Information and Entertainment System - General Information - Navigation System Map Updates

Description and Operation

Map Update Applicability - DVD/USB

| Vehicle	Pre - 10MY	10 MY	11 MY	12MY	13MY	14MY
XK	DVD	DVD	DVD	DVD	DVD	DVD
F-Type	-	-	-	-	-	USB
XF	DVD	DVD	DVD	USB	USB	USB
XJ	-	USB	USB	USB	USB	USB
Freelander	DVD	DVD	DVD	DVD	USB	USB
Discovery 3	DVD	-	-	-	-	
Discovery 4	-	External HD Service Tool	External HD Service Tool	USB	USB	USB
Range Rover Evoque	-	-	-	USB	USB	USB
Range Rover Sport (L320)	DVD	External HD Service Tool	External HD Service Tool	USB	USB	USB
Range Rover Sport (L494)	-	-	-	-	-	USB
Range Rover (L322)	DVD	External HD Service Tool	External HD Service Tool	External HD Service Tool	-	-
Range Rover (L405)	-	-	-	-	USB	USB

NOTE: For vehicles using SD card navigation updates refer to SD Card Navigation Updates (Asia Navigation) below.

Mapping Regions

Region	Mapping Area
1	North America (USA, Canada and Mexico)
2	Western and Eastern Europe
3	Japan
4	Middle East (Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia and UAE
5	South Africa
6	South America (Brazil and Argentina)
7	Russia
8	Pacific (Australia and New Zealand)
9	South East Asia (Malaysia and Singapore)

DVD Map Updates

E142913

Vehicles equipped with the 'remote' navigation module are supplied with a DVD map update which is loaded into and left in the navigation module. Map data is read directly from the DVD. This update can be carried out by the customer.

External HD Service Tool Map Updates

E142915

Discovery 4, Range Rover Sport and Range Rover vehicles, equipped with a HDD (hard disc drive) integrated into the touch screen, are updated at point of service. Dealers are supplied with a set of master pack map update DVD's which are loaded onto the dealer Jaguar/Land Rover approved diagnostic equipment. The map data is then loaded from the diagnostic equipment onto the navigation tool hard drive. The map data is loaded to the touch s screen from the navigation tool hard drive.

The following process should be used to update the map data:

NOTE: The navigation update tool does not need the map data loading every time. This is only necessary when a new map update DVD is released.

- Using the approved Jaguar/Land Rover diagnostic equipment select the navigation update tool.

E142966

- Select **Setup** on th navigation update tool.

E142967

- Connect the navigation update tool to the Jaguar/Land Rover approved diagnostic equipment using the USB cable and press **Continue** proceed.

E142969

- The navigation update tool will then check the connection.
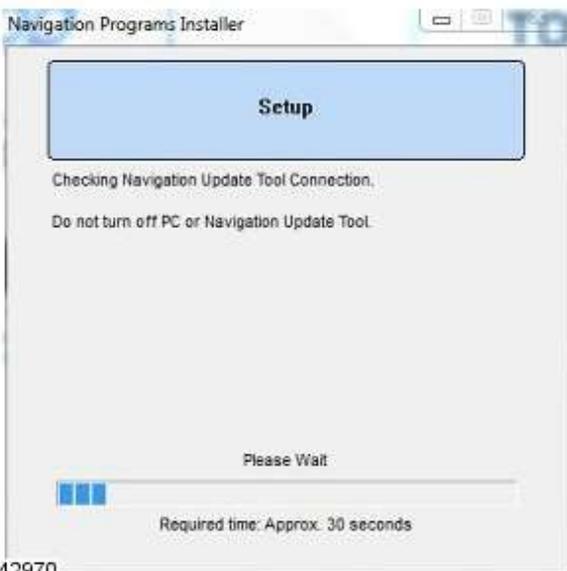
E142970

- Select your preferred language from the drop down menu then press **Save and Continue Setup** to proceed.

E142971

- When the navigation update tool confirms the initial setup is complete, press **Continue** to proceed.

E142972
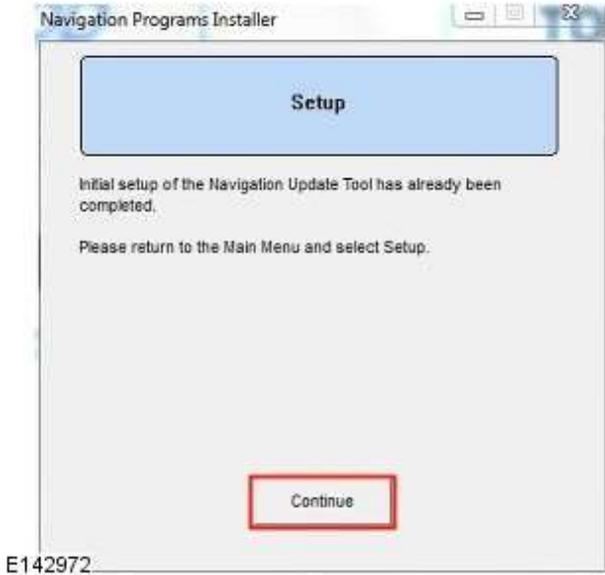
- The navigation update tool will the return to the main menu screen, select **Load Map Data** to proceed.

E142968

- Disconnect then reconnect, the USB cable connecting to the navigation update tool to the Jaguar/Land Rover approved diagnostic equipment, press **Continue** proceed.

E142973

- The navigation update tool will then check the connection.

Navigation Programs Installer

Load Map Data

Checking Navigation Update Tool Connection.

Do not turn off PC or Navigation Update Tool.

Please Wait

Required time: Approx. 30 seconds

E142974

- Insert map update disk 1 into the DVD drive of the Jaguar/Land Rover approved diagnostic equipment and press **Continue** proceed

Navigation Programs Installer

Load Map Data

Insert Map Disk 1 into DVD Drive.

DVD

Cancel   Continue

E142975

- The navigation update tool will then read the map data

Navigation Programs Installer

Load Map Data

DVD Drive is reading Map Data.

Do not turn off PC or Navigation Update Tool.

Please Wait

Required time: Approx. 5 seconds

E142976

- Map data will then be copied from disk 1 to the Jaguar/Land Rover approved diagnostic equipment.

Navigation Programs Installer

Load Map Data

Map Data is being copied to the PC.

Do not turn off PC or Navigation Update Tool.

Copying. . .

22.5 MB of 6159.0 MB

Please Wait

Transfer Rate - 3.00 MB/sec
Time Remaining - 00:34:01

E142977

- Insert map update disk 2 into the DVD drive and press **Continue** proceed

- Map data will then be copied from disk 2 to the Jaguar/Land Rover approved diagnostic equipment.

- Map data is now ready to be uploaded onto the navigation update tool, press **Continue** proceed.

Navigation Programs Installer

Load Map Data

Preparing to install Map Data onto Navigation Update Tool.

The following Map Data will be loaded:

Generation No.	Map Version
000WEU10	20100501

Press Continue to Load Map Data

Cancel   Continue

E142980

- The map data is now being uploaded onto the navigation update tool.

Navigation Programs Installer

Load Map Data

Navigation Update Tool is creating partition(s) for the following Map Generations:

Generation 000WEU10

Do not turn off PC or Navigation Update Tool.

Please Wait

Required time: Approx. 15 minutes

E142981

- Map data upload is now complete.

E142982

- Disconnect the navigation update tool from Jaguar/Land Rover approved diagnostic equipment.
- Connect the navigation update tool to the vehicle using the firewire cable.
- Select **Navigation** using the touch screen display soft key.

E142956

- Select **Navigation Setup** using the touch screen soft key.

E142957

- Select **Map Change** using the touch screen.

E 142958

- Select map region using the touch screen display and press **Map Data Update** to continue.

E 142959

- The current map data version and the proposed update map data versions will now be shown, Select the relevant region, using the related touch screen key to proceed.

E 142960

- Select **OK** to input the licence key using the touch screen.

E 142961

- Input the licence key using the touch screen display and press **OK** to continue.

E142962

- Select **OK** using the touch screen.

E142963

- The map update will begin.

E142964

- When the map update is complete a message will be shown in the touch screen, select **OK** to continue using the touch screen display soft key. The navigation system will restart with the new map data.

E142965

- Disconnect the navigation update tool from the vehicle.

USB Map Updates

E142914

All Gen 2.1 equipped vehicles are supplied with a USB map updates, these updates can be carried out by the customer.

The following process should be used to update the map data:

- Start the engine.
- Navigate to the touch screen **Home Menu** screen.

E142916

- Insert the USB memory stick containing the map data into the vehicle USB port.

E142914

- Press **Continue** on the touch screen to proceed with the installation of the map update.

E142917

- using the touch screen enter the licence code and press **OK** to proceed.
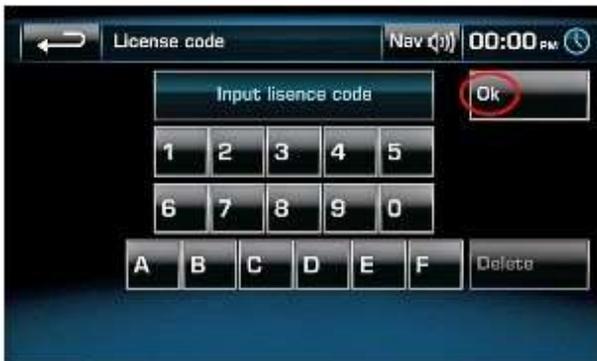
E142918

- ⚠ NOTE: Selecting 'Cancel' returns to the 'Home Menu' screen, the map update will continue to run in the background

The map update will begin and a message will be displayed in the touch screen display advising that navigation is unavailable.

E142919

- Map update progress can be viewed as a percentage of the completed download in the **Home Menu** screen.

E142920

- When the update is complete a message is displayed informing the user.

E142921

- The navigation will restart upon completion of the map update.

NOTE: Remove USB stick immediately

E142922

- Turn off the engine.
- Exit, lock the vehicle and leave for at 15 minutes before using the navigation system.

Japanese Navigation

The Japanese satellite navigation system uses a separate navigation computer module.

The HDD in the ACM/IAM is not used for navigation downloads in this market.

Map updates are supplied in DVD format. The DVD is loaded into the navigation module. Map data is read directly from the DVD.

SD Card Navigation Updates (Asia Navigation)

The Asia market navigation system is an aftermarket unit.

Map updates are supplied in an SD card format. The SD card is loaded into the navigation module. Map data is read directly from the SD card.

NOTE: The following countries use SD card navigation updates.

Country
ANGOLA
ARGENTINA
AZERBAIJAN
BAHAMAS
BARBADOS
BENIN
BOTSWANA
BRAZIL
BRUNEI
BURUNDI
CAYMAN ISLANDS
CHILE
CHINA
COLOMBIA
EGYPT
FIJI
GHANA
HONG KONG
INDIA
INDONESIA
ISRAEL
JAMAICA
KENYA
LEBANON
LESOTHO
MALAWI
MALI
MAURITIUS
MONGOLIA
MOROCCO
MOZAMBIQUE
NAMIBIA
NIGER

Country
NIGERIA
PERU
PHILIPPINES
RWANDA
SENEGAL
SOUTH AFRICA
SRI LANKA
SAINT LUCIA
SWAZILAND
TAIWAN
TANZANIA
THAILAND
TOGO
TUNISIA
UGANDA
URUGUAY
VENEZUELA
VIETNAM
ZAMBIA
ZIMBABWE

Information and Entertainment System - General Information - Information and Entertainment System
Diagnosis and Testing

Principle of Operation

For a detailed description of the Information and Entertainment System, refer to the relevant Description and Operation sections in the workshop manual. REFER to: (415-01A Information and Entertainment System)

Audio System (Description and Operation),
Audio System (Description and Operation),
Audio System (Description and Operation).

Inspection and Verification

⚠ CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

1. Verify the customer concern.

2. Visually inspect for obvious signs of damage and system integrity.

Visual Inspection

Mechanical	Electrical
- Information and entertainment module - Audio amplifier module - Integrated audio module - Portable audio interface module - Digital audio broadcast module - Integrated control panel - Touch screen display - Satellite radio module - Television module - Navigation system module - Telephone module - Compact disc player jammed, not loading - Scratched/dirty compact discs - Speakers	- Fuses - Loose or corroded connector(s) - Information and entertainment module - Audio amplifier module - Integrated audio module - Portable audio interface module - Digital audio broadcast module - Integrated control panel - Touch screen display - Satellite radio module - Television module - Navigation system module - Telephone module - Speakers

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the relevant DTC Index.

Symptom Chart

Symptom	Display	Possible Causes	Action

Poor audio quality (all sources)	Display normal	- MOST harness connections loose - MOST harness connections contaminated - MOST harness misrouted
		  - Too many bends
		  - Bend radius less than 25mm
			- Check MOST harness connectors for security - Check MOST harness connectors for contamination - Check the routing of the MOST harness

Information and entertainment system inoperative	Touch screen blank or displaying a flashing logo	MOST network fault	REFER to: Communications Network (418-00 Module Communications Network, Diagnosis and Testing).

DTC Index

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: (100-00 General Information)

Information and Entertainment System - General Information - Cellular Phone
Diagnosis and Testing

Principle of Operation

For a detailed description of the Cellular Phone System, refer to the relevant Description and Operation sections in the workshop manual.

Inspection and Verification

⚠️CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

1. Verify the customer concern.

2. Visually inspect for obvious signs of damage and system integrity.

Visual Inspection

Mechanical	Electrical
• Microphone • Bluetooth antenna	• Electrical connectors • Wiring harness for damage or corrosion • Fuses

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the relevant DTC Index.

Symptom Chart

Symptom	Action
Unable to pair	• GO to Pinpoint Test A.
Not Auto Connecting	• GO to Pinpoint Test B.
No Audio to 3rd Party	• GO to Pinpoint Test C.
No Audio from 3rd Party	• GO to Pinpoint Test D.
No Audio	• GO to Pinpoint Test E.

DTC Index

⚠️CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTES:

△If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

△Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

△When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

⚠️ Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

⚠️ If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1A5613	Antenna	• Bluetooth antenna circuit - open circuit	Refer to the electrical circuit diagrams and check blue tooth antenna circuit for open circuit
B1D7984	Microphone Input	• Signal amplitude < minimum	Refer to the electrical circuit diagrams and test microphone input circuit for short/open circuit. Check integrated audio module for related DTCs and refer to relevant DTC Index
U1A0088	Private Communication Network	• Bluetooth phone module internal communications failure	Suspect the module. Check and install a new telephone module as required, refer to the new module/component installation note at the top of the DTC Index
U210000	Initial Configuration Not Complete	• Initial configuration not complete	Re-configure the RJB using the manufacturer approved diagnostic system. If DTC remains, carry out CAN network integrity tests using the manufacturer approved diagnostic system
U210100	Control Module Configuration Incompatible	• Configuration incompatible	Re-configure the RJB using the manufacturer approved diagnostic system. If DTC remains, suspect the telephone module. Check and install a new telephone module as required, refer to the new module/component installation note at the top of the DTC Index
U300044	Control Module	• Data memory failure	Re-configure the telephone module. If the DTC remains, suspect the telephone module. Check and install a new telephone module as required, refer to the new module/component installation note at the top of the DTC Index
U300045	Control Module	• Program memory failure	Re-configure the telephone module. If the DTC remains, suspect the telephone module. Check and install a new telephone module as required, refer to the new module/component installation note at the top of the DTC Index
U300055	Control Module	• Incorrect car configuration data received	Re-configure the RJB using the manufacturer approved diagnostic system. Clear DTC and re-test. If the DTC remains suspect the telephone module. Check and install a new module as required, refer to the new module/component installation note at the top of the DTC Index
U300098	Control Module	• Component or system over temperature	Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition for re-occurrence
U300362	Battery Voltage	• Mis-match in battery voltage, of 2 volts or more, between telephone module and RJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Pinpoint Tests

PINPOINT TEST A : UNABLE TO PAIR	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
A1: 'NO PHONE FITTED' DISPLAY	
	⚠️ NOTE: Prior to continuing with any diagnosis, ensure that the Customer telephone and level of software is included on the JLR approved list, the telephone battery is fully charged and in a serviceable condition, the bluetooth function is activated and the telephone handset is placed within the vehicle cabin area.
	1 Carry out checks to determine if 'No Phone Fitted' is shown on vehicle display.

	Is 'No Phone Fitted' displayed?
	Yes
	    GO to A2.
	No
	    Locate the connected telephone and if not Customer telephone, disconnect from the system.

A2: TELEPHONE BLUETOOTH DEVICE SEARCH	
	1 Carry out Bluetooth device search using Customer handset.

	Is 'Jaguar' identified in Bluetooth device list?
	Yes
	Select device from list, then continue with diagnosis.GO to A3.
	No
	Carry out further Bluetooth device search, to a maximum of 4 times, waiting approximately 20 seconds between searches. If 'Jaguar' still not identified in Bluetooth device list, set ignition status to OFF, wait approximately 30 seconds and set ignition status to ON. Carry out further Bluetooth device search, to a maximum of 4 times, waiting approximately 20 seconds between searches. If 'Jaguar' still not identified in Bluetooth device list, contact your local in market support for further assistance.

A3: TELEPHONE HANDSET ERROR

	1	Check for any error shown on the telephone handset when 'Jaguar' is selected from the Bluetooth device list.

	Was an error immediately shown on the telephone handset?
	Yes
	Wait approximately 10 seconds then re-attempt selection, to a maximum of 4 times, waiting approximately 10 seconds between each attempt. If error still being displayed, contact your local in market support for assistance.
	No
	Enter PIN '1313' then continue with diagnosis.GO to A4.

A4: PIN ENTRY STATUS

	1	Check for successful PIN entry.

	Was PIN entry successful?
	Yes
	GO to A5.
	No
	Wait approximately 10 seconds then re-attempt PIN entry, to a maximum of 4 times, waiting approximately 10 seconds between each attempt. If PIN entry is still un-successful, contact your local in market support for assistance.

A5: 'NO PHONE FITTED' DISPLAY

	1	Carry out checks to determine if 'No Phone Fitted' is still shown on vehicle display.

	Is 'No Phone Fitted' still displayed?
	Yes
	From the telephone handset, select the connect option for the 'Land Rover' device identified in the Bluetooth device list. If 'No Phone Fitted' is still displayed, suspect a telephone handset fault. Carry out Pinpoint test again using known good telephone handset.
	No
	The telephone is paired and connected to the system. No further action is required for this symptom.

PINPOINT TEST B : NOT AUTOMATICALLY CONNECTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: BLUETOOTH MODULE PAIRED DEVICE LIST	

NOTE: Prior to continuing with any diagnosis, ensure that the Customer telephone and level of software is included on the JLR approved list, the telephone battery is fully charged and in a serviceable condition, the bluetooth and auto connect functions are activated and the telephone handset is placed within the vehicle cabin area.

	1	Carry out checks to determine if the Customer telephone is shown in the Bluetooth Module paired device list.

	Is the Customer telephone in the Bluetooth Module paired device list?
	Yes
	GO to B2.
	No
	Carry out Unable to Pair Pinpoint Test.GO to A.

B2: CUSTOMER HANDSET PAIRED DEVICE LIST

	1	Carry out checks to determine if the Bluetooth Module is shown in the Customer telephone paired device list.

	Is the Bluetooth Module in the Customer telephone paired device list?
	Yes
	GO to B3.
	No
	Carry out Unable to Pair Pinpoint Test.GO to A.

B3: CUSTOMER TELEPHONE IN POSITION 1

	1	Carry out checks to determine if the Customer telephone is in position 1 in the Bluetooth Module paired device list.

	Is the Customer telephone in position 1?
	Yes
	GO to B4.
	No
	Advise Customer that auto connection will only be attempted with the device that is shown in position 1 in Bluetooth Module paired device list.

B4: CHECK FOR DTC B1A56-13

	1	Using Manufacturer approved diagnostic system, check for DTC B1A56-13.

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	Is DTC B1A56-13 logged? **Yes** Carry out remedial actions as outlined in DTC Index. If symptom remains, contact your local in market support for assistance. **No** GO to B5.

B5: BLUETOOTH CONNECTION

	1	Carry out checks to determine if Bluetooth connection icon is shown on Customer Bluetooth telephone screen but shows 'No Phone Fitted' on vehicle screen.
		Is Bluetooth connection icon shown on the Customer handset but 'No Phone Fitted' displayed on vehicle screen? **Yes** GO to B9. **No** GO to B6.

B6: 'LAND ROVER' AUTHORISATION

⚠️NOTE: Some handsets may require operator intervention to manually authorise connection.

	1	Carry out checks to determine if 'Land Rover' is authorised in the Customer Bluetooth telephone device list menu.
		Is 'Land Rover' authorised in the Customer Bluetooth telephone device list menu? **Yes** GO to B7. **No** Advise customer that 'Land Rover' needs to be authorised in the Customer Bluetooth telephone device list menu, or operator intervention may be required to manually authorise connection.

B7: SEARCH FOR DEVICES SCREEN

	1	Select the search for devices button on the vehicle display.
		Does pressing the search for devices button bring up the searching screen on the vehicle display? **Yes** Contact your local in market support for assistance. **No** GO to B8.

B8: CYCLE IGNITION AND CHECK SEARCH FOR DEVICES SCREEN

	1	Lock vehicle (wait 60s) before unlocking and turning Ignition status back to ON.
		Does pressing the search for devices button bring up the searching screen on the vehicle display? **Yes** No further action required for this Symptom. Possible intermitent fault. **No** Contact your local in market support for assistance.

B9: PAIRED DEVICE

	1	Check Customer telephone paired device list to establish which device the Customer telephone is connected to.
		Is the Customer telephone connected to the vehicle? **Yes** Lock vehicle (wait 60s) before unlocking and turning Ignition status back to ON. If Not Automatically Connecting, contact you local in market support for assistance. **No** Using the Customer telephone controls, disconnect from the currently connected device and delete from paired device list. Lock vehicle (wait for 60s) before unlocking and turning Igition status to ON. If Not Automatically Connecting, contact your local in market support for assistance.

