehicle occupants and is permanently active.

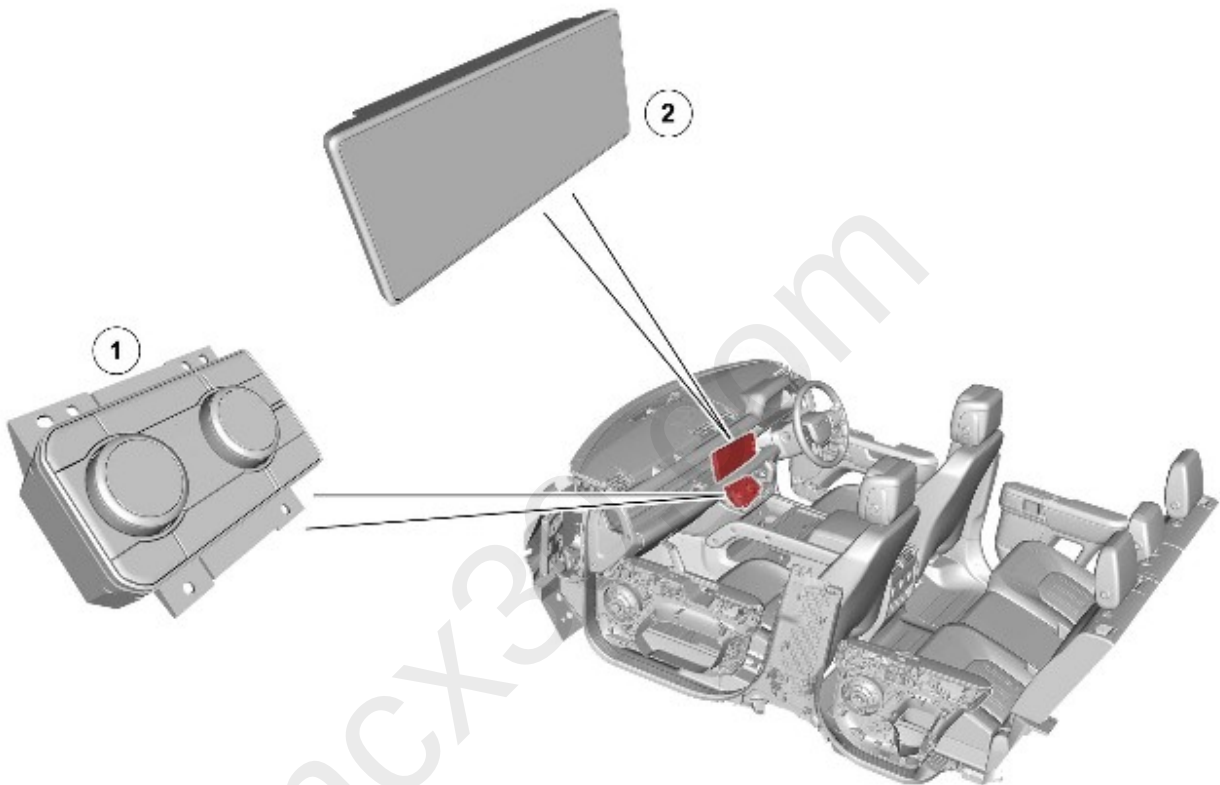
DESCRIPTION

TOUCH SCREEN AND INTEGRATED CONTROL PANEL



NOTE:

RHD vehicle is shown, LHD vehicle is similar.



E247712

ITEM	DESCRIPTION
1	FCIM
2	FCDIM

The FCDIM and the FCIM are located in the center of the instrument panel. The FCDIM is connected to the IGM / ICCM by a single APIX2 connection.

The FCDIM is controlled by the user using touch icons located in the screen image.

The FCDIM is the primary user interface of the audio system. The FCDIM communicates with the other components of the audio or infotainment system on the APIX2 connection through the IGM / ICCM. The communication allows control of the audio system and other infotainment systems from a single point.