PINPOINT TEST C : NO AUDIO TO THIRD PARTY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS

C1: MICROPHONE DIAGNOSTIC TROUBLE CODES (DTCS)

⚠️NOTE: Prior to continuing with any diagnosis, ensure that the Customer telephone and level of software is included on the JLR approved list, the telephone battery is fully charged and in a serviceable condition, the telephone is placed within the vehicle cabin area and is connected to the vehicle via bluetooth.

	1	Using the Manufacturer approved diagnostic system, check for any logged microphone DTCs in Audio Front Control module.
		Is DTC B1D79-01 logged? **Yes** Carry out diagnosis of electrical failure as advised in Action column of DTC Index. **No** Contact your local in market support for assistance.

PINPOINT TEST D : NO AUDIO FROM THIRD PARTY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS

D1: 'IN CALL' DISPLAY

1	Carry out checks to determine if 'In Call' is shown on the vehicle display.

Is vehicle display showing 'In Call'?
Yes
> Contact your local in market support for assistance.

No
> Call has ended. No further action is required for this symptom.

PINPOINT TEST E : NO AUDIO

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
E1: AUDIO FROM THIRD PARTY	

1	Establish from Customer feedback/symptom if there is Audio from the Third Party.

Is there Audio from the Third Party?
Yes
> GO to E2.

No
> Refer to the 'No Audio From Third Party' Pinpoint test. GO to D.

E2: AUDIO TO THIRD PARTY

1	Establish from Customer feedback/symptom if there is Audio to the Third Party.

Is there Audio to the Third Party?
Yes
> GO to E3.

No
> Refer to the 'No Audio To Third Party' Pinpoint test. GO to C.

E3: CD OR RADIO AUDIO

1	Establish from Customer feedback/symptom if there is Audio from the CD or Radio.

Is there Audio from the CD or Radio?
Yes
> GO to E4.

No
> Suspect MOST ring fault, refer to electrical circuit diagrams and check/rectify MOST ring as necessary.

E4: TELEPHONE HANDSET AUDIO

1	Establish from Customer feedback/symptom if there is Audio from the telephone handset.

Is there Audio from the telephone handset?
Yes
> Ensure vehicle is parked. Disconnect and reconnect handset. If issue not resolved, contact your local in market support for assistance.

No
> Contact you local in market support for assistance.

Information and Entertainment System - General Information - Navigation System

Diagnosis and Testing

Principle of Operation

For a detailed description of the Navigation System, refer to the relevant Description and Operation sections in the workshop manual. REFER to: (415-01 Information and Entertainment System)

Navigation System (Description and Operation),
Navigation System (Description and Operation),
Navigation System (Description and Operation),
Video System (Description and Operation),
Video System (Description and Operation),
Video System (Description and Operation).

Inspection and Verification

⚠️ CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

1. Verify the customer concern.

2. Visually inspect for obvious signs of damage and system integrity.

Visual Inspection

Mechanical	Electrical
- Information and entertainment module - Audio amplifier module - Integrated audio module - Portable audio interface module - Digital audio broadcast module - Integrated control panel - Touch screen display - Satellite radio module - Television module - Navigation system module - Telephone module - Compact disc player jammed, not loading - Scratched/dirty compact discs - Speakers	- Fuses - Loose or corroded connector(s) - Information and entertainment module - Audio amplifier module - Integrated audio module - Portable audio interface module - Digital audio broadcast module - Integrated control panel - Touch screen display - Satellite radio module - Television module - Navigation system module - Telephone module - Speakers

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4. If the cause is not visually evident, check for Diagnostic Trouble Codes (DTCs) and refer to the relevant DTC Index.

DTC Index

Navigation System Module

⚠️ CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTES:

◭ If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

◭ Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

◭ When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

⚠️Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

⚠️If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B1A8911	Satellite Antenna	• Satellite antenna circuit - short to ground	Check satellite antenna connections. Refer to the electrical circuit diagrams and check satellite antenna circuit for short to ground
B1A8913	Satellite Antenna	• Satellite antenna circuit - open circuit	Check satellite antenna connections. Refer to the electrical circuit diagrams and check satellite antenna circuit for open circuit
B1A891B	Satellite Antenna	• Satellite antenna - circuit resistance above threshold	Suspect navigation module. Check and install a new navigation system module as required, refer to the new module/component installation note at the top of the DTC Index
B1D5514	Antenna #2	• TMC/VICS FM antenna circuit - open circuit	Check TMC/VICS FM antenna connections. Refer to the electrical circuit diagrams and check TMC/VICS FM antenna circuit for open circuit
B1D5614	Antenna #3 Circuit	• VICS antenna circuit - open circuit	Check VICS antenna connections. Refer to the electrical circuit diagrams and check VICS antenna circuit for open circuit
U200531	Vehicle Speed	• Missing vehicle speed message	Check ABS module and Instrument Cluster for speed related DTCs and refer to relevant DTC Index
U300049	Control Module	• Internal electronic failure	Suspect the navigation module. Check and install a new navigation system module as required, refer to the new module/component installation note at the top of the DTC Index
U300055	Control Module	• Incorrect car configuration data received	Using the manufacturer approved diagnostic system check/amend the Car Configuration File parameter in block 2, byte 127 to match vehicle market/specification. If the DTC remains check navigation system module part number and ensure the correct component is installed to vehicle market/specification
U300087	Control Module	• Missing message	Re-configure the RJB using the manufacturer approved diagnostic system. Check navigation module for DTCs and refer to the DTC Index. Check CAN network integrity using the manufacturer approved diagnostic system
U300098	Control Module	• Component or system over temperature	Check for additional DTCs and refer to DTC Index. Clear DTC and re-test/monitor condition for re-occurrence
U300317	Battery Voltage	• Circuit voltage above threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300362	Battery Voltage	• Mis-match in battery voltage, of 2 volts or more, between navigation module and RJB	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Touch Screen Display (TSD)

⚠️CAUTION: When probing connectors to take measurements in the course of the pinpoint tests, use the adaptor kit, part number 3548-1358-00

NOTES:

⚠️If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

⚠️Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give extra information read by the manufacturer-approved diagnostic system).

⚠️ When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places and with a current calibration certificate. When testing resistance, always take the resistance of the DMM leads into account.

⚠️ Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

⚠️ If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

DTC	Description	Possible Cause	Action
B100E25	Video Input 'A'	• ODST Only - TV video synch mis-match	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
B100F25	Video Input 'B'	• ODST Only - Reverse Camera video synch mis-match	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U1A0101	Communication Link	• ODST Only - cable from navigation module not correctly installed	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Check electrical harness from navigation module is correctly installed
U1A0115	Communication Link	• TSD to navigation module circuit - short to power, open circuit	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system. Refer to the electrical circuit diagrams and check TSD to navigation module circuit for short to power, open circuit
U1A4B48	Control Module Processor B	• Supervision software failure	Re-configure the TSD using the manufacturer approved diagnostic system
U300044	Control Module	• EEPROM, External RAM access failure	Suspect the TSD, check and install a new TSD as required, refer to the new module/component installation note at the top of the DTC Index
U300048	Control Module	• Supervision software failure	Re-configure the TSD using the manufacturer approved diagnostic system
U30004B	Control Module	• Touch panel backlight - high temperature detected	Allow the system to cool, clear the DTC and check/monitor system for re-occurrence. If DTC re-occurs suspect the TSD. Check and install a new TSD as required, refer to the new module/component installation note at the top of the DTC Index
U300055	Control Module	• Incorrect Car Configuration Parameters received	Check/amend the Car Configuration File using the manufacturer approved diagnostic system
U300087	Control Module	• Car Configuration File not received	Check RJB for related DTCs and refer to relevant DTC Index. Check CAN and MOST networks, carry out the CAN and MOST network tests using the manufacturer approved diagnostic system
U300098	Control Module	• TSD internal temperature over limit	Allow the system to cool, clear the DTC and check/monitor system for re-occurrence. If DTC re-occurs suspect the TSD. Check and install a new TSD as required, refer to the new module/component installation note at the top of the DTC Index
U300316	Battery Voltage	• Circuit voltage below threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system
U300317	Battery Voltage	• Circuit voltage above threshold	Carry out any pinpoint tests associated with this DTC using the manufacturer approved diagnostic system

Information and Entertainment System -

Description	Nm	lb-ft	lb-in
Audio antenna unit to "D" pillar retaining bolts	9	-	80
Digital Radio antenna pod retaining nuts	5	-	48
Amplifier retaining nuts	7	-	62
Information and entertainment display retaining bolts	2	-	17
Information and entertainment display mounting bracket to Information and entertainment display retaining bolts	3	-	26
Information and entertainment module retaining bolts	3	-	26
Instrument panel speaker retaining screws	2	-	18
Steering wheel audio control switch retaining screws	3	-	26
Subwoofer amplifier retaining nuts	7	-	62
Subwoofer speaker retaining bolts	6	-	53

Information and Entertainment System - Audio System   - Component Location

Description and Operation
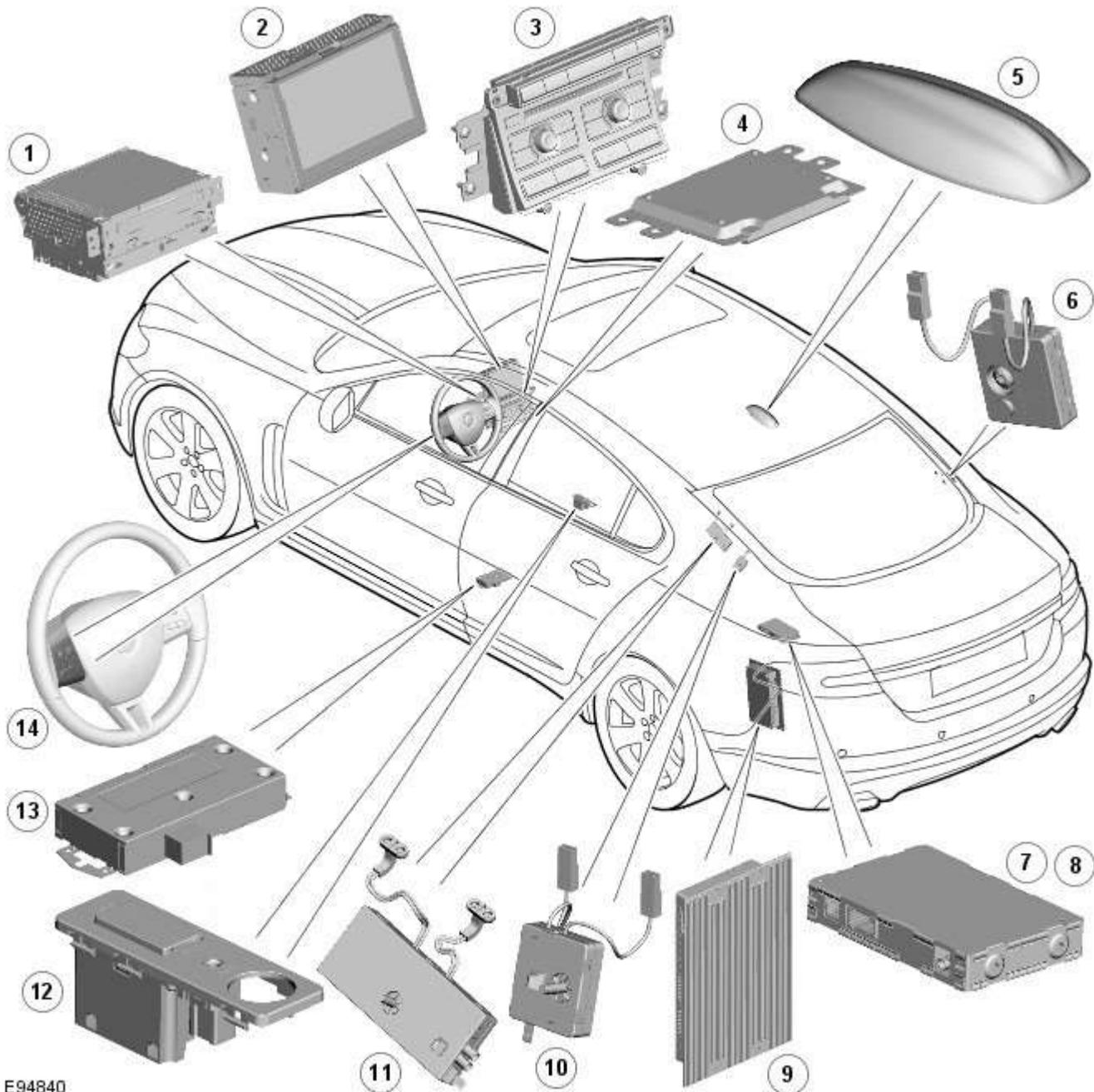
E94840

Item	Description
1	IAM (integrated audio module)
2	Touch-screen
3	ICP (integrated control panel)
4	ICM (information control module)
5	Roof pod antenna module (DAB band L and satellite radio receiver antennas)
6	RF filter
7	DAB (digital audio broadcasting) radio receiver (Optional - Europe only)
8	Satellite radio digital receiver (Optional - NAS only)
9	Power amplifier (Not fitted to the Jaguar Sound System)
10	RF filter

11	Diversity antenna module (AM/FM and DAB band III antennas)
12	Portable audio interface console (Optional)
13	Portable audio module (Optional)
14	Steering wheel remote audio controls

Information and Entertainment System - Audio System   - Overview

Description and Operation

OVERVIEW

The audio system is available in three versions.

- Jaguar Sound System
- Jaguar 320W Premium Sound System
- Bowers & Wilkins 440W Surround Sound System

The audio systems are instrument panel mounted and combine the radio tuner with a slot loading single or 6 disc CD (compact disc) player. All units have AM/FM diversity reception, through the diversity antenna module, which receives signals from antennas located in the heated rear window. The audio systems have various levels of user control through the Touch-screen, ICP (integrated control panel) and steering wheel control panel. The Jaguar Sound System (base audio unit) with single CD player is only compatible with standard CD's. All other versions of CD player are compatible with standard CDs and CDs with MP3 or WMA (windows media audio) files.

A portable audio module allows for the connection of a range of portable audio devices to the **car's** audio system. The portable audio module is controlled through the IAM (integrated audio module) and Touch-screen with play back through the **car's** speaker system. The introduction of this system allows the user to import their personal portable media player to interface with the car, including iPod and other MP3 players, or USB mass storage devices such as memory sticks. MP3 players can also be controlled through the Touch-screen if they are configured as mass storage devices. Details of how to do this will be contained in the manufacturers instructions.

The chosen audio device can be plugged into the car using an interface panel located in the floor console between the front seats. The interface includes a 3.5mm auxiliary jack-plug socket, a 12-volt power supply, a dedicated iPod connector with charging function, plus a USB2 connector which allows connectivity for a wide variety of USB devices. The USB port also provides a charging function although it **does not** support a USB hub. The maximum charging current supplied is 500ma. The user can connect an iPod and USB device at the same time, changing the source via the Touch-screen. The non selected source will still charge.

The Jaguar Sound System is the basic audio system which comprises of an IAM (integrated audio module) with no external amplifier and 8 speakers.

The Jaguar 320W Premium Sound System has the addition of an AUD 8 power amplifier and a 9 speaker system.

The Bowers & Wilkins 440w Surround Sound System additions include an AUD 12 power amplifier, a Dolby Pro-Logic 2 7.1 Surround Sound System, and 14 speakers.

DAB (digital audio broadcasting) is available for most European markets and gives access to digital radio channels for better sound quality and enhanced functionality depending on local service availability. The DAB (digital audio broadcasting) module is located in the luggage compartment. The system receives reception signals from the following sources to ensure optimum signal strength.

- DAB band L antenna located in the roof pod antenna module
- DAB band III antenna located in the heated rear window.

For NAS vehicles the digital format adopted is satellite radio which specifically links to the Sirius network. The system operates in the S-band frequency range, and as a result of the use of satellite transmission, has the ability to provide CD quality audio broadcasts over very large areas (typically continents). The satellite radio receiver is located in the luggage compartment. The system receives reception signals from the satellite radio antenna located in the roof pod module.

Primary user control of the audio system is via the ICP (integrated control panel) and the Touch-screen which are located in the center of the instrument panel. Control signals from the ICP (integrated control panel) are relayed on the medium speed CAN (controller area network) bus to the ICM (information control module). The ICM (information control module) relays the control signals to the rest of the audio system on the MOST (media oriented systems transport) ring. The ICM (information control module) is the timing master for the MOST (media oriented systems transport) ring and also hosts a gateway function between the medium speed CAN bus and the MOST (media oriented systems transport) ring. Audio output signals on the Jaguar 320W Premium Sound System and Bowers & Wilkins 440W Surround Sound System are sent on the MOST (media oriented systems transport) ring from the IAM (integrated audio module) to the power amplifier for speaker output.

Information and Entertainment System - Audio System   - System Operation and Component Description

Description and Operation

Control Diagram

NOTE: A = Hardwired; N = Medium Speed CAN (controller area network) bus; O = LIN bus; P = MOST ring; T = Coaxial
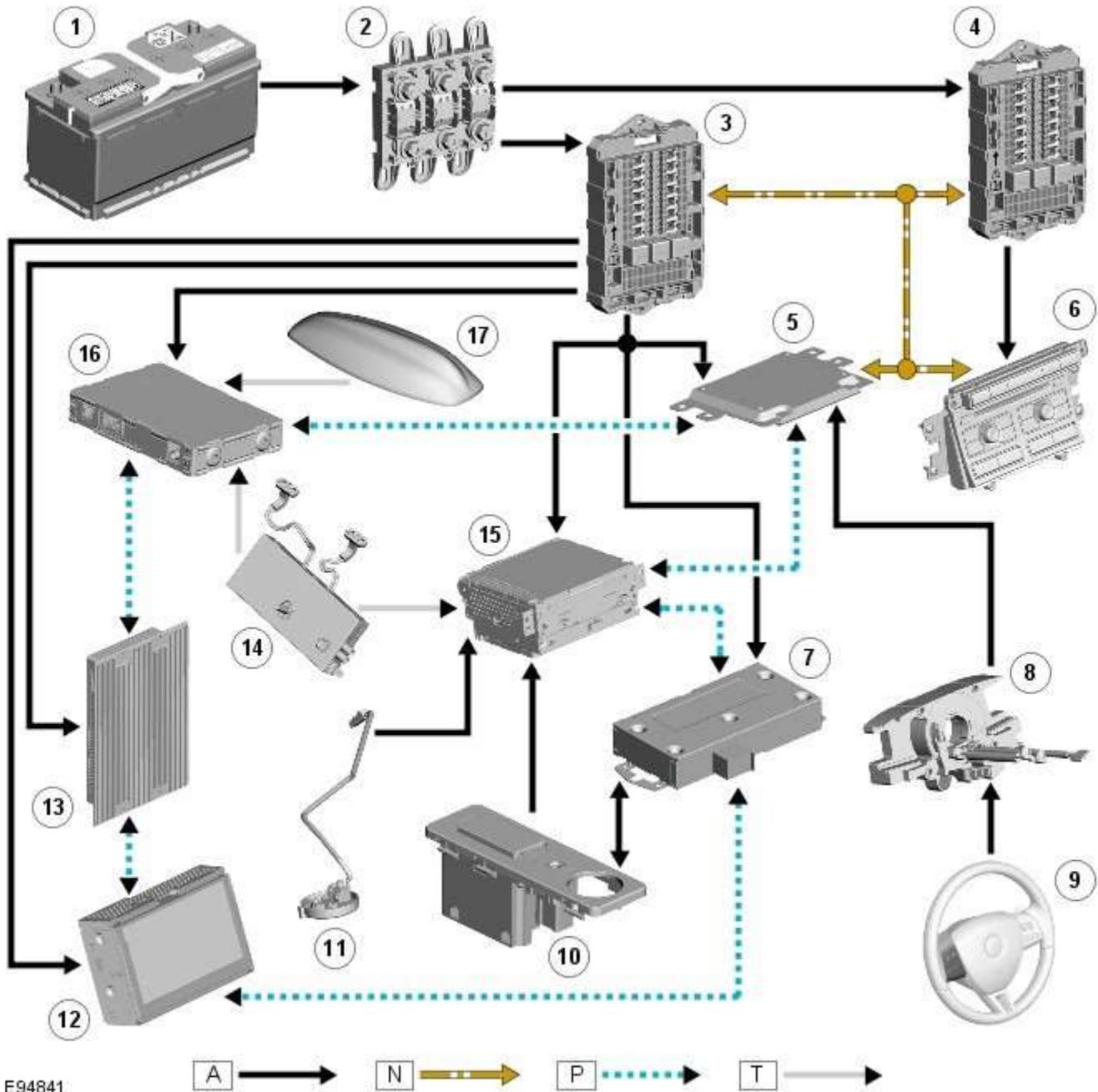
E94841

Item	Description
1	Battery
2	BJB (battery junction box)
3	RJB (rear junction box)
4	CJB (central junction box)
5	ICM (information control module)
6	ICP (integrated control panel)

7	Portable audio module
8	Clock spring
9	Steering wheel remote audio controls
10	Portable audio interface panel
11	Microphone
12	Touch-screen
13	Power amplifier
14	Diversity antenna module
15	IAM (integrated audio module)
16	DAB receiver/Satellite Radio receiver (Note: There is no co-axial link from the diversity antenna module to the satellite radio receiver)
17	Roof pod
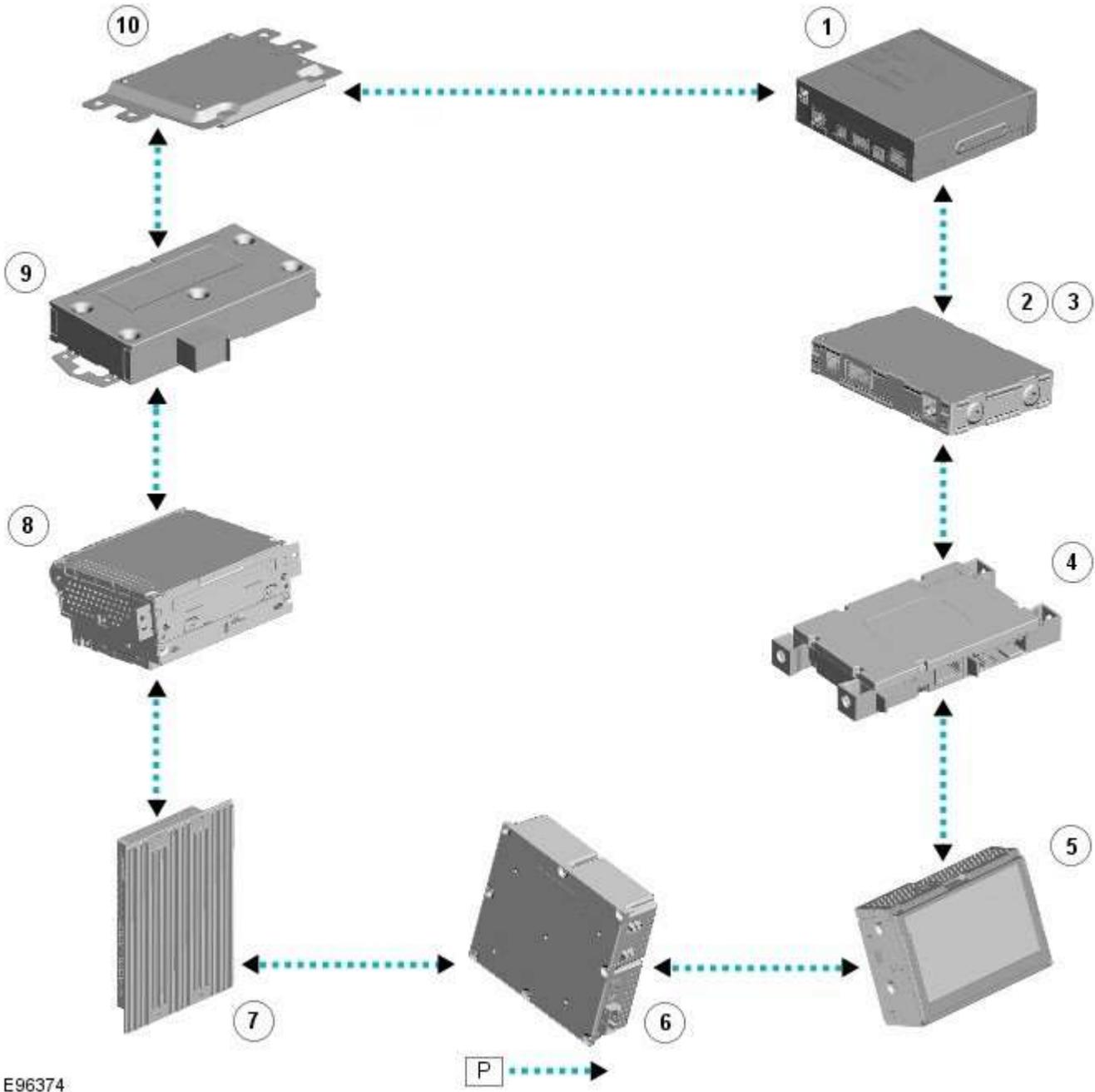
E96374

Item	Description
1	Navigation computer (Optional)
2	DAB (digital audio broadcasting) radio receiver (Optional - Europe only)

3	Satellite Radio digital receiver (Optional - NAS only)
4	Telephone control module (Optional)
5	Touch-screen
6	TV tuner (Optional)
7	Power amplifier (Not fitted to the Jaguar Sound System)
8	IAM (integrated audio module)
9	Portable audio module (Optional)
10	ICM (information control module)

System Operation

AUDIO SYSTEM OPERATION

The components of the audio/infotainment system are all connected on the MOST (media orientated systems transport) ring. The MOST (media orientated systems transport) ring is a fibre optic communications bus for multimedia applications. Audio and control information is passed around the MOST (media orientated systems transport) ring and can be picked up by any of the systems units. For example, radio station tuning/selection input by the vehicle user into the Touch-screen is sent along the MOST (media orientated systems transport) ring and collected by the IAM (integrated audio module) which then selects the requested radio station.

MOST (media orientated systems transport) technology uses a plastic optical fibre which forms a network connecting the audio and multimedia system components. Each component in the ring is connected to the plastic optical fibre through a device known as a FOT (fibre optical transceiver). Each FOT (fibre optical transceiver) has two optical connections; one connection is sensitive to light and is the input, the second connection forms the light source and is the output. The system operates by connecting the output from one FOT (fibre optical transceiver) to the input of another FOT (fibre optical transceiver).

The light signals are sent in one direction only and are formed in the following way:

- Electrical signals are converted into an electrical current
- The current then drives an LED (light emitting diode) in the FOT (fibre optical transceiver) to produce a high intensity red light
- The LED transmits the light through a fibre optic cable
- A photo diode in the FOT (fibre optical transceiver) at the opposite end of the fibre optic cable detects the light.

The following components may be connected to the MOST ring dependant on the vehicle equipment level:

- IAM (integrated audio module)
- Touch-screen
- ICM (information control module)
- DAB (digital audio broadcasting) radio receiver (Optional - Europe only)
- Satellite radio digital receiver (Optional - NAS only)
- Power amplifier (Not fitted to the Jaguar Sound System)
- Portable audio module (Optional)
- Telephone control module (Optional)
- Navigation computer (Optional)
- TV tuner (Optional)

NOTE: Do not view the red light directly

MOST is a synchronous network. A timing master supplies the clock information and all other devices on the network synchronize their operation to this clock. The timing master for the MOST (media orientated systems transport) network on this vehicle is the ICM (information control module). This unit also controls and manages the MOST (media orientated systems transport) ring and the system components.

An Optical Bus tester is used in conjunction with the Jaguar diagnostic system to diagnose the MOST (media orientated systems transport) system. The Optical Bus tester emits a visible, high intensity red light which can be connected into the ring at any point to test the ring integrity. Disconnecting a MOST (media orientated systems transport) connector will reveal if the high intensity red light is visible.

If a break occurs in the MOST (media orientated systems transport) ring fault codes are stored in the ICM (information control module) which can be retrieved using the Jaguar diagnostic system equipment.

With reference to the audio system information and signal transfer the instrument cluster is the gateway between the high and medium speed CAN bus communication protocols. The ICM (information control module) is the gateway between medium speed CAN and the MOST (media orientated systems transport) systems.

A typical example of information transfer is vehicle speed information from the ABS (anti-lock brake system) module used to control the automatic volume control function. The vehicle speed information from the ABS module is sent on the high speed CAN network and collected by the instrument panel gateway. The signal is passed to the medium speed CAN network and onto the ICM (information control module) gateway. The ICM (information control module) calculates the volume adjustment required. The corrected audio volume level signal is sent on the MOST (media orientated systems transport) network to the IAM (integrated audio module) or Power amplifier (dependant on vehicle equipment level) for output to the speaker system.

AUDIO SYSTEM GATEWAY FUNCTIONS

With reference to the audio system information and signal transfer the instrument cluster is the gateway between the high and medium speed CAN bus communication protocols. The ICM is the gateway between medium speed CAN and the MOST systems.

A typical example of information transfer is vehicle speed information from the ABS (anti-lock brake system) module used to control the automatic volume control function. The vehicle speed information from the ABS module is sent on the high speed CAN network and collected by the instrument panel gateway. The signal is passed to the medium speed CAN network and onto the ICM gateway. The ICM calculates the volume adjustment required. The corrected audio volume level signal is sent on the MOST network to the IAM or Power amplifier (dependant on vehicle equipment level) for output to the speaker system.

AUDIO SYSTEM USER CONTROLS

Touch-Screen

E96378

Item	Description
1	Touch-screen
2	Home menu button
3	Touch-screen on/off button

The Touch-screen forms the basis of the audio system. It communicates with the rest of the audio/infotainment system on the MOST ring and allows control of the audio system and other infotainment systems from a single point.

The Touch-screen communicates with the IAM on the MOST ring and provides the primary user interface and display of the audio system controls. No configuration procedure is required if the touch-screen is replaced.

Calibration of the Touch-screen using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.

The touch-screen provides user control of the following systems:

System	Functions
Audio	Radio display AM/FM or DAB, auxiliary and portable audio, digital TV or CD (compact disc)
Climate control	Air conditioning, distribution, seats, heated steering wheel, automatic air recirculation
Telephone	Digit dialer, phone book, last ten calls (made, received, missed)
Navigation	Destination, stored locations, navigation setup, route options
Vehicle	Security, parking, valet mode, trip computer, clock, brightness, contrast, system settings, vehicle settings, display settings

Integrated Control Panel

E96379

Item	Description
1	Touch-screen
2	CD load
3	CD load and eject slot
4	Seek up
5	Settings button
6	Audio system on/off and volume control
7	Audio source
8	Seek down
9	Eject

The ICP duplicates many of the touch-screen audio user control features. Any volume setting made whilst in audio, TV, phone, navigation or voice activation mode will be memorized for that system. The ICP communicates with the ICM on the medium speed CAN. The ICM converts control/command signals from the ICP and then distributes the information onto the MOST system to the audio system and other information and entertainment systems.

No configuration procedure is required if the ICP is replaced. There is no option to calibrate the ICP using the Jaguar approved diagnostic equipment.

Steering Wheel Controls

E96380
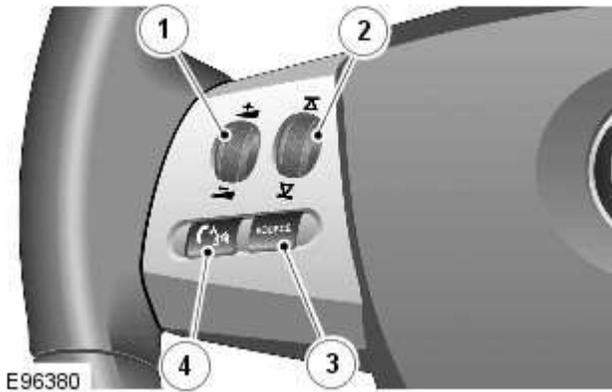
Item	Description
1	Volume adjustment
2	Change pre-set radio stations or CD tracks
3	Select audio source
4	Audio mute control/JaguarVoice control

Additional control of the audio system is available in the form of steering wheel mounted switches which are located on the left hand side of the steering wheel. The four switches provide for volume adjustment, change pre-set radio stations or CD tracks, select audio source and finally audio mute control. The mute control is also used for JaguarVoice control.

The steering wheel audio control switches are hardwired through the clock spring to the ICM. The ICM processes the analogue signals from the switches into digital signals. The digital signals are then passed from the ICM onto the MOST system to control the requested audio functions.

AVC (automatic volume control) controls the audio volume in relation to vehicle speed. As vehicle speed increases the audio level is adjusted to compensate for extra road and vehicle noise. There are three settings for AVC:

- Low
- Medium
- High

Setting of the AVC level is made using the audio controls. The default setting is medium.

The vehicle speed signal is used to enable the ICM to calculate the volume adjustment required. The vehicle speed signal is received over the CAN. The signal is an average of the four wheel speed sensor signals. Should an invalid speed signal be received the AVC will not alter the output volume.

Component Description

INTEGRATED AUDIO MODULE

E96375

The IAM is located in the center console behind the ICP faceplate, and combines the radio tuner and CD player. The head unit controls which of the two sources is routed to the speakers. All tuner versions have AM/FM reception. Each audio system features auto-store, with a press and hold function to store selected channels as pre-sets. The standard search facility finds the nine strongest channels currently available, while search and manual tuning allow channels to be stored as above.

The Jaguar Sound System IAM uses an internal amplifier which directly drives the system speakers. The Jaguar 320W Premium Sound System and Bowers & Wilkins 440W Surround Sound System differs from the Jaguar Sound System with the addition of an external amplifier. Audio output signals from the IAM are sent on the MOST system to the external amplifier which drives the system speakers.

Depending on audio specification the slot-loading CD unit is either a single-disc type or six-disc auto-changer. The system automatically detects the CD format of the source (standard CD, MP3 or WMA files) and offers a full range of options, presenting folders on the touch-screen, listed by albums and tracks, to browse as on a PC. Both versions have mix and repeat functions and the six-disc version displays disc names.

The IAM communicates on the MOST system with the rest of the audio system. If the IAM is replaced it must be configured as a new module using the Jaguar approved diagnostic equipment.

Calibration of the IAM using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.

Audio Antennas
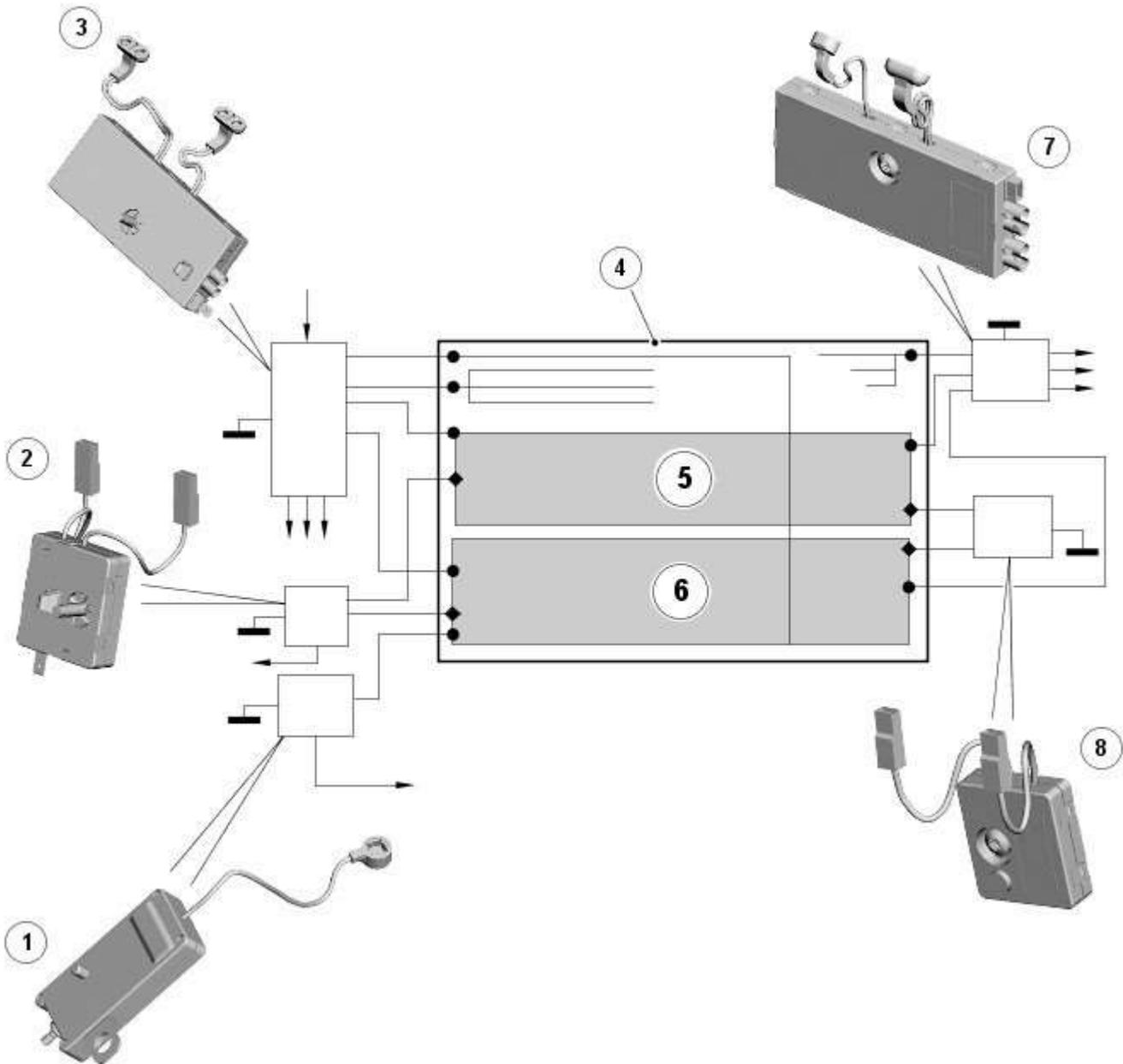
E96376

Item	Description
1	Single TV antenna module
2	RF filter
3	Diversity antenna module
4	Heated rear window
5	Heated rear window upper section

6	Heated rear window lower section
7	Triple TV antenna module
8	RF filter

The diversity antenna module, located on the left hand side of the heated rear window, receives signals from four antennas located in the heated rear window, where one antenna is dedicated as an AM antenna.

The diversity tuning system ensures that the strongest signals are used by the radio system to ensure the best possible FM reception. Using the three remaining receiving antennas serves to eliminate multipath signal distortion. Typically, the signal from the antenna with the least noise is chosen, and the other antennas are ignored.

The diversity antenna module is an interface between the antenna aerials in the heated rear window and audio system modules/tuners. It provides antenna signals to the AM/FM tuner in the IAM, to the DAB receiver and to the VICS (vehicle information and communication systems) or TMC (traffic message channel) in the navigation computer.

There are three different types of diversity antenna module fitted depending on the vehicle market and infotainment equipment specification:

- AM/FM with one co-axial output
- AM/FM and VICS/TMC with two co-axial outputs
- AM/FM, VICS/TMC and DAB band III with three co-axial outputs

The diversity antenna module receives a power supply from the IAM.

Vehicle or other component generated electromagnetic interference may cause unwanted disturbances in the radio and TV reception signals. The disturbance may interrupt, obstruct, or otherwise degrade or limit the effective performance of the circuit. It frequently affects the reception of AM radio in urban areas and can also affect FM radio and television reception, although to a lesser extent.

The RF filters, which act as RF isolators, are located on both sides of the heated rear window and are used to reduce the electromagnetic interference. The left hand side RF filter is connected across the heated rear window power supply and used to separate the DC (direct current) interference from the RF signals. The right hand side RF filter is used in conjunction with the TV antenna module (if fitted). If the TV system is not fitted the filter is linked directly to ground.

INFORMATION CONTROL MODULE

E96377

The ICM is located beneath the IAM in the center console. The unit performs a range of infotainment and some climate-control functions.

The ICM, which is the timing master of the MOST system; supplies clock information to all other devices on the network which synchronize their operation to this clock.

The unit also controls and manages the MOST ring and provides the allocations of channels, system power management, functionality and co-ordination of the other system components.

The system becomes operational when the vehicle is unlocked and a 'wake up' signal is received by the ICM on the medium speed CAN. The ICM 'wakes up' all the control modules on the MOST system ready for immediate operation by the vehicle user.

If the ICM is replaced it must be configured as a new module using the Jaguar approved diagnostic equipment.

Calibration of the ICM using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.

PORTABLE AUDIO MODULE
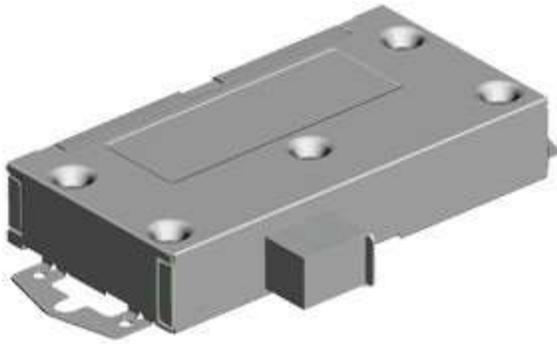
E96381

The portable audio module, located under the left hand front seat, allows for the connection, control and playback of a range of portable audio devices through the **car's** audio system.

No configuration procedure is required if the portable audio module is replaced. Calibration of the portable audio module using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.
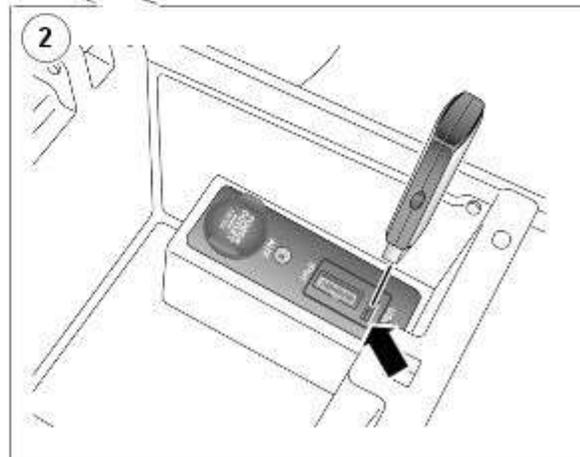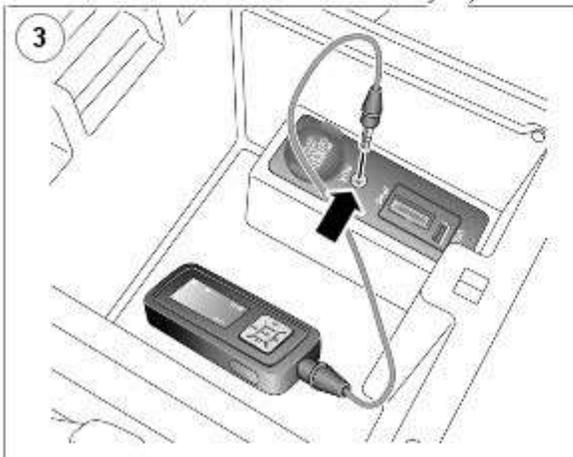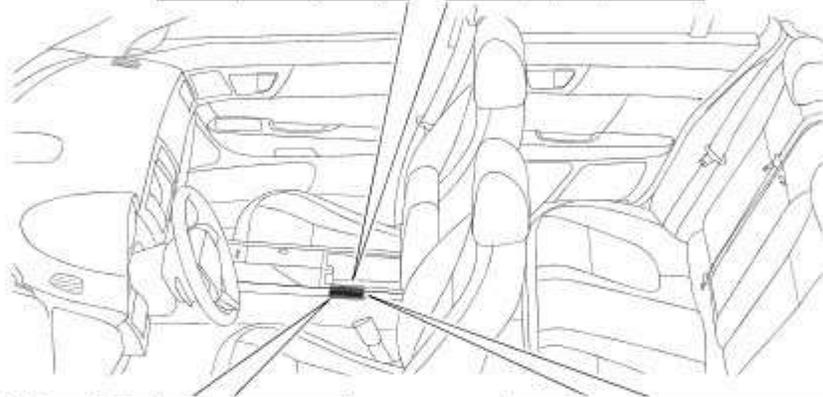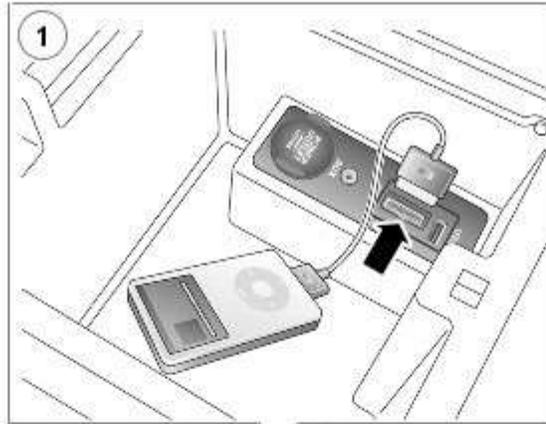
E96382

Item	Description
1	iPod connection
2	USB connection
3	Auxiliary connection

The chosen audio device is plugged into the car using the interface panel located in the center console between the front seats. Vehicles with the optional iPod function are supplied with a bespoke iPod lead in the vehicle delivery pack .