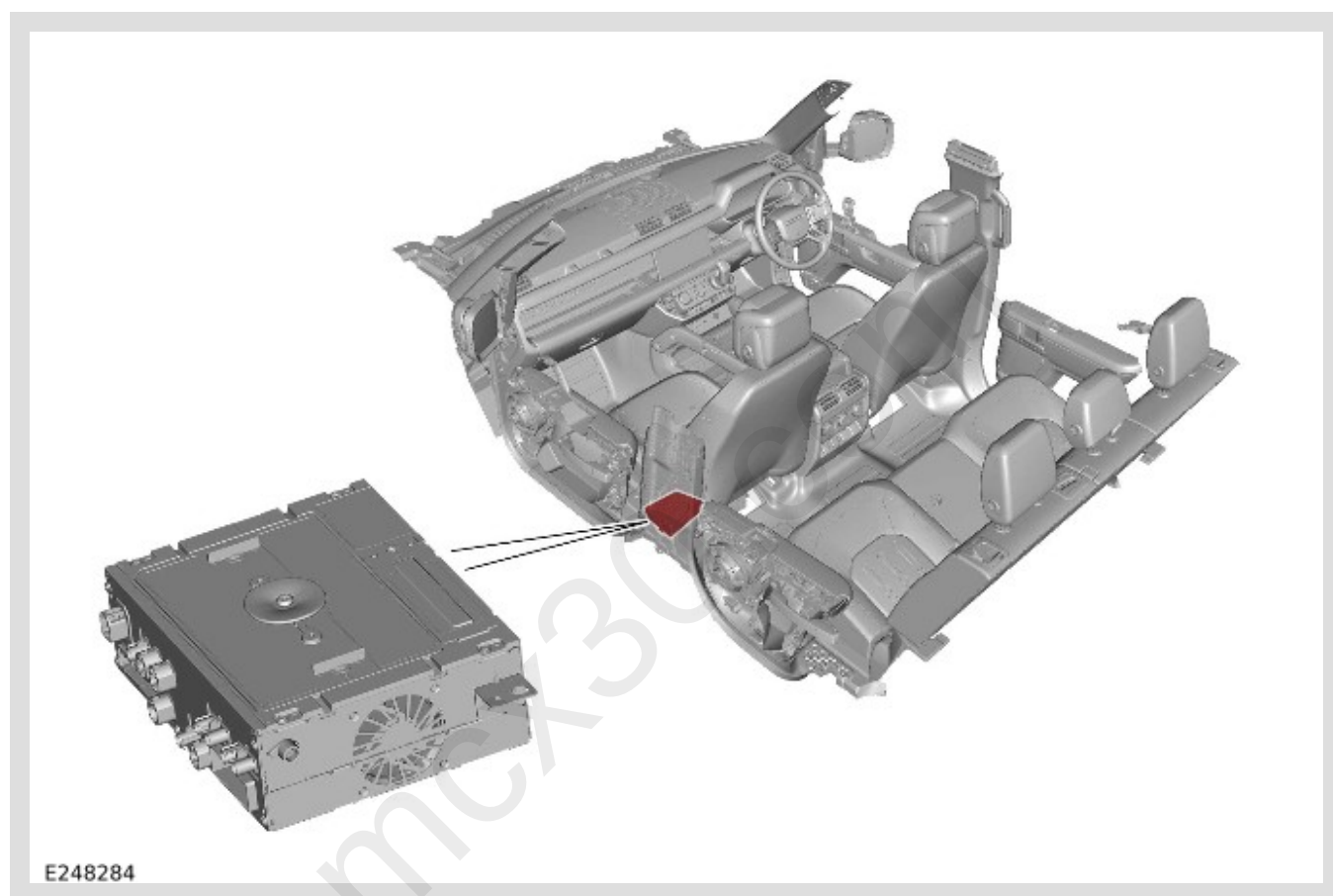
The FCIM has the volume control for the audio system. Volume control signals pass directly to the IGM / ICCM.

The Jaguar Land Rover (JLR) approved diagnostic equipment enables software updates to be downloaded.

FRONT INFOTAINMENT CONTROL MODULE

NOTES:

- RHD vehicle is shown, LHD vehicle is similar.
- Vehicle with 5 doors is shown. Vehicle with 3 doors is similar.



The IGM / ICCM is located under the front left seat. The IGM / ICCM is available in different versions depending on the market and vehicle specifications.

The IGM / ICCM has a high speed Qualcomm 820A multicore processor.

The IGM / ICCM has the following integrated features:

- Radio tuner system.
- Bluetooth® mobile phone and audio streaming.
- Applications.
- Voice recognition.
- WiFi connectivity.

- Navigation information.
- USB 2.0 input ports.

When the vehicle systems become active, the IGM / ICCM and the FCDIM are woken up by CAN bus.

The IGM / ICCM incorporates a radio tuner system. The following market dependent systems are available:

- AM/FM (ROW)
- AM/FM/ Digital Audio Broadcasting (DAB) (ROW with DAB)
- AM/FM/HD Radio™/SDARS (NAS).
- AM/FM with Vehicle Information and Communication System (VICS) (Japan)

A feature of radio reception is the ability of the system to automatically switch from DAB to FM (ROW with DAB markets) and FM to HD Radio™ (NAS markets) where the technologies are supported by the local broadcasters. The feature provides a consistent signal when driving between regions.

The radio tuner incorporates the following radio functions:

- Station list
- Favorites:
 - The 20 combined AM/FM/ DAB.
 - The 20 favorite channels and 10 sports team favorites SDARS (NAS only).
- Radio data system functions including:
 - Station name
 - Radio text
 - Program type
 - Traffic announcements (not available in NAS)
 - Alternative frequency switching (not available in NAS)
 - Regional to lock to regional/local broadcast (not available in NAS)

The radio data system functionality is dependent on broadcaster.

All radio antennas are routed into the IGM / ICCM through antenna amplifiers. The IGM / ICCM supplies a power output to the antenna amplifier.

The IGM / ICCM receives a fused power supply from the Rear Junction Box. Power management is controlled by the Body Control Module (BCM)/ Gateway Control Module (GWM).

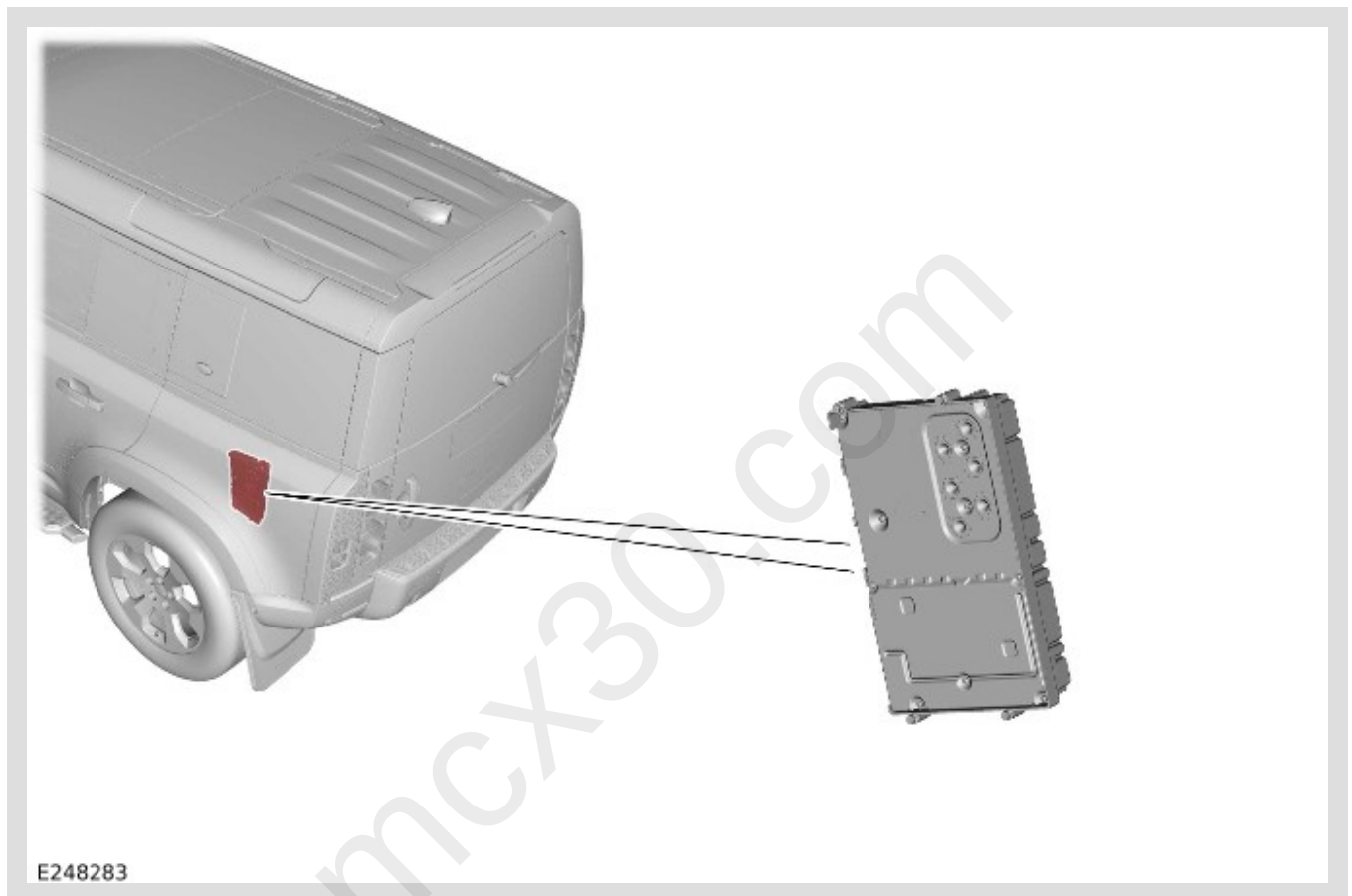
The JLR approved diagnostic equipment enables software updates to be downloaded. When the IGM / ICCM is replaced, The IGM / ICCM must be configured as a new module using JLR approved diagnostic equipment.