A menu option is available through the Touch-screen audio section when selecting a portable audio device for operation through the vehicle audio system.

After the connection of an iPod or USB mass storage device the Touch-screen is used to operate and search the connected device. Due to safety regulations, the normal control interfaces of either the iPod or USB device are disabled when it is plugged into the interface panel.

NOTE: Some MP3 players have their own file system that is not supported by this system. To use the MP3 player it must be set to USB Removable Device or Mass Storage Device mode. The manufacturer's information should include details of this procedure. Only music that has been added to the device in this mode can be played via the vehicle's portable audio system.

Conversely, connection of any devices through the auxiliary connection cannot be controlled through the touch-screen and are

controlled through the device itself.

The wiring link harness between the portable audio module and interface panel consists of hardwired and digital connections for data and signal exchange. The MOST carries the communication signals and information between the portable audio module to the IAM and touch-screen. Audio output to the speaker system is controlled by the IAM or power amplifier depending on the audio system specification.

POWER AMPLIFIER
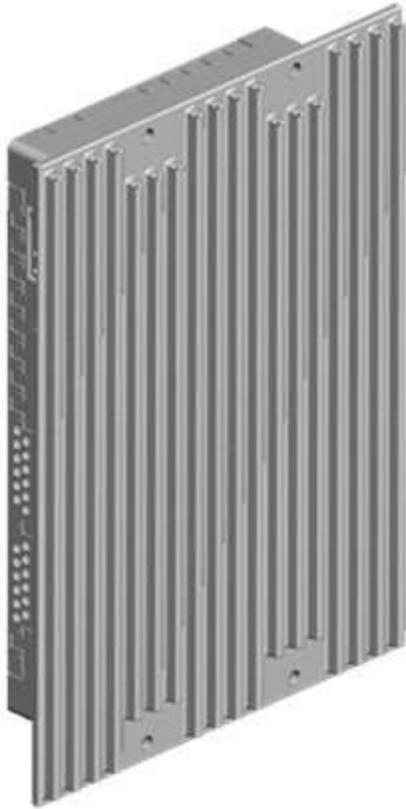
E96383

The audio system has three amplification options dependant on the audio system specification:

- IAM internal amplifier
- Alpine AUD 8
- Alpine AUD 12

The power amplifier is located in the left hand side of the luggage compartment and is connected to the audio system via the MOST bus. Speaker connections are hardwired.

If the power amplifier is replaced it must be configured as a new module using the Jaguar diagnostic equipment.

Calibration of the power amplifier using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.

DIGITAL AUDIO BROADCASTING

DAB is a digital radio network designed to provide reliable, multi-service broadcasting for reception by mobile, portable and fixed receivers.

DAB provides a clear signal with minimal interference, hiss or fading. After a channel (or station) has been tuned and stored, it does not need retuning.

⚠️ NOTE: Radio signals travel in a straight line so large obstacles, such as tall buildings, can shield the vehicle from the signal causing temporary loss of reception (known as dead spots).

Digital radio is transmitted from regional terrestrial transmitters. Some local digital radio channels are not available outside the range of a transmitter. To receive new local channels during vehicle movement around a country, the auto-tune function is used to build new channel lists.

Digital radio channels are organized into groups called ensembles (also known as multiplexes). Some individual channels may also provide a number of subchannels. For example, if several sports events are being held simultaneously, the channel may temporarily choose to broadcast each different event on a separate subchannel.

DAB is broadcast across Europe, Canada and parts of Asia. System transmission is via a terrestrial network, on two separate broadcasting bands:

- DAB band-L
- DAB band III

The DAB system requires additional components to be added to the audio system. DAB antennas and a receiver are fitted to allow reception of the service.

Operation of the DAB system is the same as the radio operation with selections made through the touch-screen and ICP to access and navigate the system functions.

The DAB receiver is a dedicated tuner which is controlled by the ICM on the MOST ring. The receiver processes the signals from the DAB antennas. Information is transmitted on the MOST ring and processed by the ICM. The processed information is sent out to the power amplifier or IAM (with internal amplifier) and broadcast through the speaker system.

No configuration procedure is required if the DAB receiver is replaced. Calibration of the DAB receiver using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.

Digital Audio Broadcasting Antennas

E96385

Item	Description
1	Roof pod
2	Diversity antenna module

The DAB band III antenna is located in the heated rear window and is part of the diversity antenna module circuit. The two antenna circuits each have a co-axial connection to the DAB module.

DAB signals are transmitted on either DAB band III (174 - 240 MHz) or DAB band-L (1452 - 1492 MHz). Some countries may only use the band III signals, while others may only use the band-L signals. Some countries use both frequency ranges within the same geographical area. The type of DAB signal received depends on the vehicle market location.

The DAB antennas are designed with 50 ohm output impedance. The DAB receiver is fitted with 50 ohm fakra II connectors to ensure compatibility with the antenna. For optimum performance 50 ohm low loss coaxial cable is used between the antenna and receiver.

SATELLITE RADIO (NAS VEHICLES ONLY)

E96386

The digital radio format adopted for NAS vehicles is satellite radio. Satellite service providers transmit a signal from their up-link facility (which is the original point of transmission of data, voice or other information through an antenna system) to a satellite where the signal is then down linked to both the terrestrial repeater network and the individual satellite car radios. The radio switches between the satellite signal and the repeater network signal depending on the strength of the signal at any given time.

The Sirius satellite system comprises:

- Satellites
- Ground repeaters
- Up-link ground stations
- Radio receiver systems

The Sirius satellite radio system uses three satellites on an inclined elliptical orbit. This ensures that each satellite spends approximately 16 hours a day over the continent of the USA, with at least one satellite over the country at any one time.

The satellites beam their signals down to the ground where the signal is picked up by receivers or is transmitted to repeater stations to cover built up areas where the signal is obscured. The satellite service comprises over 100 channels of digital entertainment which is provided by subscription requiring a monthly payment.

Operation of the satellite radio system is the same as the radio operations with selections made through the Touch-screen and ICP to access and navigate the system functions.

The satellite radio receiver is a dedicated tuner which is controlled by the ICM on the MOST ring. The receiver filters the signals from the satellite radio antenna. Information is transmitted on the MOST ring and processed by the ICM. The processed information is sent out to the power amplifier or IAM (with internal amplifier) and broadcast through the speaker system.

No configuration procedure is required if the satellite radio receiver is replaced. Calibration of the satellite radio receiver using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.

Satellite Radio Antenna

E96387

The satellite radio antenna is located in the roof pod and is shared with the navigation system GPS (global positioning system) antenna where fitted. The roof pod is located externally in a central position towards the rear of the roof.

Similar to the DAB system the satellite radio antenna is designed with 50 ohm output impedance. The satellite radio receiver is fitted with 50 ohm fakra II connectors to ensure compatibility with the antenna. For optimum performance 50 ohm low loss coaxial cable is used between the antenna and receiver.

The antenna is designed to receive one of two signals, using the strongest signal with the least distortion to process for audio output. For example, if the vehicle drives into a tunnel, the signal received will change from a satellite signal to a repeater station signal maintaining the strongest signal.

Information and Entertainment System - Speakers - Component Location
Description and Operation
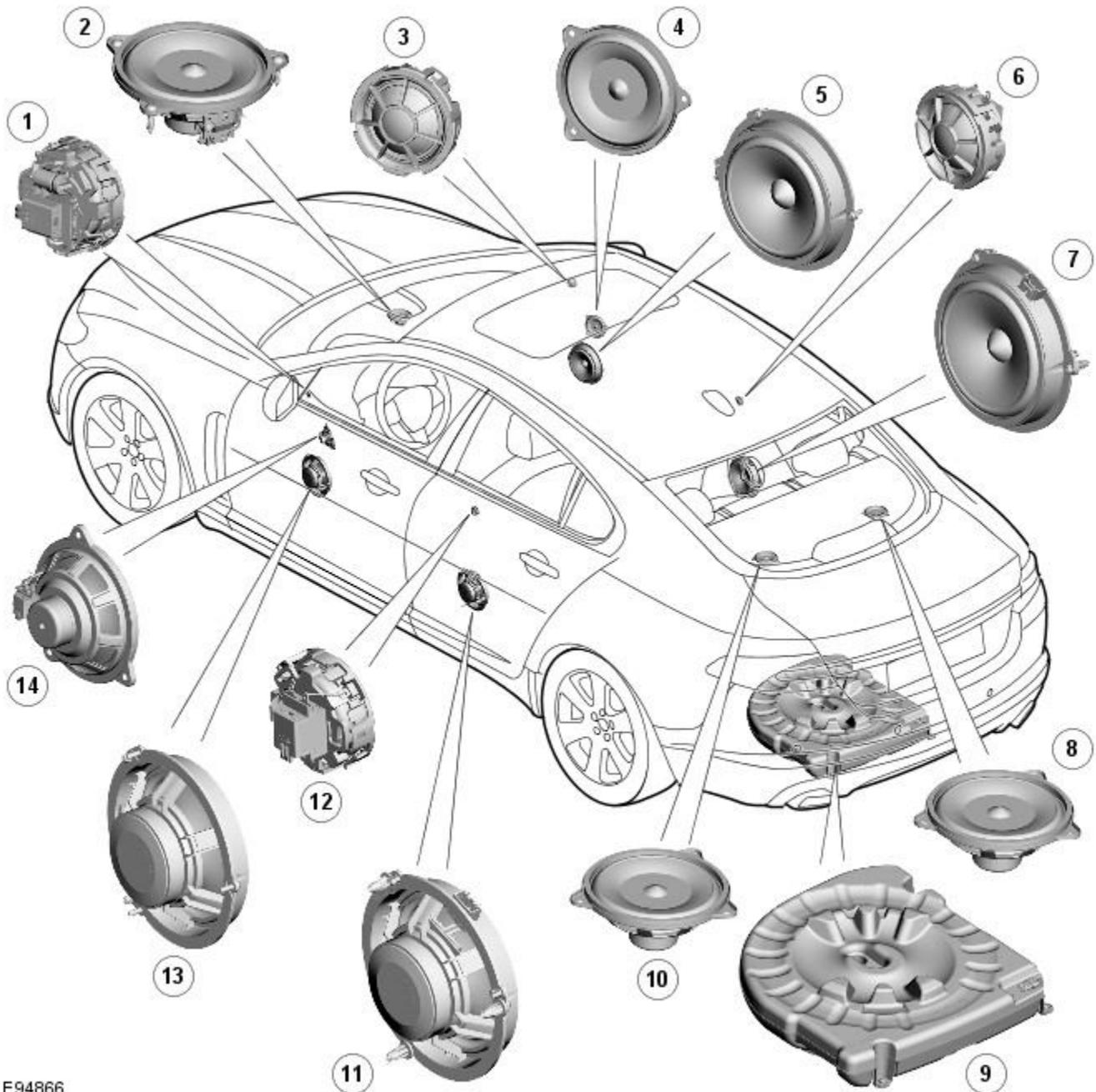
E94866

Item	Description
1	LH (left-hand) front tweeter speaker (All models)
2	Front center speaker (Bowers & Wilkins 440W Surround Sound System only)
3	RH (right-hand) front tweeter speaker (All models)
4	RH front mid-range speaker (Bowers & Wilkins 440W Surround Sound System only)
5	RH front mid-bass speaker (All models)
6	RH rear tweeter speaker (All models)
7	RH rear mid-bass speaker (All models)
8	RH rear full range speaker (Bowers & Wilkins 440W Surround Sound System only)
9	Subwoofer enclosure (Not fitted to Jaguar Sound System)
10	LH rear full range speaker (Bowers & Wilkins 440W Surround Sound System only)
11	LH rear mid-bass speaker (All models)
12	LH rear tweeter speaker (All models)
13	LH front mid-bass speaker (All models)
14	LH front mid-range speaker (Bowers & Wilkins 440W Surround Sound System only)

Information and Entertainment System - Speakers - Overview

Description and Operation

Overview

The vehicle has three levels of audio system available:

- Jaguar Sound System
- Jaguar Premium Sound System
- Bowers & Wilkins Surround Sound System

The Jaguar Sound System has 8 speakers, comprising an identical mid-bass and tweeter combination in each door. All speaker domes in this system are of standard textile construction. The speakers are driven directly by the IAM (integrated audio module) internal amplifier.

The Jaguar 320W Premium Sound System has 9 speakers including mid-bass and tweeters in the doors, adding a sub-woofer in the spare wheel well. The speakers are driven by an Alpine AUD 8 amplifier located in the LH (left-hand) side of the luggage compartment.

The Bowers & Wilkins 440W Surround Sound System uses an Alpine AUD 12 amplifier, a Dolby Pro-Logic 2 7.1 Surround Sound System and has 14 speakers. This layout adds a mid-range speaker to each front door while retaining a mid-bass and tweeter in each rear door. It also adds an instrument panel center speaker, 2 surround-effect speakers in the rear parcel shelf, and has the luggage compartment-mounted sub-woofer as the Jaguar 320W Premium Sound System. The speakers are driven by an AUD 12 power amplifier located in the luggage compartment.

The main speakers on the Jaguar 320W Premium Sound System and the Bowers & Wilkins 440W Surround Sound System are identified by the bright yellow Kevlar constructed domes which are visible through the speaker grilles. The tweeter speaker domes are an aluminum construction. The sub-woofer speakers are a textile dome construction.

Information and Entertainment System - Speakers - System Operation and Component Description

Description and Operation

Control Diagram

- NOTE: A = Hardwired
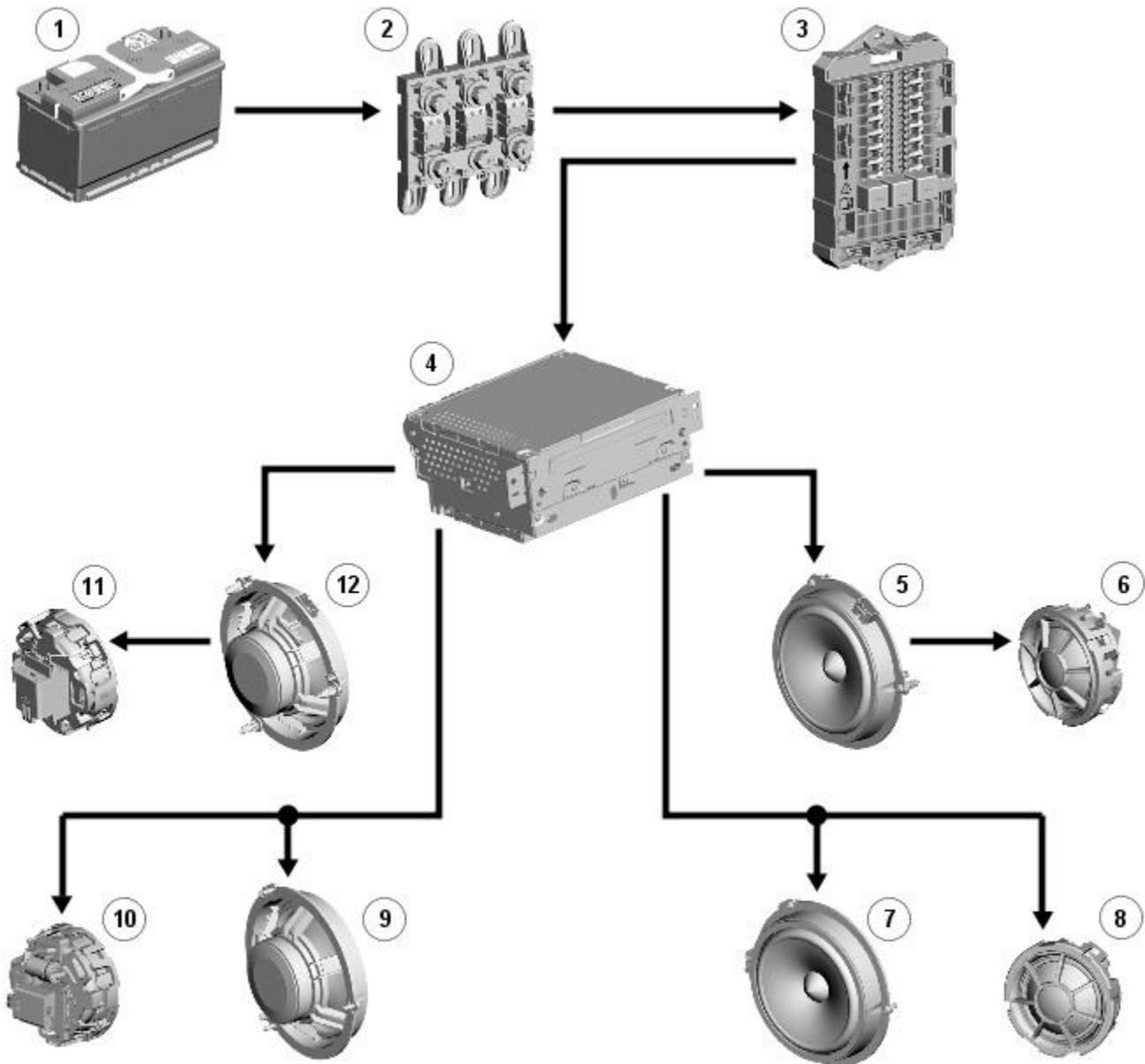
E94867

Item	Description
1	Battery
2	BJB (battery junction box)
3	RJB (rear junction box)
4	IAM (integrated audio module)
5	RH (right-hand) rear mid-bass speaker
6	RH rear tweeter speaker
7	RH front mid-bass speaker
8	RH front tweeter speaker
9	LH (left-hand) front mid-bass speaker
10	LH front tweeter speaker

| 11 | LH rear tweeter speaker |
| 12 | LH rear mid-bass speaker |

CONTROL DIAGRAM - JAGUAR 320W PREMIUM SOUND SYSTEM
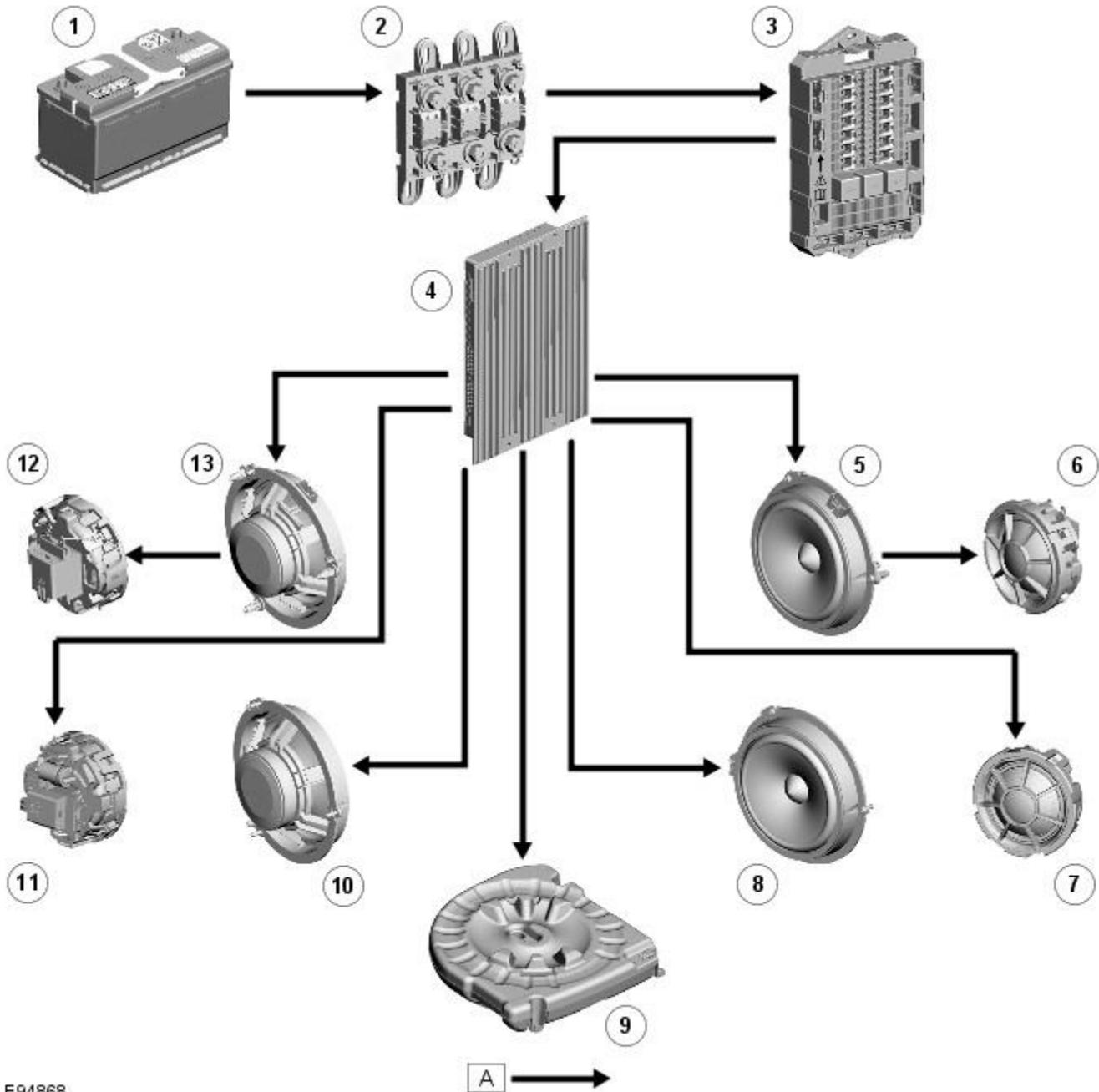
E94868

ItemDescription

Item	Description
1	Battery
2	BJB
3	RJB
4	Power amplifier
5	RH rear mid-bass speaker
6	RH rear tweeter speaker
7	RH front tweeter speaker
8	RH front mid-bass speaker
9	Subwoofer enclosure
10	LH front mid-bass speaker
11	LH front tweeter speaker
12	LH rear tweeter speaker
13	LH rear mid-bass speaker