Temperature control within the IGM / ICCM is necessary to make sure of the optimum performance. The IGM / ICCM temperatures are monitored constantly and controlled by software within the IGM / ICCM. The temperature assessment software is integrated into the IGM / ICCM. Temperature is controlled by the fan assisted cooling. The IGM / ICCM reduces speed of response when the temperature is too high or too low.

AUDIO AMPLIFIER CONTROL MODULE

NOTE:

Vehicle with 5 doors is shown. Vehicle with 3 doors is similar.



The AAM is located behind the left trim panel in loadspace. Power supply for the AAM is received from the Rear Junction Box.

The sound system uses an AAM specific to the audio system option.

The AAM has connectors which provide for the following:

- Power supply and ground.
- Hardwired connections to vehicle speakers.
- BroadR-Reach® ethernet from the IGM / ICCM.

For additional information, refer to: [Speakers](#) (415-01 Information and Entertainment System, Description and Operation).

LEFT STEERING WHEEL SWITCH

NOTE:

RHD vehicle is shown, LHD vehicle is similar.



ITEM	DESCRIPTION
1	Thumbwheel
2	Voice control
3	Seek down
4	Volume down
5	'O' switch
6	Seek up
7	Volume up

The switches are a resistive ladder type which apply a different voltage to the left steering wheel switch in response to different switches being pressed.

The left steering wheel switch converts the voltage into a Local Interconnect Network (LIN) message. The LIN message is passed to the BCM/ GWM through the Steering Wheel Module (SWM). The BCM/ GWM communicates the driver request from the left steering wheel switch to the IGM / ICCM. The communication is passed through the HS CAN HMI systems bus.

The left steering wheel switch controls the following functions:

- Thumbwheel - Press repeatedly to scroll through all audio or video sources.
- Short press seek up:
 - Select the next radio preset.
 - Select the next track on chosen audio source.
 - When the mobile phone is in use, press to scroll up lists of calls or phonebook entries.
- Short press seek down:
 - Select the previous radio preset.
 - Select the previous track or start of current track on chosen audio source.
 - When the mobile phone is in use, press to scroll down lists of calls or phonebook entries.
- Short press the volume up for any audio source.
- Short press the volume down for any audio source.

The 'O' switch is for use with the IPC menu.

For additional information, refer to: [Instrument Panel Cluster](#) (413-01 Instrument Cluster, Description and Operation).

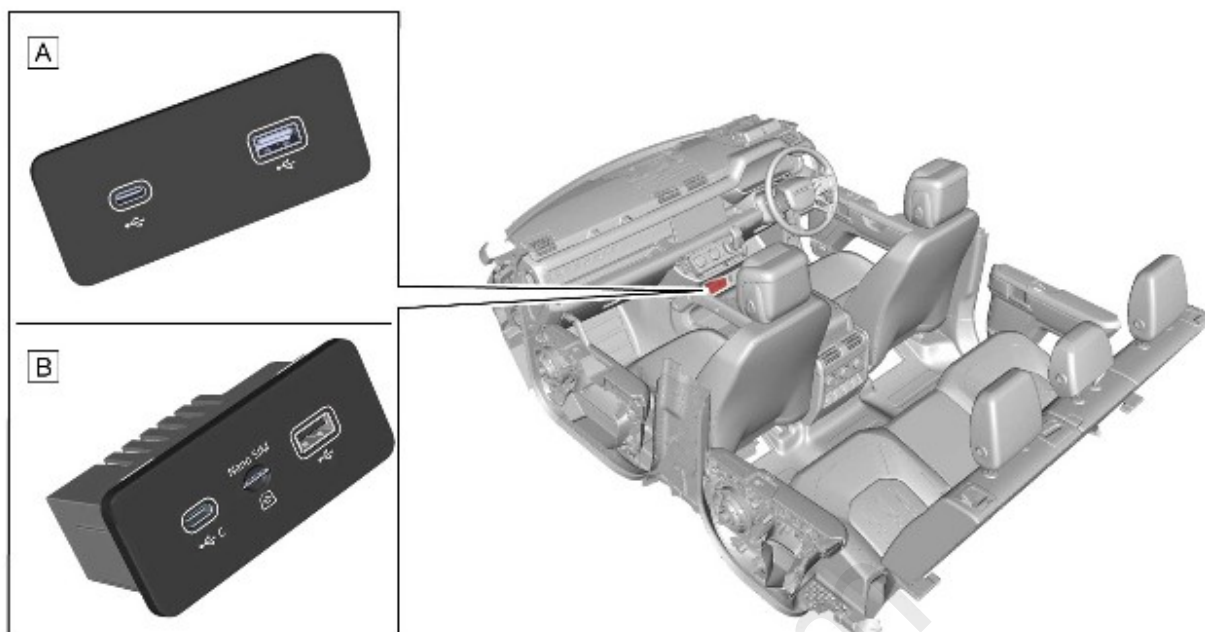
For additional information, refer to: [Voice Control](#) (415-01 Information and Entertainment System, Description and Operation).

FRONT PORTABLE MEDIA INTERFACE PANEL



NOTES:

- RHD vehicle is shown, LHD vehicle is similar.
- Vehicle with 5 doors is shown. Vehicle with 3 doors is similar.



E249004

ITEM	DESCRIPTION
A	Front portable media interface panel - Embedded SIM card reader
B	Front portable media interface panel - Physical SIM card reader

The front portable media interface panel is in the front floor console. The front portable media interface panel has 2 configurations, one is embedded SIM card reader, the another is physical SIM card reader.

The front portable media interface panel receives a power supply from a fuse in the Rear Junction Box. Power management is controlled by the BCM/ GWM.

The front portable media interface panel has the following connections:

- The USB 2.0 socket
- The Type-C socket
- A nano SIM card reader.

The front portable media interface panel is connected directly to the IGM / ICCM.

The nano SIM card is placed in the front portable media interface panel. The nano SIM card reader utilizes a nano SIM interface.

To install a nano SIM card, insert the nano SIM card into the nano SIM card socket in the portable media interface panel.

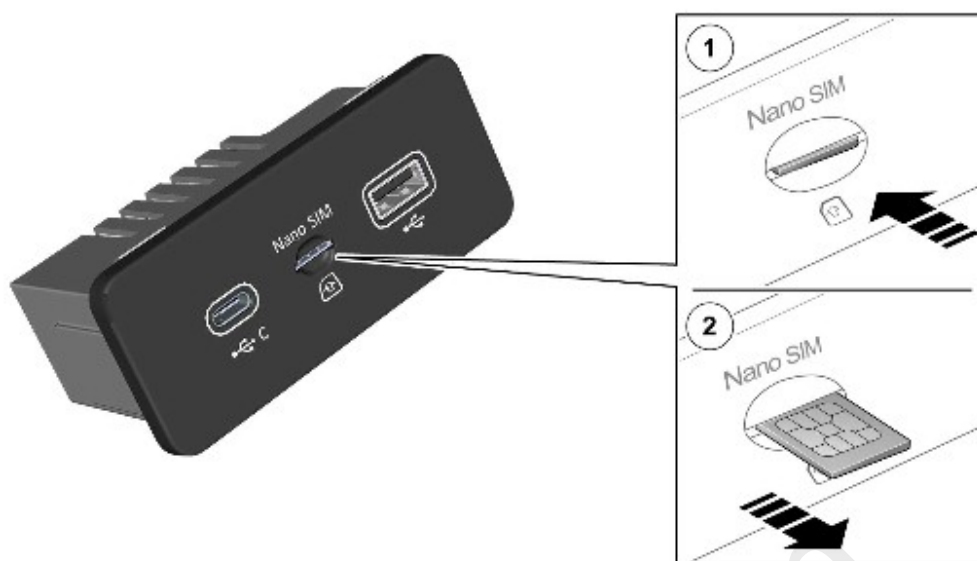
The nano SIM card must be inserted with the contacts facing up and the shortest end facing outwards. The graphic on the portable media interface panel shows the correct orientation. The nano SIM card should not be protruding when correctly inserted. Make sure the nano SIM card is located correctly in the nano SIM card reader. Failure to do so may damage the nano SIM card or nano SIM card reader. To remove the nano SIM card, gently push in the nano SIM card and release.