CONTROL DIAGRAM - BOWERS & WILKINS 440W SURROUND SOUND SYSTEM
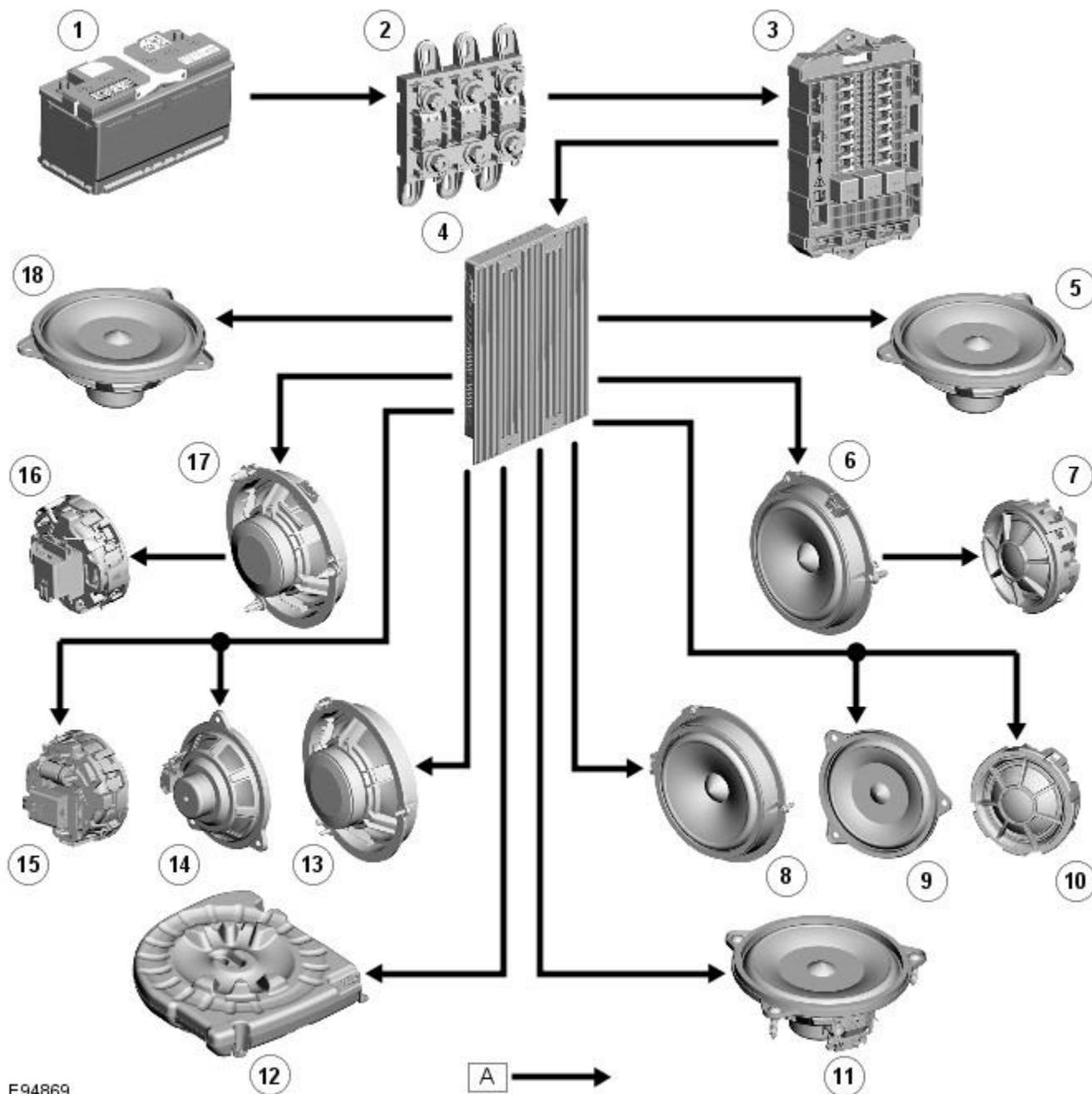
E94869

Item	Description
1	Battery
2	BJB
3	RJB
4	Power amplifier
5	RH rear full range speaker
6	RH rear mid-bass speaker
7	RH rear tweeter speaker
8	RH front mid-bass speaker
9	RH front mid-range speaker
10	RH front tweeter speaker
11	Front center speaker
12	Subwoofer enclosure
13	LH front mid-bass speaker
14	LH front mid-range speaker
15	LH front tweeter speaker
16	LH rear tweeter speaker
17	LH rear mid-bass speaker
18	LH rear full range speaker

System Operation

The Jaguar Sound System has 8 speakers, comprising an identical mid-bass and tweeter combination in each door. All speaker domes in this system are of standard textile construction. The speakers are driven directly by the IAM (integrated audio module) internal amplifier.

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The main speakers on the Jaguar 320W Premium Sound System and the Bowers & Wilkins 440W Surround Sound System are identified by the bright yellow Kevlar constructed domes which are visible through the speaker grilles. The tweeter speaker domes are an aluminum construction. The sub-woofer speakers are a textile dome construction.

Information and Entertainment System - Cellular Phone - Component Location

Description and Operation
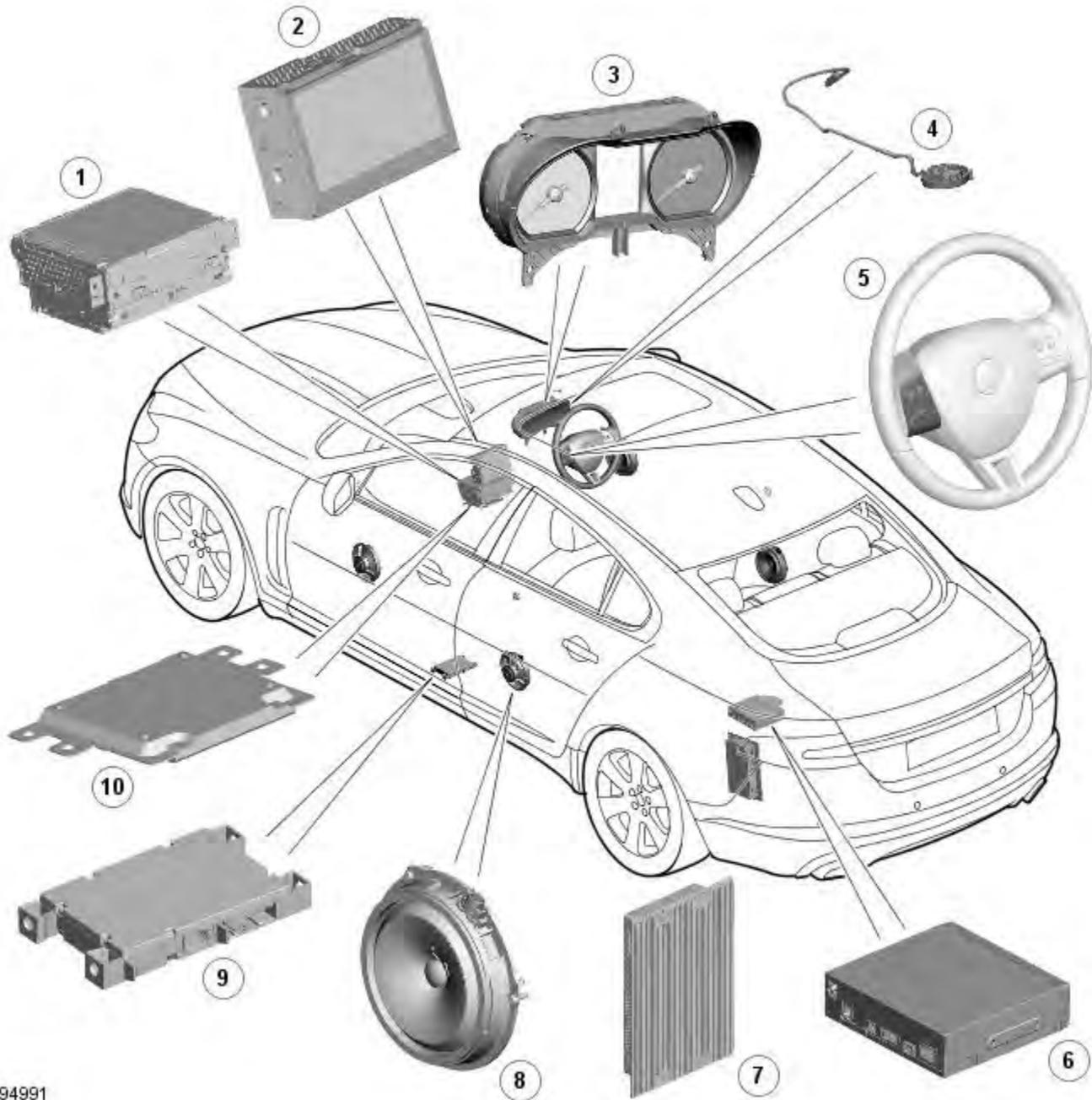
E94991

Item	Description
1	IAM (integrated audio module)
2	Touch-screen
3	Instrument cluster
4	Microphone
5	Steering wheel controls
6	Navigation Computer
7	Power amplifier
8	Speakers
9	Telephone control module
10	ICM (information control module)

Information and Entertainment System - Cellular Phone - Overview
Description and Operation

Authoring Template

OVERVIEW

The cellular phone system uses the customers own Bluetooth® capable handset in conjunction with the vehicle information and entertainment system. The telephone control module is located under the left-hand front seat, and has a Bluetooth® antenna integrated into the unit. Telephone handsets must be paired with the telephone control module, requiring input of a PIN (personal identification number) before they can be used with the vehicle system. Once paired, any phone can be docked to the car without re-entering a PIN (personal identification number). In addition to this, the last connected device will dock automatically the next time it is placed in the vehicle and the ignition is in power mode (ignition on).

The system has the ability to pair and dock telephone handsets from the telephones themselves. By supplying a fixed PIN (personal identification number), a user will be able to use their telephone or other telephone related Bluetooth® device and pair with it without using the touch screen. This enables devices such as Blackberry's and other secure PDA's (personal digital assistants) to pair and dock with the vehicle system.

Up to 5 telephone handsets can be paired with the vehicle, but only 1 telephone can be used at a time. The Touch-screen displays phone functionality, including dialing, and (if compatible) the handset's phone book. The Touch-screen also displays the phone's signal strength and battery meter (if supported by the phone). These functions allow the user to view the displays on the Touch-screen and not have to use the handset.

• NOTE: There is no physical connection (cradle) between the phone handset and the telephone control module. Communications between the 2 components are purely Bluetooth®. This can limit the available functions dependant on the handset used.

The system allows the driver to make, receive and end phone calls using the Touch-screen, steering wheel switches and voice recognition system (if fitted).

Phone dialing is achieved using one of the following methods:

- Dialing a number using the Touch-screen keypad
- Selecting a number from the handsets (automatically or manually downloaded) phonebook on the Touch-screen
- Selecting a number from the handsets (automatically or manually downloaded) phonebook in the instrument cluster message center
- Selecting from the handsets (downloaded) call register, typically the last 10 calls made, received and missed

The telephone control module is connected to the information and entertainment system on the MOST (media oriented systems transport) ring. This allows audio and control signals to be routed to and from the telephone control module.

Information and Entertainment System - Cellular Phone - System Operation and Component Description

Description and Operation

Control Diagram

• NOTE: A = Hardwired; N = Medium Speed CAN (controller area network) bus; O = LIN bus; P = MOST ring
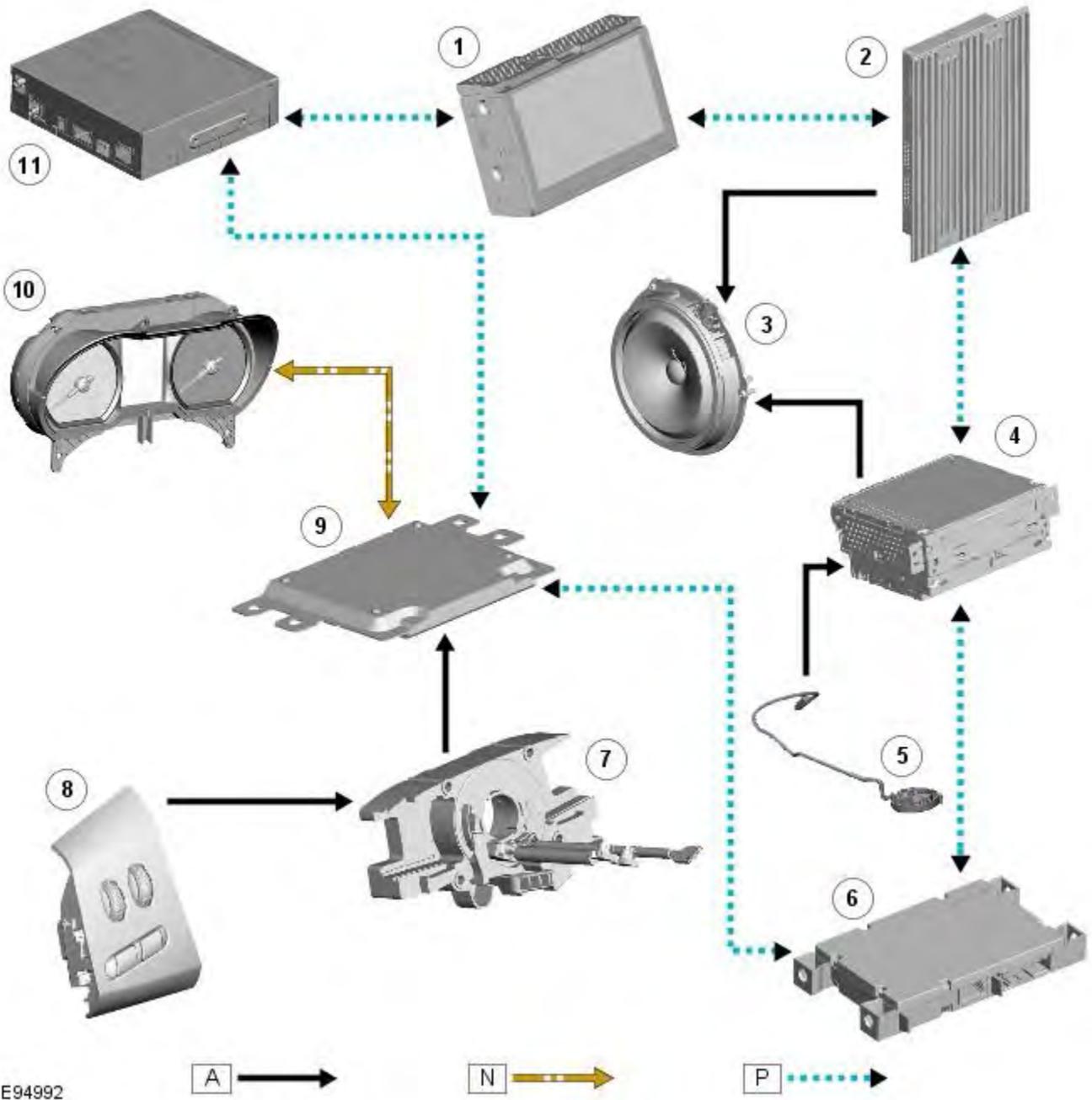
E94992

Item	Description
1	Touch-screen
2	Power amplifier
3	Speakers
4	IAM (integrated audio module)
5	Microphone
6	Telephone control module
7	Clock spring
8	Steering wheel controls
9	ICM (information control module)
10	Instrument cluster
11	Navigation computer

PRINCIPLES OF OPERATION

Primary user control of the phone system is via the Touch-screen and JaguarVoice control switch. Selection of 'phone/comms' on the Touch-screen home menu sends a control signal to the telephone control unit on the MOST (media orientated systems transport) ring, opening the phone submenu options.

When making an outgoing phone call using the JaguarVoice function the ICM (information control module) processes the analogue signal from the switch into a digital signal. The digital signal is passed from the ICM (information control module) onto the MOST (media orientated systems transport) system to the JaguarVoice control unit which is integral with the navigation computer.

The navigation computer sends an instruction via MOST (media orientated systems transport) to the IAM (integrated audio module) to turn on the microphone facility.

The voice command signals are relayed from the IAM (integrated audio module) via the MOST (media orientated systems transport) ring to the navigation computer for processing.

The processed voice command is relayed on the MOST (media orientated systems transport) ring from the navigation computer to the phone control module.

Speech output information is transferred from the phone control module via the Bluetooth® connection to the cell phone.

Incoming calls are received from the Bluetooth® phone by the phone control module. The information is processed by the phone control module and transferred on the MOST (media orientated systems transport) ring to the power amplifier or IAM (integrated audio module) for audio output through the vehicle's audio speaker system.

A number of responses by the telephone and voice systems are reinforced by messages appearing in the instrument cluster message center display. Information is relayed to the message center from the phone control module and navigation computer on the MOST (media orientated systems transport) ring to the ICM (information control module).

The ICM (information control module) is the gateway from the MOST (media orientated systems transport) ring to the medium speed CAN. The ICM (information control module) transfers the message center information onto the medium speed CAN which is received and processed for display on the instrument cluster message center.

Users can pair & dock their handset using their phone or the touch screen. If there is no phone already docked with the system, a user can use their phone to search for Bluetooth Devices. If the vehicles Bluetooth system has been successfully discovered, the phone will display "Jaguar" as a device to pair & connect to. Using this method requires the user to enter the Jaguar PIN of 1313. Alternatively, after accessing the phone menu from the Touch-screen home menu, selecting 'Search New' searches for the Bluetooth® enabled handsets within range, displays their identities on screen, and allows the user to pair and dock the phone ready for use, using a random four-digit security code displayed on screen. The system will normally try to dock (automatically) to the last phone docked, but if a different Bluetooth® enabled phone enters the car it will become available on the screen's list of handsets once the search has been completed.

Once a phone is paired and docked a digit dial screen is displayed, including phonebook options. With a Bluetooth® compatible handset and software version there is the option, through the settings menu, to automatically download the contents of the handset's phonebook to the vehicle system. Because there is no industry standard for arranging the phonebook, the downloaded lists from individual handsets may vary.

Cell phone handset manufacturers continually update hardware and software to standard specifications laid down by the Bluetooth® Special Interest Group (SIG), which defined how Bluetooth® would work in an automotive environment. However, because different makes and models may use different software, not all handsets are fully compatible with Jaguar, but through testing individual handset models Jaguar has produced a list of compatible handsets and the appropriate software version for Jaguar Bluetooth® connectivity. Referral to the list also describes how to check the software version of each individual cell phone manufacturer. This list must be consulted by users, sales & service teams to confirm whether customer's handsets are compatible or not.

Jaguar is continually validating compatible handset and software combinations. The most up-to-date compatibility list will always be available on-line from Jaguar.

• NOTE: To achieve full Bluetooth® handset functionality it is crucial that the phone software level matches the version detailed in the list of compatible handsets.

The upgraded hands free profile of this system allows the display of the network signal strength, network operator and phone battery level indication on the vehicle display. Also, if applicable, the phone handset will show a "car" or "headset" symbol to indicate it is in handsfree profile.

BLUETOOTH®

Bluetooth® is a short-range RF (radio frequency) technology that operates at 2.4 GHz and is capable of transmitting voice and data wirelessly. The effective range of Bluetooth® devices is 32 feet (10 meters) with a data transfer rate of 1 Mbps.

Bluetooth® is essentially a wireless connection which operates with the user's own mobile handset, does not have to be fixed into the car and is designed to function without an external aerial. The handset can be located anywhere within the cabin, even in a bag, or jacket pocket. It could work from the luggage compartment, although the signal could be compromised. The handset can be charged from the 12 volt power socket or USB (if supported) while in use.

Component Description

Touch-Screen

The Touch-screen communicates with the telephone control module on the MOST (media orientated systems transport) ring and provides the primary user interface and display of the phone system.

E96378

ItemDescription

Item	Description
1	Touch-screen
2	Touch-screen on/off button
3	Home menu button

The following functions are available on the phone menu:

- Digit dial
- Phone book
- Last ten calls (made, received, missed)
- Voicemail

Steering Wheel Controls
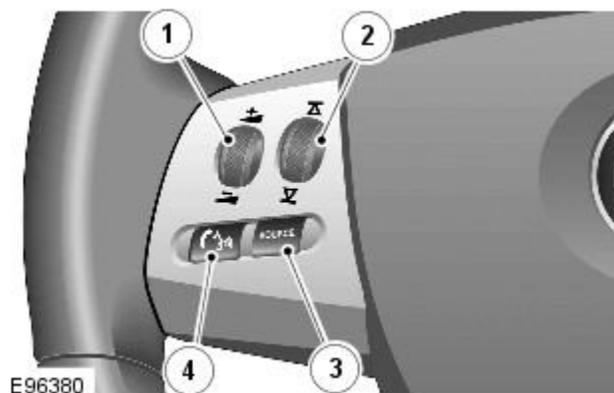
E96380

ItemDescription

Item	Description
1	Volume adjustment
2	Scroll up/down to next/previous memory location.
3	Audio source (Long press for instrument cluster message center phonebook access)
4	JaguarVoice button. Briefly press to initiate or end a call. This is also used for voice control functions

Additional control of the phone system is available in the form of steering wheel mounted switches which are located on the left hand side of the steering wheel. The switches provide for volume adjustment, scroll up/down to next/previous memory location, instrument cluster message center phonebook access and finally JaguarVoice/call control.

The steering wheel control switches are hardwired through the clock spring to the ICM (information control module). The ICM (information control module) processes the analogue signals from the switches into digital signals. The digital signals are then passed from the ICM (information control module) onto the MOST (media orientated systems transport) system for control unit processing and operation of the requested functions.

JaguarVoice

JaguarVoice enables activation of several voice activated functions of the infotainment and climate control systems without the need to touch any controls manually. The following systems include JaguarVoice functionality;

- Navigation system
- Phone system
- Climate control system
- Vehicle display system
- Vehicle notepad

The 'notepad' facility allows voice notes to be recorded. Nametags for phone dialing and navigation locations allow the system to be personalized and there is a help and tutorial function to provide advice on using the system.

The system allows the vehicle user to concentrate fully on driving the vehicle, without any need to divert their eyes from the road ahead in order to check information read outs on the vehicle instrument panel information units. The voice control system also feeds back audible information to the vehicle user.

JaguarVoice is a key component of the phone system, allowing hands free control and use of the Bluetooth® enabled phone.

The system is controlled by the voice button on the left hand side of the steering wheel. Voice commands are picked by the dedicated microphone. When giving a voice command audible feedback will be heard through the vehicle's audio speakers. Received call voice/speech is also broadcast on the vehicle audio speaker system. All speakers are used for voice/speech output with the exception of the front center speaker (only fitted on the Bowers & Wilkins 440W Surround Sound System) due to echo return picked up by the microphone.
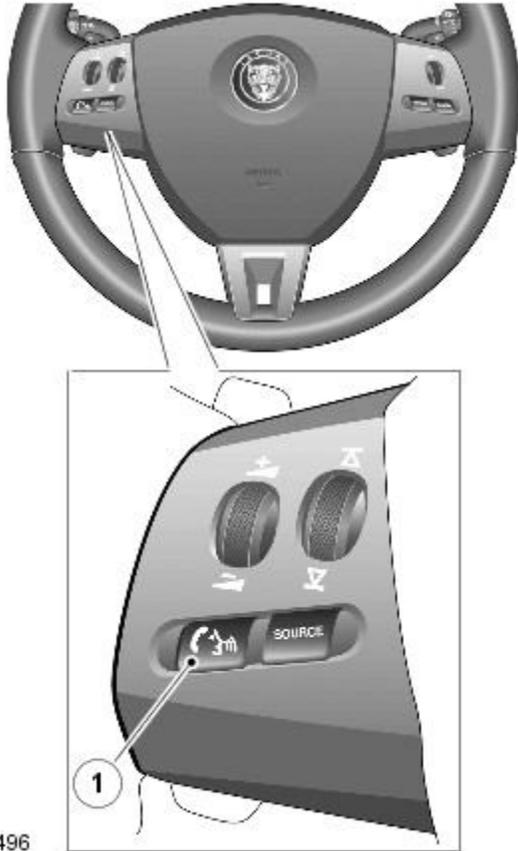
E96496

ItemDescription

1	JaguarVoice button

Efficient operation of JaguarVoice is reliant on the user understanding some of the following basic operating conditions;

- Face forwards, sitting in a normal driving position
- After pressing the voice button, always wait for the end of the audible tone before speaking.
- Speak naturally, as if you were talking to a passenger or on the phone without pausing between words
- When the system asks for more information, always wait for the end of the tone before responding
- Always say numbers correctly
- Excessive noise, for example while driving with windows open, may cause voice command mis-recognition. If it is too noisy to use the phone, it is likely that voice commands will not be recognized

Most accents are understood without difficulty, but if the system does not recognize the command it will respond "SORRY" and allow two more attempts to say the command.

Voice feedback is given in the same language as the command recognition. It is possible to change the language of the speech control system.

Information and Entertainment System - Navigation System   - Component Location

Description and Operation
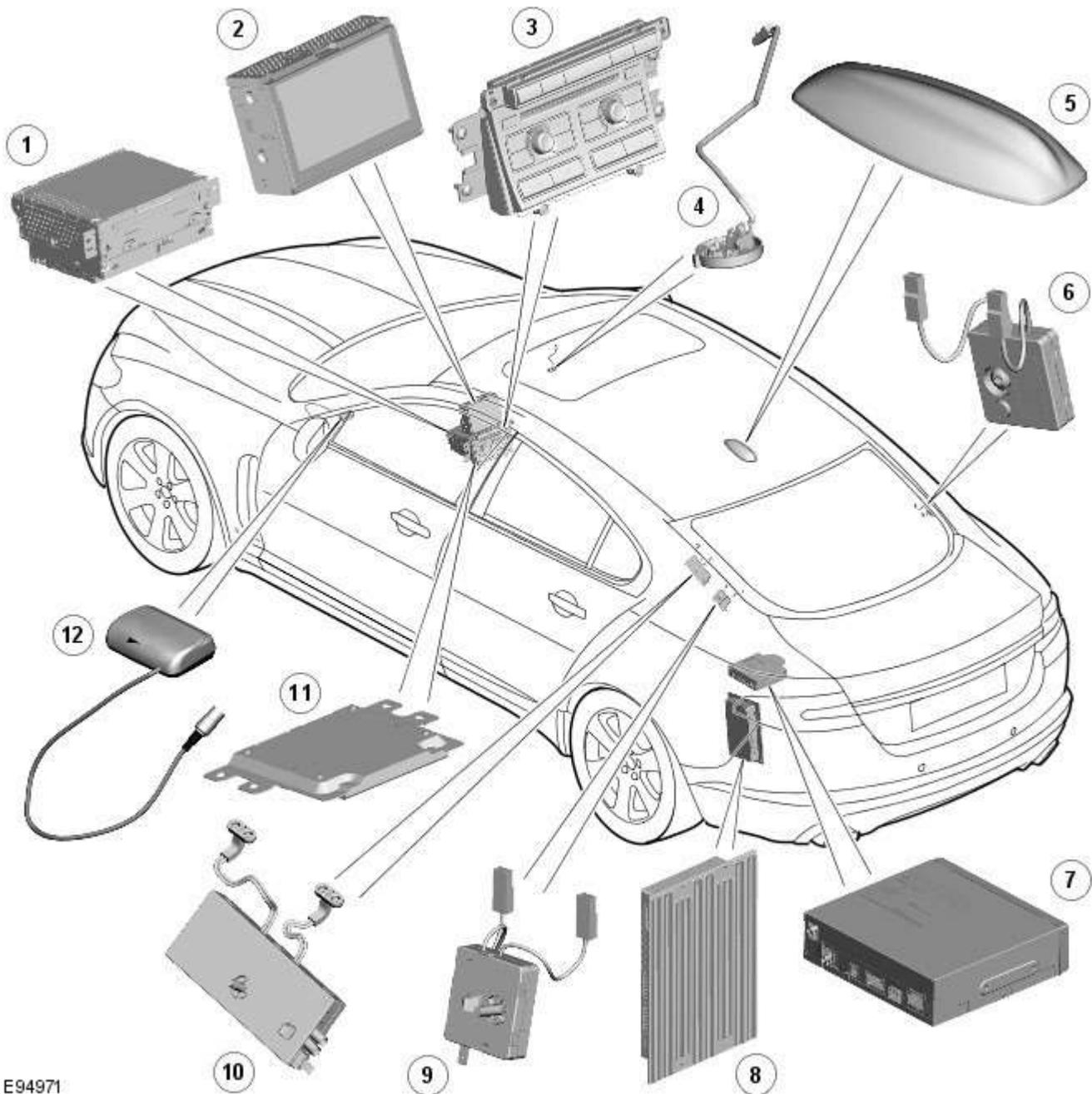
E94971

Item	Description
1	IAM (integrated audio module)
2	Touch-screen
3	ICP (integrated control panel)
4	Microphone
5	Roof pod antenna module (GPS antenna)
6	RF filter
7	Navigation computer
8	Power amplifier
9	RF filter

10	Diversity antenna module (VICS/TMC antenna)
11	ICM (information control module)
12	VICS (vehicle information and communication system) beacon antenna - Japan only

Information and Entertainment System - Navigation System   - Overview

Description and Operation

OVERVIEW

The navigation system provides audible and visual route guidance information to enable the driver to reach a desired destination. The system allows the driver to choose the desired route using minor or major roads and will present 3 routes to the driver based on user preferences. Directions to hospitals, museums, monuments and hotels are also available. The navigation computer uses map information stored on a DVD (digital versatile disc) to determine the best route for the journey and provide the driver with details of directions and approaching junctions.

The navigation system has various levels of user control through the Touch-screen and JaguarVoice system. System volume adjustment can be made using the ICP (integrated control panel), Touch-screen and steering wheel controls.

There are 3 navigation system variants specific to various markets. On all systems the GPS (global positioning system) signal is received by the GPS (global positioning system) antenna located in the roof pod antenna module.

The European navigation system includes the TMC (traffic messaging channel) function, which receives traffic information from an FM antenna integrated into the heated rear window. On a pre-selected route the system will offer re-routing options depending on traffic conditions.

The Japanese navigation system includes the VICS (vehicle information and communication systems) function. The VICS (vehicle information and communication systems) supplies information to enable the navigation computer to re-route the navigation guidance or to inform the vehicle driver of traffic conditions in the vehicles vicinity. Information is provided to the system through an FM antenna integrated into the heated rear window and a VICS beacon located in the LH upper side of the instrument panel.

The NAS (North American specification) variant does not include any additional traffic information systems.

The navigation system is primarily controlled from the Touch-screen which is located in the center of the instrument panel. Control signals from the Touch-screen are sent on the MOST (media oriented systems transport) ring to the navigation computer. The navigation computer uses a dedicated GVIF (gigabit video interface) bus to transmit video signals to the Touch-screen.

Depending upon the audio system version fitted the navigation audio output signals are sent on the MOST (media oriented systems transport) ring to the IAM (integrated audio module) or the power amplifier for speaker output.

Information and Entertainment System - Navigation System   - System Operation and Component Description

Description and Operation

Control Diagram

⚠ NOTE: A = Hardwired; D = High Speed CAN bus; N = Medium Speed CAN bus; O = LIN bus; P = MOST ring; Q = GVIF; T = CoAxial
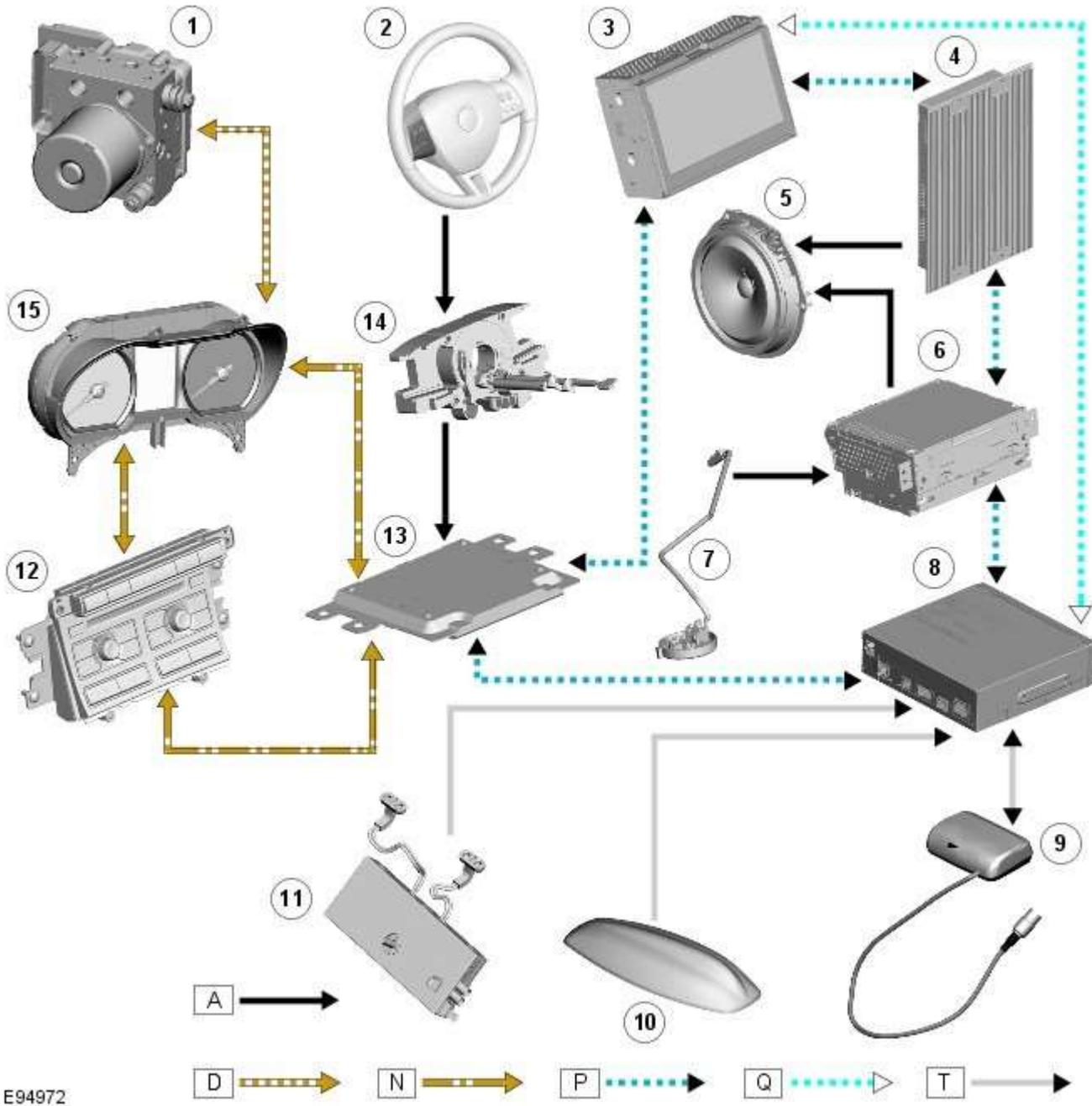
E94972

Item	Description
1	ABS (anti-lock brake system) module
2	Steering wheel remote audio controls
3	Touch-screen
4	Power amplifier
5	Speakers

6	IAM (integrated audio module)
7	Microphone
8	Navigation computer
9	VICS (vehicle information and communication system) beacon antenna - Japan only
10	Roof pod antenna module (GPS (global positioning system) antenna)
11	Diversity antenna module (VICS/TMC antenna)
12	ICP (integrated control panel)
13	ICM (information control module)
14	Clock spring
15	Instrument cluster

System Operation

Authoring Template

INTRODUCTION TO THE GLOBAL POSITIONING SYSTEM

The system used to calculate the current position of the vehicle is called the GPS. The system utilizes satellites which are owned by the United States Department of Defense. A total of 24 satellites circular orbit the earth every 12 hours at a height of 20,000 km (12500 miles), and between 5 and 11 of these satellites can be seen from a single point at any given time. The orbits are tilted to the earth's equator by 55 degrees to ensure coverage of polar regions. Each satellite transmits radio signals to provide information about the satellite position i.e. latitude, longitude, altitude, almanac data and an accurate time signal generated by an on-board atomic clock. Each satellite contains four atomic clocks.

The vehicle needs to receive data from at least four different satellites to give a three dimensional fix on its current position.

As the vehicle moves, this information is continually being updated. The computer determines which satellites are 'visible' to the system and their current position and relationship to each other. Using this information the computer can account for positional deviations of the satellites and compensate to enhance the accuracy of the navigation system.
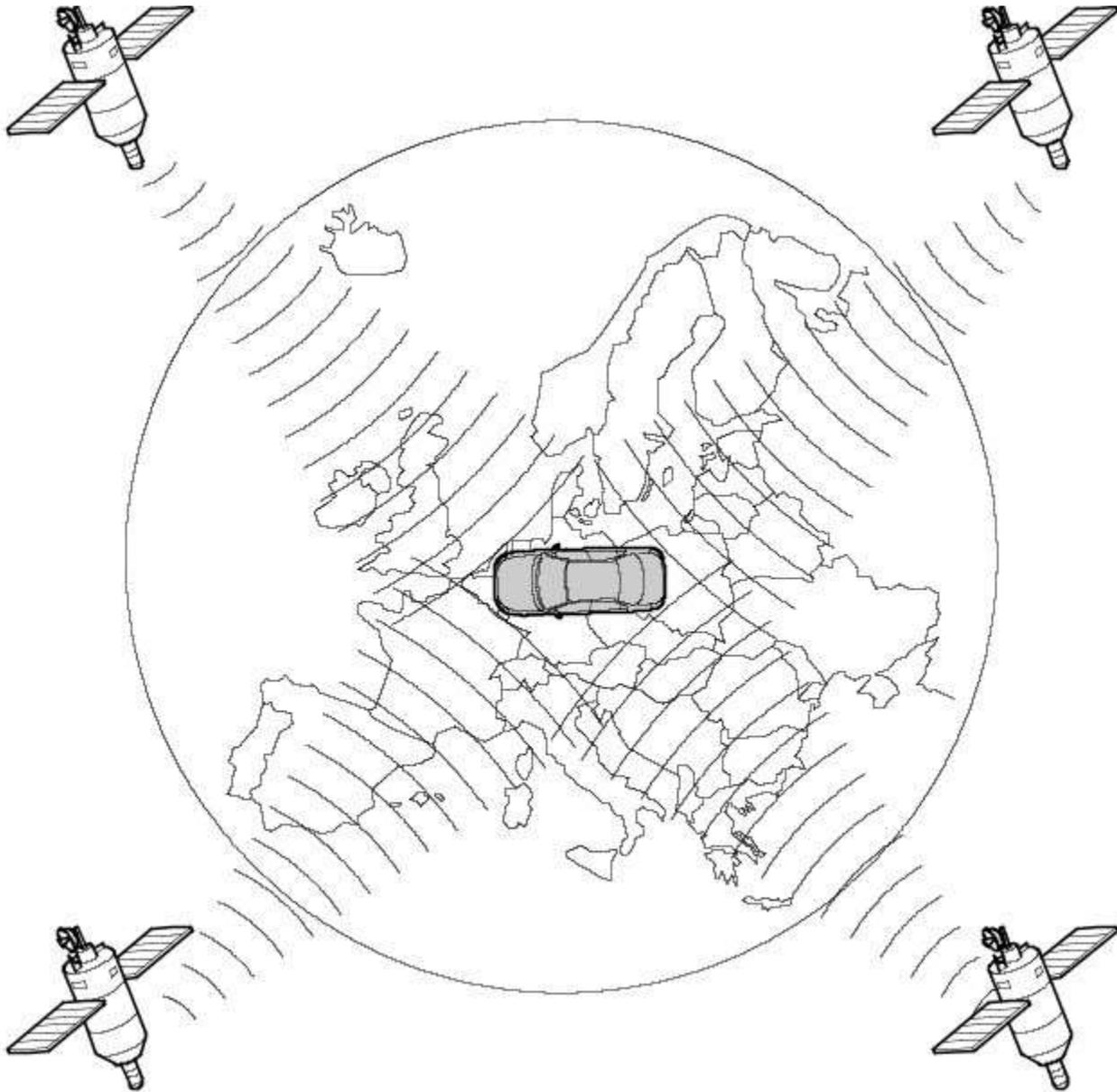
E51822

The GPS signal is also known as the PPS (precision positioning signal).

PPS (precision positioning signal) predictable accuracy is:

- 22 meters horizontal accuracy
- 27.7 meters vertical accuracy
- 200 nanoseconds time accuracy

The navigation system receives GPS information via the GPS antenna. The GPS signals are used by the navigation computer to calculate the vehicles position. Once the driver has input a desired destination the navigation computer can calculate a route, based on the driver's pre-determined preferences or the default settings in the navigation computer.

The navigation system is accessed from the Touch-screen home menu.

Navigation is initiated by the driver inputting a destination. This can be achieved by:

- Entering an address using the Touch-screen
- Entering a post code
- Choosing a previous destination
- Choosing a point of interest from the map disc database
- Choosing the home location
- Choosing a memory stored location

The driver is then guided to the destination by a scrolling map display and voice guidance. The display can be varied by scale and display type.