Data transfer from the nano SIM card is direct to the IGM / ICCM, using the USB 2.0 wiring harness.

Nano SIM Card Insertion



Nano SIM Card Removal



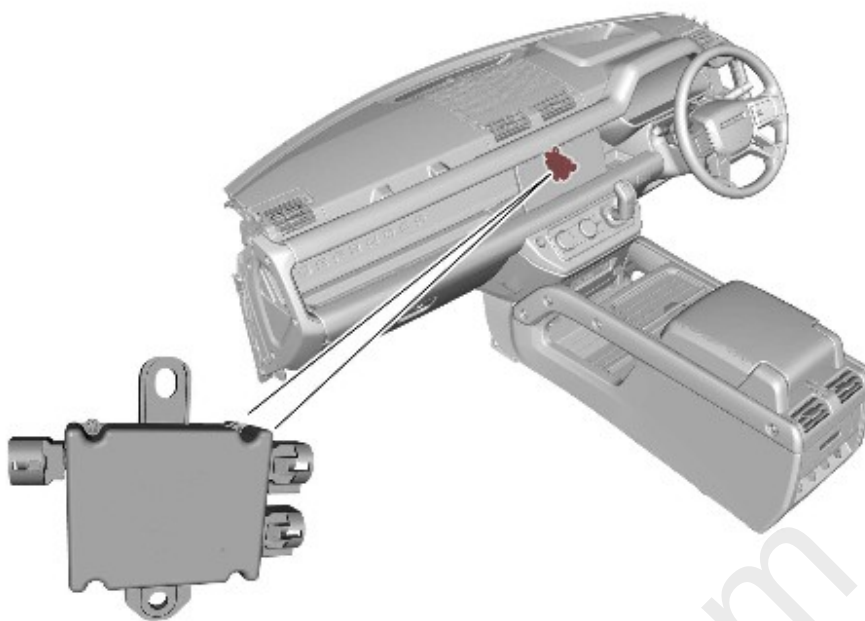
E249006

USB 2.0 HUB (IF EQUIPPED)



NOTE:

RHD vehicle is shown, LHD vehicle is similar.



E250155

The USB 2.0 hub is located in the instrument panel.