In addition to the standard navigation system there are two market dependant systems that supply extra information to the navigation system and the driver. These are:

- TMC (traffic message channel) (Europe only)
- VICS (vehicle information and communication system) (Japan only)

The TMC (traffic message channel) is a function of the FM (frequency modulation)RDS (radio data system). The system broadcasts real-time traffic and weather information. Data messages are received and decoded by the TMC (traffic message channel) integral receiver and processed by the navigation computer. TMC (traffic message channel) messages can be filtered by the navigation computer so that only those relevant to the current journey are displayed, allowing the navigation system to offer dynamic route guidance - alerting the driver of a problem on the planned route and calculating an alternative route to avoid the incident. All TMC (traffic message channel) events on the map can be viewed not just the ones on the calculated route.

TMC (traffic message channel) traffic information systems conform to a global standard that has been adopted by traffic data gatherers, information service providers, broadcasters and vehicle/receiver manufacturers.

All TMC (traffic message channel) receivers use the same list of event codes, while the location database (on the map disc) contains both a country-specific set of location codes for the strategic European road network.

TMC (traffic message channel) traffic data is currently broadcast in many European countries.

The VICS (vehicle information and communication system) is broadcast in the Japanese market.

The VICS (vehicle information and communication system) supplies information to enable the navigation computer to re-route the navigation guidance or to inform the vehicle driver of traffic conditions in the vehicles vicinity. Information is provided to the system through 3 routes:

- RF (radio frequency) transmission
- Infra-red transmission
- FM multiplex transmissions

The RF (radio frequency) transmissions are generally transmitted from road side beacons mainly on expressways. The information transmitted is as follows:

- Traffic congestion
- Travel time to next intersection
- Traffic conditions in surrounding areas and expressway turn offs
- Traffic accidents
- Speed limits
- Lane regulations
- Tire change
- Parking availability at expressway service areas and parking areas

Infra-Red transmissions are transmitted from road side beacons on major trunk roads. The information transmitted is:

- Traffic congestion and travel time
- Traffic accidents
- Breakdowns
- Road works restrictions
- Parking availability

FM transmissions are broadcast as part of the FM multiplex broadcasting system from NHK FM stations. Information transmitted is:

- Traffic congestion and travel time for wide areas
- Traffic accidents, road works, speed limits and lane restrictions for a wide area
- Parking availability information

The traffic data is split from the normal FM transmissions by the diversity antenna module.

Selection of 'Navigation' on the Touch-screen home menu and subsequent sub-menu selection sends a control request signal to the navigation computer on the MOST (media orientated systems transport) ring. The requested control information is processed by the navigation computer.

If voice guidance is operational the voice signal information is relayed from the navigation computer on the MOST (media orientated systems transport) ring to either the IAM (integrated audio unit) or Power Amplifier, dependant on equipment level, for output on the speaker system. The navigation audio output is through the front speakers whilst the background audio, for example radio or CD (compact disc), is played at a reduced volume on the rear speakers.

The GPS signal is available to the navigation system at all times when the vehicle ignition is switched on.

Navigation user voice commands are made using the JaguarVoice system. The ICM (information control module) processes the analogue signal from the JaguarVoice switch into a digital signal. The digital signal is passed from the ICM (information control module) onto the MOST (media orientated systems transport) system to the JaguarVoice control unit which is integral with the navigation computer.

The navigation computer sends an instruction via the MOST (media orientated systems transport) ring to the IAM (integrated audio module) to turn on the microphone facility.

The microphone is hardwired to the IAM (integrated audio module). The spoken voice command signals are relayed from the IAM (integrated audio module) via the MOST (media orientated systems transport) ring to the navigation computer for

processing.

The processed voice command is relayed from the navigation computer to the Touch-screen.

Traffic data from TMC (traffic message channel) or VICS (vehicle information and communication system) is processed by the navigation computer, distributed to the Touch-screen with any supporting voice instruction relayed through the MOST (media orientated systems transport) ring to either the IAM (integrated audio unit) or Power Amplifier, dependant on equipment level, for output on the speaker system.

A number of actions, when using the navigation voice system, are reinforced by messages appearing in the instrument cluster message center display. Information is relayed to the message center from the navigation computer on the MOST (media orientated systems transport) ring to the ICM (information control module).

The ICM (information control module) is the gateway from the MOST (media orientated systems transport) ring to the medium speed CAN (controller area network). The ICM (information control module) transfers the message center information onto the medium speed CAN which is received and processed for display on the instrument cluster message center.

Component Description

NAVIGATION COMPUTER

The navigation computer is located in the left hand side of the luggage compartment.

E96571
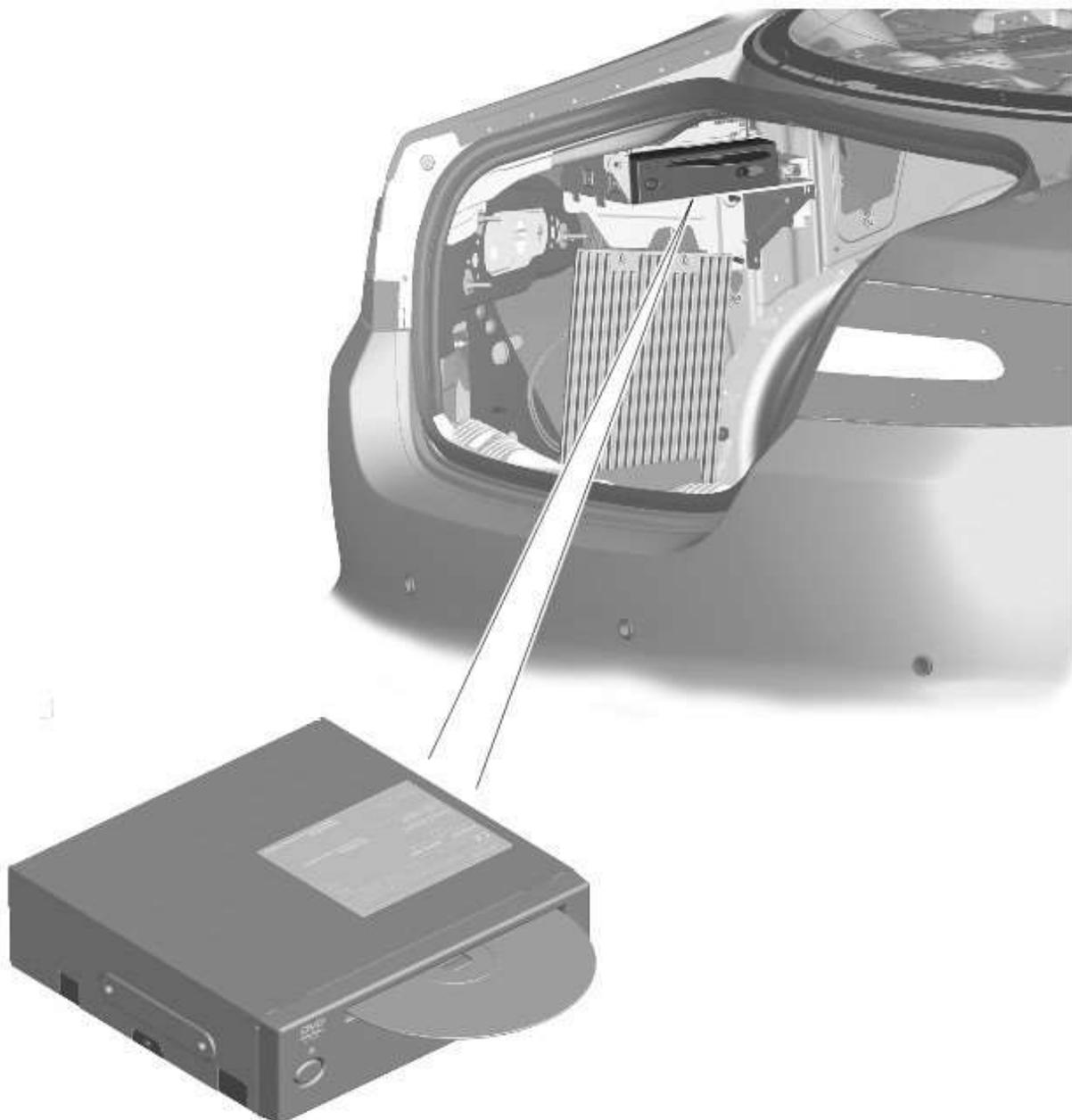
The navigation computer incorporates the following:

- GPS receiver
- VICS (vehicle information and communication system) receiver (Japan only)
- TMC (traffic message channel) receiver (Europe only)
- JaguarVoice control module

The navigation computer contains a solid state piezo gyro which measures the motion of the vehicle around its vertical axis. The gyro operates on the principle known as the coriolis force. The coriolis force is the force that appears to accelerate a body moving away from its rotational axis against the direction of rotation of the axis.

Using inputs from the ABS module, the GPS antenna and the gyro sensor, the computer calculates the vehicle's current position, direction and speed.

The navigation computer houses the DVD (digital versatile disc) drive. The drive is used to read map data from region specific DVD's. The number of DVD's issued per region varies depending on the amount of information available. The regions are as follows:

- Europe (2 versions, Western Europe and Whole of Europe)
- NAS (North American specification)
- Japan, Middle East, Australia and South Africa

A button, located adjacent to the DVD slot, is provided to eject the DVD from the unit. Prior to ejecting the disc the slot protection has to be slid to the side. If the ignition is on, or the entertainment system is in 1-hour mode, one press of the button will eject the DVD.

The navigation computer uses non-volatile memory to store settings and configuration information when it is powered down. This process takes place just before the computer turns off.

No configuration procedure is required if the navigation computer is replaced. There is no option to calibrate the navigation computer using the Jaguar approved diagnostic equipment; however in some regions a software download, contained in the DVD disc, is required before the navigation system becomes operational.

MICROPHONE

E96495

A single microphone is used for hands-free operation using the JaguarVoice system. The microphone has an integrated noise suppression system for hands-free use. The microphone is a standard directional type and is located in the front roof overhead console. The microphone is hardwired to the IAM (integrated audio module). When replacing the microphone extra care must be taken to make sure it is fitted into its securing clips for correct positioning and orientation.

GPS Antenna

E96387

The GPS antenna passes signals from the GPS satellites to the navigation computer for processing. The antenna is located in

the roof pod and is shared with the DAB (digital audio broadcasting) band L antenna or satellite radio antenna where fitted. The roof pod is located externally in a central position towards the rear of the roof.

The GPS antenna is designed with 50 ohm output impedance. The navigation computer is fitted with 50 ohm fakra II connectors to ensure compatibility with the antenna. For optimum performance 50 ohm low loss coaxial cable is used between the antenna and navigation computer.

It is possible for the GPS antenna to lose the signal from the GPS satellites;

- In hilly or tree lined areas
- Built up areas with tall buildings
- In multi storey car parks
- In garages
- In tunnels
- On bridges
- During heavy rain or thunderstorms

When the signal is lost the navigation computer will continue to give guidance using memory mapped data from the DVD map until the signal is restored.

TMC/VICS FM Antenna

Data messages for both TMC (traffic message channel) and VICS (vehicle information and communication system) are received through the FM antennas and diversity antenna module located in the heated rear window.

VICS Beacon Antenna (Japan Only)

E96572

The VICS (vehicle information and communication system) beacon antenna receives infra red and RF (radio frequency) traffic data signals from road side transmitters. The antenna is connected to the navigation computer which incorporates a VICS (vehicle information and communication system) receiver.

Touch Screen Display
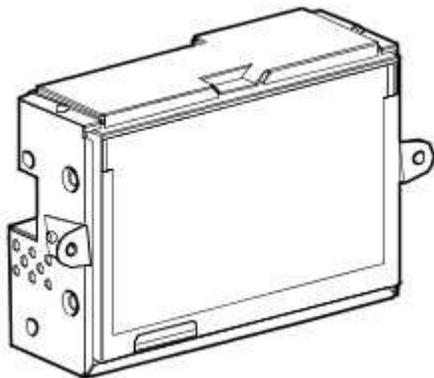
E73867

The Touch-screen is the control interface for the following vehicle systems;

System	Functions
Audio	Radio display AM/FM or DAB (digital audio broadcast), auxiliary and portable audio, digital TV or CD
Climate control	Air conditioning, distribution, seats, heated steering wheel, automatic air recirculation
Telephone	Digit dialer, phone book, last ten calls (made, received, missed)

System	Functions
Navigation	Destination, stored locations, navigation setup, route options
Vehicle	Security, parking, valet mode, trip computer, clock, brightness, contrast, system settings, vehicle settings, display settings

The screen is a touch sensitive 7 inch LCD (liquid crystal display) VGA screen containing 800 x 480 pixels in a 15:9 format. The screen processes its own video for system operation but receives the navigation graphics from the navigation computer.

Steering Wheel Controls
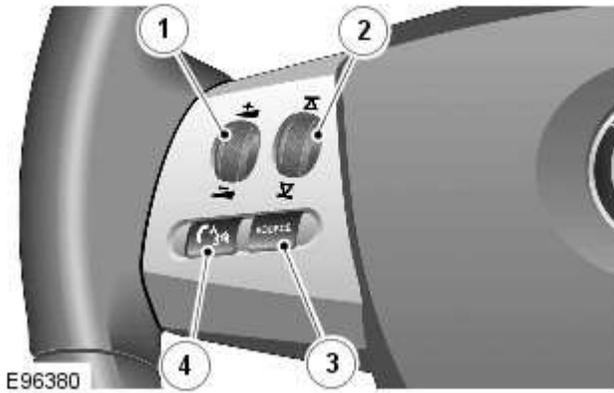
Item	Description
1	Volume adjustment
2	Scroll wheel (No navigation functionality)
3	Audio source (No navigation functionality)
4	JaguarVoice control

Additional control of the navigation system is available in the form of steering wheel mounted switches which are located on the left hand side of the steering wheel. 2 switches are used for navigation functions;

- Volume adjustment
- JaguarVoice control

JaguarVoice enables operation of several voice activated functions of the infotainment and climate control systems without the need to touch any controls manually. The following systems include JaguarVoice functionality;

- Navigation system
- Phone system
- Climate control system
- Vehicle display system
- Vehicle notepad

The 'notepad' facility allows voice notes to be recorded. Nametags for phone dialing and navigation locations allow the system to be personalized and there is a help and tutorial function to provide advice on using the system.

The system allows the vehicle user to concentrate fully on driving the vehicle, without any need to divert their eyes from the road ahead in order to check information read outs on the vehicle instrument panel information units. The voice control system also feeds back audible information to the vehicle user.

JaguarVoice is a key component of the navigation system, allowing hands free control when issuing navigation commands.

The system is controlled by the voice button on the left hand side of the steering wheel. Voice commands are picked up by a dedicated microphone. When giving a voice command audible feedback will be heard through the vehicle's audio speakers.

E96496

Item	Description
1	JaguarVoice button

Efficient operation of JaguarVoice is reliant on the user understanding some of the following basic operating conditions;

- Face forwards, sitting in a normal driving position
- After pressing the voice button, always wait for the end of the tone before speaking.
- Speak naturally, as if you were talking to a passenger or on the phone without pausing between words
- When the system asks for more information, always wait for the end of the tone before responding
- Always say numbers correctly
- Excessive noise, for example while driving with windows open, may cause voice command mis-recognition. For example if it is too noisy to use the phone, it is likely that voice commands will not be recognized.

Most accents are understood without difficulty, but if the system does not recognize the command it will respond "SORRY" and allow two more attempts to say the command.

Voice feedback is given in the same language as the command recognition. It is possible to change the language of the speech control system.

Information and Entertainment System - Video System - Component Location

Description and Operation
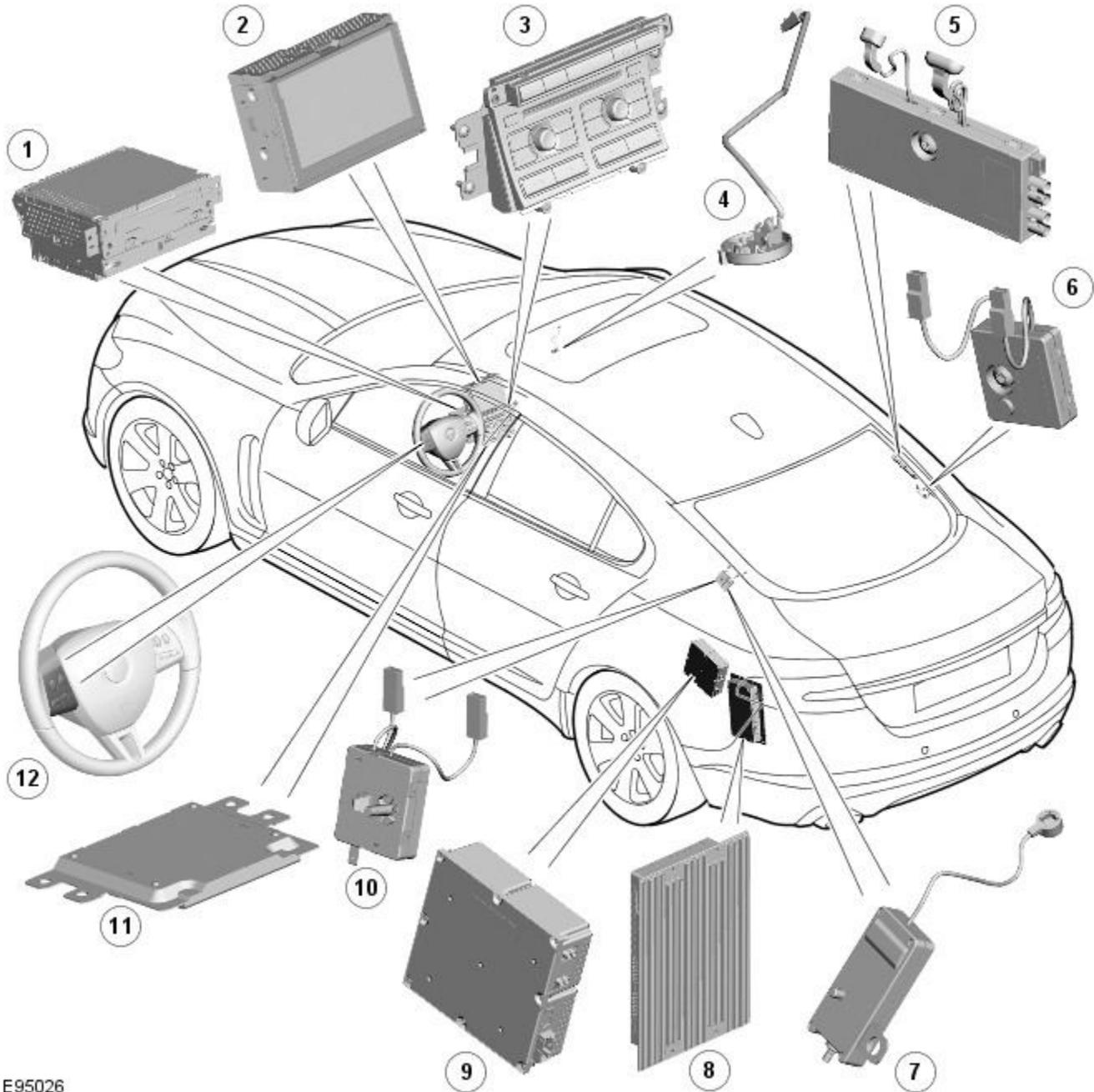
E95026

Item	Description
1	IAM (integrated audio module)
2	Touch-screen
3	ICP (integrated control panel)
4	Microphone
5	Triple TV (television) antenna module
6	RF filter
7	Single TV (television) antenna module
8	Power amplifier
9	TV (television) tuner
10	RF filter
11	ICM (information control module)
12	Steering wheel remote controls

Information and Entertainment System - Video System - Overview

Description and Operation

OVERVIEW

The Television system combines digital and analogue reception. The digital element is similar to the home based freeview system, and displays information such as current channel detail. The Japanese market uses the analogue signal as the digital format is not compatible.

For legal reasons, the Touch-screen Television image can only be displayed when the vehicle is at rest, however the system is configured not to constantly switch on and off in stop-start traffic. It is possible to listen to Television sound as the vehicle is moving.