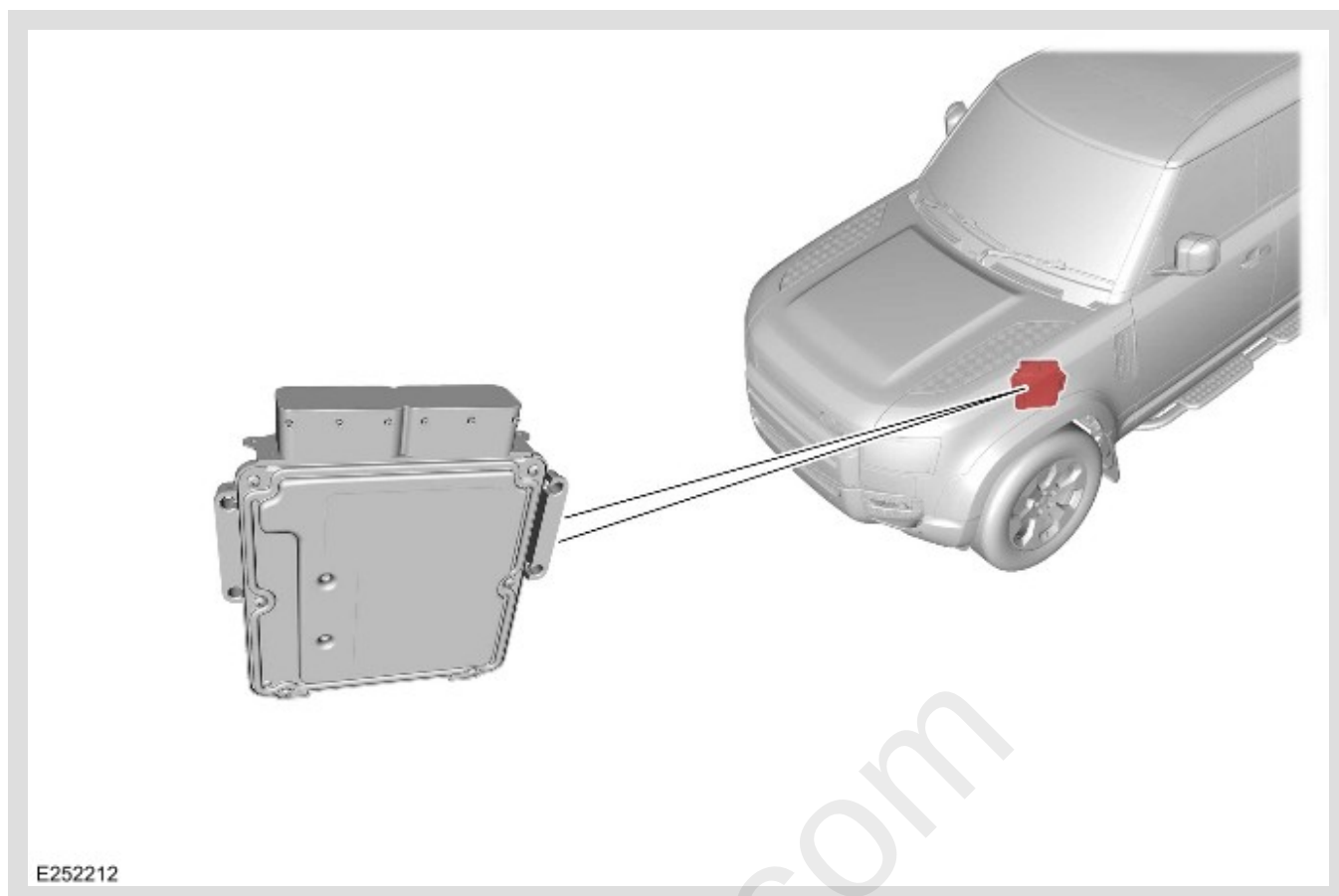
The USB 2.0 hub functions as a signal booster for USB 2.0 signals. The signals are between the electronic toll collection module and the IGM / ICCM.

POWERTRAIN CONTROL MODULE



NOTE:

Vehicle with 5 doors is shown. Vehicle with 3 doors is similar.



The PCM provides engine speed data to the audio system. The PCM is part of the Engine Management System (EMS).

For additional information, refer to: [Electronic Engine Controls](#) (303-14A Electronic Engine Controls - INGENIUM I4 2.0 L Diesel, Description and Operation).

For additional information, refer to: [Electronic Engine Controls](#) (303-14B Electronic Engine Controls - INGENIUM I6 3.0 L Petrol, Description and Operation).

HD RADIO™ (NAS ONLY)

The HD Radio™ technology is a free digital radio format broadcast available in the NAS market. The HD Radio™ may become available for other markets in the future.

The HD Radio™ digital broadcasts are transmitted alongside the analog AM and FM signals by stations broadcasting HD Radio™ signals. The HD Radio™ technology has the ability to deliver improved sound quality and content to the listener. The HD Radio™ blends between analog and a digital audio stream of the primary station and delivers extra multicast stations on the same frequency.

The HD Radio™ receiver is integrated into the AM/FM tuner on NAS variants of the IGM / ICCM.

ANTENNAS

The AM, FM, DAB, satellite radio and other system antennas are located in the roof pod and side windows.

For additional information, refer to: [Antenna](#) (415-01 Information and Entertainment System, Description and Operation).

SPEAKERS

The number, location and specification of the speakers in the vehicle differs depending on the level of audio system equipped.

For additional information, refer to: [Speakers](#) (415-01 Information and Entertainment System, Description and Operation).

MICROPHONE

The microphone is part of the voice control system and the telematics system. The vehicle has 2 different microphones. The microphone on the front overhead console is used for telematics system. The microphones on the headliner are used of voice control and active Noise, Vibration and Harshness (NVH) features.

For additional information, refer to: [Telematics](#) (415-01 Information and Entertainment System, Description and Operation).

For additional information, refer to: [Voice Control](#) (415-01 Information and Entertainment System, Description and Operation).

BODY CONTROL MODULE/GATEWAY CONTROL MODULE

The BCM/ GWM is an interface unit on the CAN bus. Information transfers from 1 CAN bus system to another within the BCM/ GWM. The BCM/ GWM also contains control components.

OPERATION

The IGM / ICCM is subject to the power management of the quiescent current relay which is integrated into the Rear Junction Box (BCMB). Power management is controlled by the BCM/ GWM.

The BCM/ GWM controls the quiescent current relay in the BCMB. The BCM/ GWM receives startup battery status signals transmitted by the Battery Monitoring System (BMS) control module. The BCM/ GWM assembly can disable the power supply to other non-essential control modules to avoid excessive discharge of the startup battery. The system supplied through the quiescent current relay is the infotainment system.

The IGM / ICCM is connected to the FCDIM through an APIX2 connection. APIX2 is a high speed data transmission over 2 twisted pair cables. FCDIM selections by the driver are passed to the IGM / ICCM on the APIX2 connection for processing.

The front portable media interface panel is connected to the IGM / ICCM with USB data links. The USB sockets provides a 5V charging output for the connected device and also provides external connection of a device to the IGM / ICCM. Power is supplied to the portable media interface panel from a fuse in the Rear Junction Box through the quiescent current relay.

The AAM receives a power supply through a fuse in the Rear Junction Box.

Video data is passed from the IGM / ICCM to the IPC on APIX2 connection. The data connection provides video output from the IGM / ICCM for user interface information to be displayed in the IPC.

For additional information, refer to: [Instrument Panel Cluster](#) (413-01 Instrument Cluster, Description and Operation).

For additional information, refer to: [Navigation System](#) (415-01 Information and Entertainment System, Description and Operation).

ACTIVE SOUND DESIGN



NOTE:

The active sound design feature is only available on specific powertrains.

Active sound design is an enhancement of the vehicle engine sound, reproduced and emitted over the vehicle speaker system.

The PCM provides engine speed input for the AAM. The engine speed signal is a Pulse Width Modulated (PWM) signal. The engine speed input allows the AAM to provide a digital audio enhancement of the engine sound.

The PCM also outputs signals for:

- Engine torque
- Road speed
- Power Mode.

The PCM sends these signals to the BCM/ GWM on the FlexRay. The BCM/ GWM sends these signals to the IGM / ICCM. The signals are sent through HS CAN HMI systems bus.

The AAM contains software to operate the enhanced engine sound output.

The enhanced engine sound output over the vehicle speakers is active when the engine is in Power Mode 7 (engine running). The sound remains active even when the audio volume is at 0 or infotainment system is turned OFF. There is no customer interaction with the system which is always active.

The PCM and the AAM record Diagnostic Trouble Code (DTC)s when a fault occurs. The JLR approved diagnostic equipment reads the fault information.

The active sound design software is not installed in a replacement AAM. It is necessary to install the software in the replacement AAM to use the JLR approved diagnostic equipment.

When the incorrect software is installed in the AAM, a loud engine noise may be heard.

DIAGNOSTICS

The IGM / ICCM records any DTC and related data. The DTC and related data are read using the JLR approved diagnostic equipment.

The JLR approved diagnostic equipment enables certain components to be activated and also read live data.



A = HARDWIRED: O = LIN: T = CO-AXIAL: AT = USB: AU = APIX2: AW = BROADR-REACH® ETHERNET: AX = FLEXRAY:
BA = HS CAN HMI SYSTEMS BUS.

ITEM	DESCRIPTION
1	IGM / ICCM
2	BCM/ GWM
3	Vehicle speakers
4	AAM
5	PCM - Vehicle speed
6	IPC
7	Head Up Display (HUD)
8	FCDIM
9	Ground
10	Power supply
11	Global Navigation Satellite System (GNSS) signal splitter
12	Roof pod - GNSS antenna
13	Roof pod - SDARS (if equipped)
14	Antenna amplifier (number dependant on vehicle and system specification)
15	Bluetooth®/WiFi antenna (quantity 2)
16	SWM
17	Left steering wheel switch
18	Front portable media interface panel
19	PCM - Engine signals