Information and Entertainment System - Video System - System Operation and Component Description

Description and Operation

Control Diagram
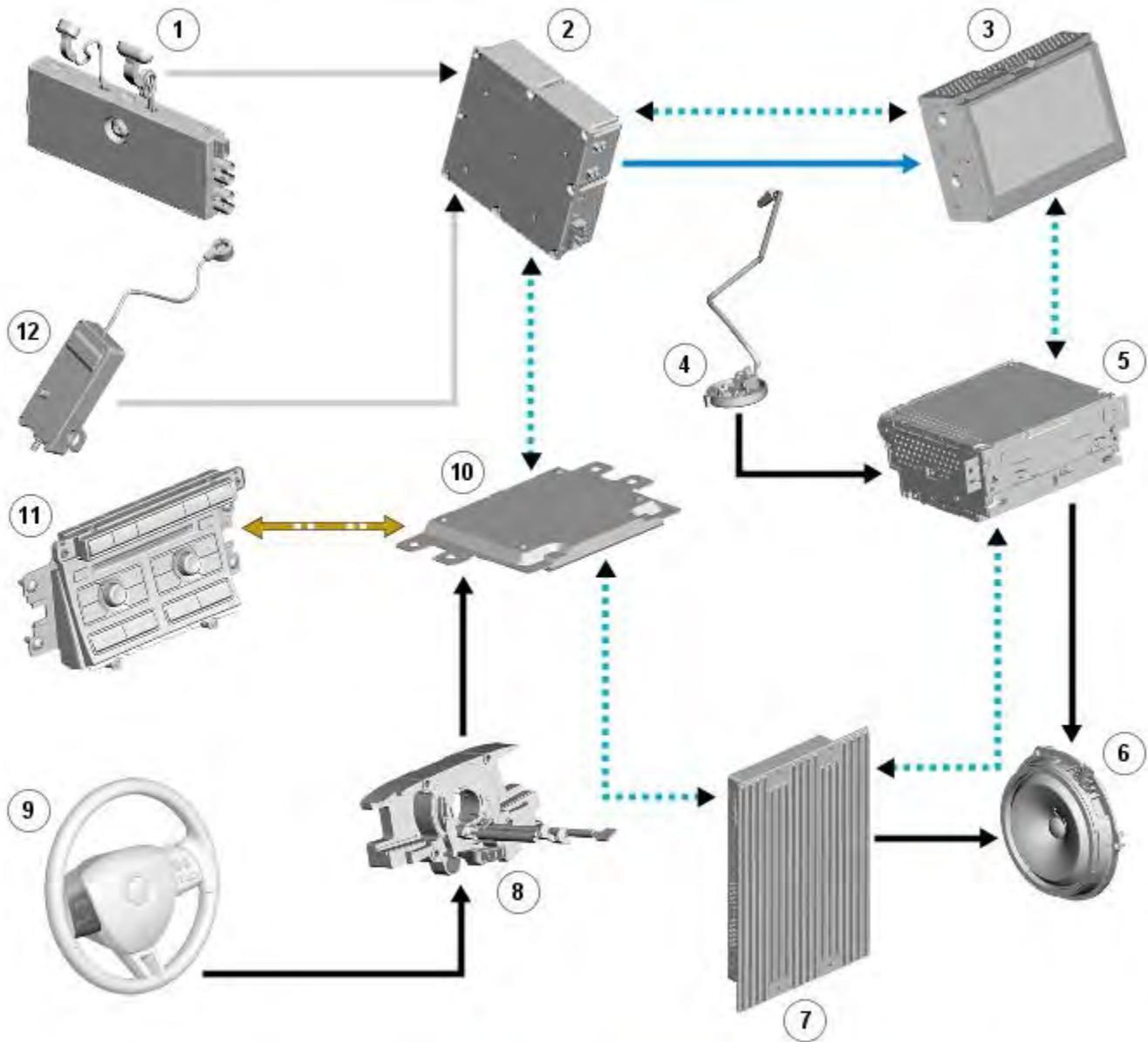
E95027

Item	Description
1	Triple TV (television) antenna module
2	TV (television) tuner
3	Touch-screen
4	Microphone
5	IAM (integrated audio module)
6	Speakers
7	Power amplifier
8	Clock spring
9	Steering wheel remote controls
10	ICM (information control module)
11	ICP (integrated control panel)
12	Single TV (television) antenna module

System Operation

The Television system has various levels of user control through the Touch-screen, ICP (integrated control panel) and steering wheel control panel. The system includes nine analogue and nine digital channel pre-sets. As with the audio system, the user can search up or down and store by a long press of the selected channel button. The system offers a choice of screen aspect ratios similar to a typical domestic receiver, giving options between the standard 4:3 format, wide screen 16:9 format and zoom to fill the screen.

To provide the strongest possible signal the Television tuner receives signals from 4 antenna sources located in the heated rear window. Unlike domestic systems this system gives a more progressive picture loss if the signal is lost. The signal loss is indicated to the user by a 'loss of reception' screen message.

The Television system is primarily controlled from the Touch-screen and the ICP (integrated control panel) which are located in the center of the instrument panel. Control signals from the Touch-screen display are sent on the MOST (media oriented systems transport) ring to the Television tuner. The Television tuner uses a dedicated CVBS (composite video signal) bus to transmit video signals to the Touch-screen.

Control signals from the ICP (Integrated control panel) are relayed on the medium speed CAN bus to the ICM (information control module). The ICM (information control module) relays the control signals to the Television tuner on the MOST (media oriented systems transport) ring. The ICM (information control module) is the timing master for the MOST (media oriented systems transport) ring and also hosts a gateway function between the medium speed CAN bus and the MOST (media oriented systems transport) ring.

Depending upon the audio system version fitted the Television tuner audio output signals are sent on the MOST (media oriented systems transport) ring to the IAM (integrated audio module) or the power amplifier for speaker output.

Component Description

TELEVISION TUNER

E96676

The television tuner is a DVB-T (digital video broadcasting - terrestrial) receiver and consists of a 'front end' which is made up of a tuner and a demodulator. Following pre-filtering, the tuner converts the signal from the antenna to an intermediate frequency. In the demodulator, the signal is first converted to a basic frequency, so that a signal from a transponder can be forwarded to the MPEG decoder as a transport stream. The transport stream usually contains several television channels along with relevant auxiliary services such as teletext, subtitles and electronic program guides.

• NOTE: Not all digital features such as text and programme listings are currently available.

Control signals from the Touch-screen display are sent on the MOST (media oriented systems transport) ring to the television tuner. The television tuner uses the dedicated CVBS (composite video signal) bus to transmit its video signals to the Touch-screen. The CVBS (composite video signal) system utilizes a single wire transmission system and is limited in bandwidth to less than 6MHz.

No configuration procedure is required if the television tuner is replaced. Calibration of the television tuner using the Jaguar approved diagnostic equipment enables updates to be downloaded as new technology becomes available or any fault concerns require software updates.

Television Antennas
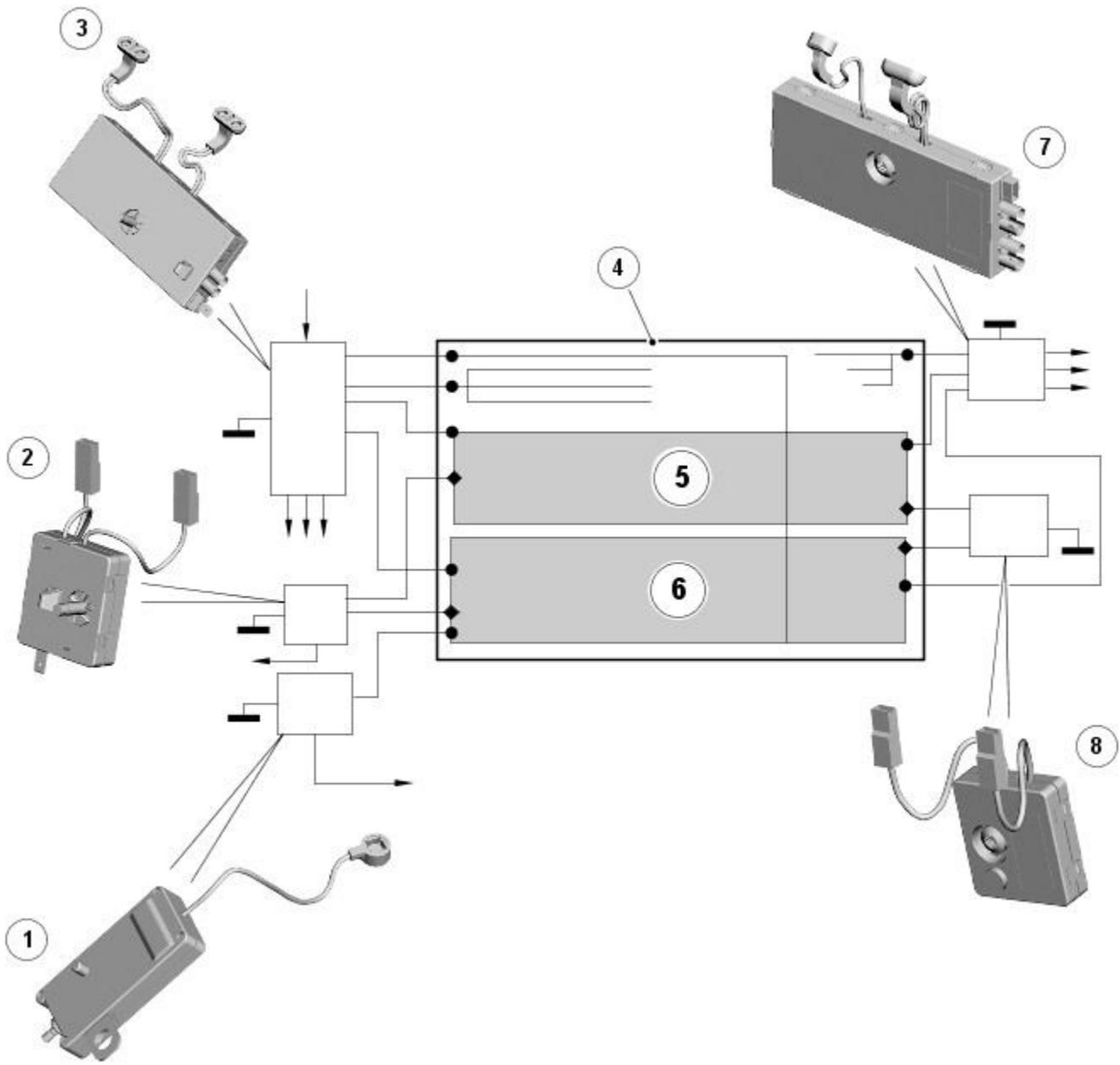
E96376

Item	Description
1	Single TV (television) antenna module
2	RF filter
3	Diversity antenna module
4	Heated rear window
5	Heated rear window upper section
6	Heated rear window lower section
7	Triple TV (television) antenna module
8	RF filter

The television tuner receives digital and analogue television signals through 4 antennas located in the heated rear window. 3 of the antennas are connected to the triple antenna amplifier/module located on the RH (right-hand) side of the heated rear window. A fourth antenna is connected to the single antenna amplifier/module located on the LH (left-hand) side of the heated rear window.

The combination of signals from several antennas is known as 'diversity' reception. For example using two or more antennas can reduce the signal error rate by 50%, which is of critical importance for mobile receivers.

Vehicle or other component generated electromagnetic interference may cause unwanted disturbance in the television reception signals. The disturbance may interrupt, obstruct, or otherwise degrade or limit the effective performance of the circuit.

Double coil RF (radio frequency) filters, which act as RF (radio frequency) isolators, are located on both sides of the heated rear window and are used to reduce any electromagnetic interference. The LH side RF (radio frequency) filter is connected across the heated rear window power supply and used to separate the DC (direct current) interference from the RF (radio

frequency) signals. The positive filter is present on all vehicle types and markets.

The right hand side double coil RF (radio frequency) filter is only used in conjunction with the television antenna modules and is connected across the heated rear window ground circuit. If a television system is not fitted a filter is used which is linked directly to ground.

Touch-Screen

E96378

Item	Description
1	Touch-screen
2	Touch-screen on/off button
3	Home menu button

The Touch-screen is the primary user interface for the television system. From the 'Home' screen menu television is a sub-menu of 'Audio'. The Touch-screen communicates with the television tuner. Video signals to the Touch-screen are transmitted from the television tuner.

Integrated Control Panel

E96677

ItemDescription

Item	Description
1	Touch-screen
2	Seek up button
3	Settings button
4	On/off and volume control
5	Source button
6	Seek down button

The ICP (integrated control panel) duplicates many of the Touch-screen television user control features. The ICP (integrated control panel) communicates with the television system through the medium speed CAN and MOST (media orientated systems transport) bus systems.

Steering Wheel Controls

E96380
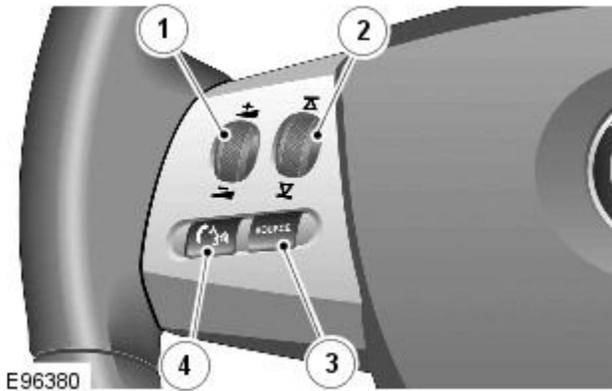
ItemDescription

Item	Description
1	Volume adjustment
2	Change pre-set TV (television) stations
3	Select source
4	Audio mute control/JaguarVoice control

Additional control of the television system is available in the form of steering wheel mounted switches which are located on the left hand side of the steering wheel. The 4 switches provide for volume adjustment, change pre-set television stations, select media source and finally audio mute control. The mute control is also used for JaguarVoice control.

Information and Entertainment System - Information and Entertainment System

Diagnosis and Testing

For additional information. REFER to: (415-00 Information and Entertainment System - General Information)

Information and Entertainment System (Diagnosis and Testing),
Cellular Phone (Diagnosis and Testing),
Navigation System (Diagnosis and Testing).

Information and Entertainment System - Audio Unit

Removal and Installation

Removal

⚠ NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Audio and Climate Control Assembly (415-01A Information and Entertainment System, Removal and Installation).

E138399
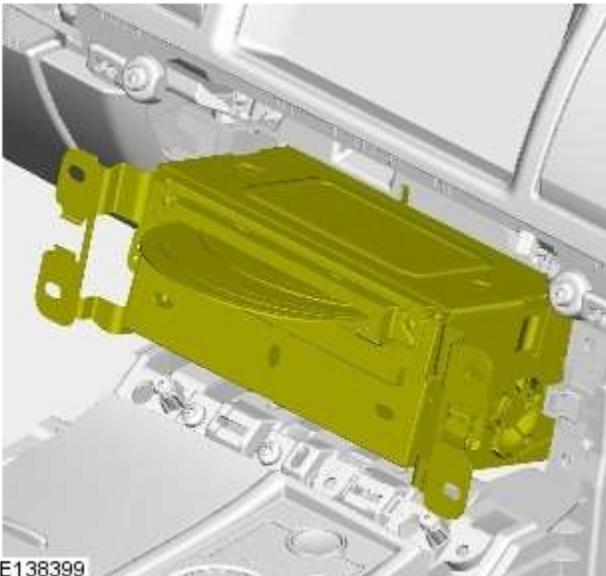
3. ⚠ CAUTION: Protect the surrounding trim to avoid damage.
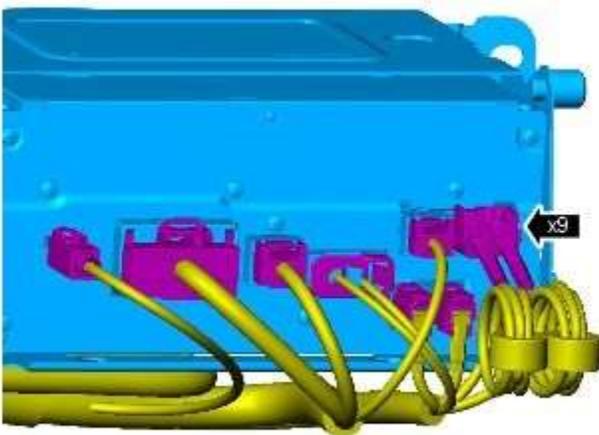
E138277

4. ⚠ CAUTION: Cover fiber optic cable connectors to minimize dust ingress and avoid bending the cables in a radius of less than 30 mm.

E138278

5. ⚠ NOTE: Do not disassemble further if the component is removed for access only.

Torque: 3 Nm

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Audio Unit Antenna Amplifier

Removal and Installation

Removal

⚠️ NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: C-Pillar Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).


3. *Torque:* 10 Nm
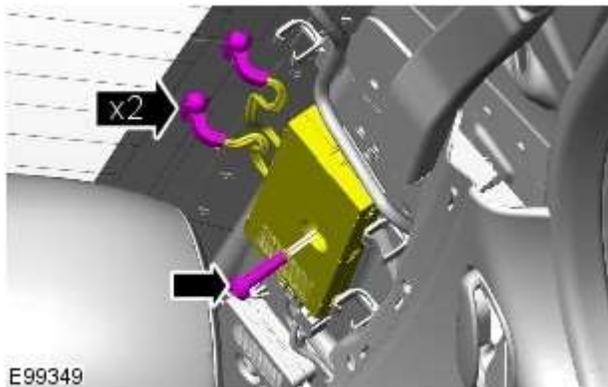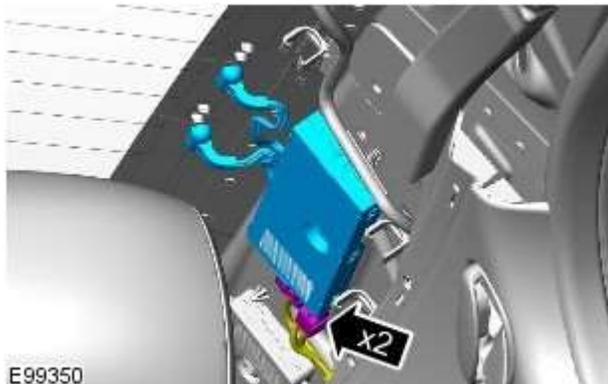
4.

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Audio and Climate Control Assembly

Removal and Installation

Removal

⚠️ NOTE: Removal steps in this procedure may contain installation details.

1. Remove both floor console side trim panels.

    Refer to: Floor Console Side Trim Panel (501-12 Instrument Panel and Console, Removal and Installation).

2. **Torque:** 4 Nm
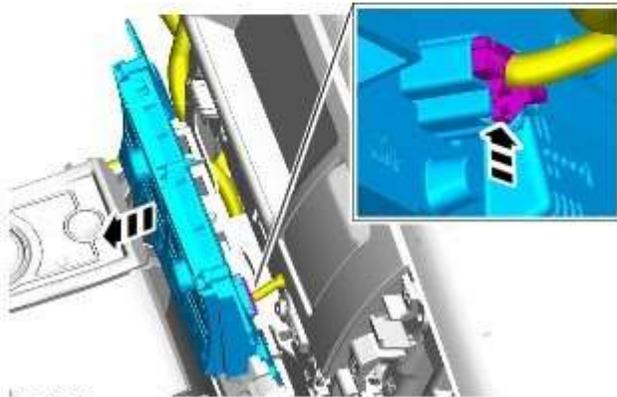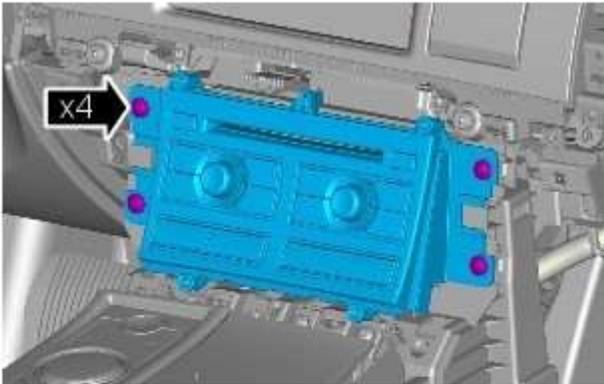
E95125

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Front Door Speaker
Removal and Installation

Removal

1. Refer to: Front Door Trim Panel (501-05, Removal and Installation).
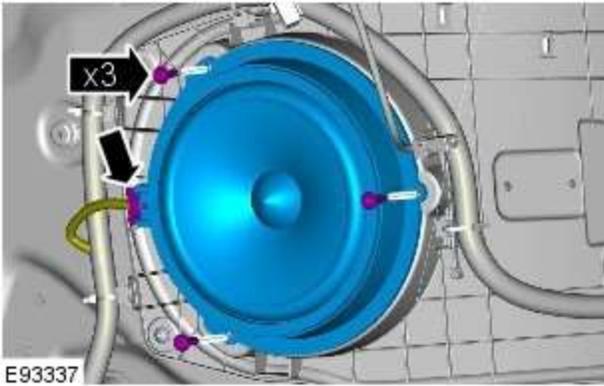
2.

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Information and Entertainment Display

Removal and Installation

Removal

⚠️NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Center Registers (412-01 Climate Control, Removal and Installation).
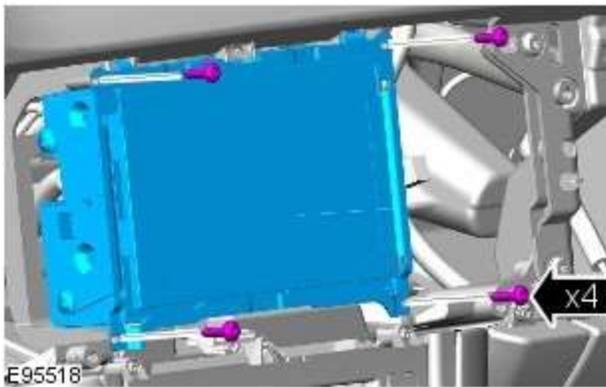
3. *Torque:* 2 Nm

4. ⚠️CAUTION: Cover fiber optic cable connectors to minimize dust ingress and avoid bending the cables in a radius of less than 30 mm.

E95520
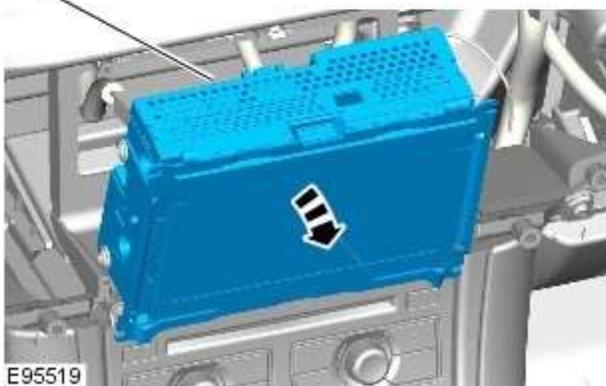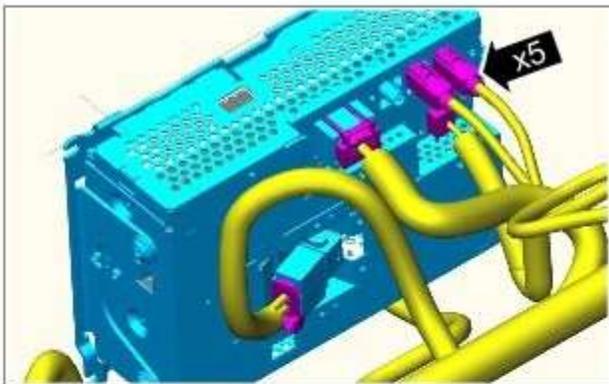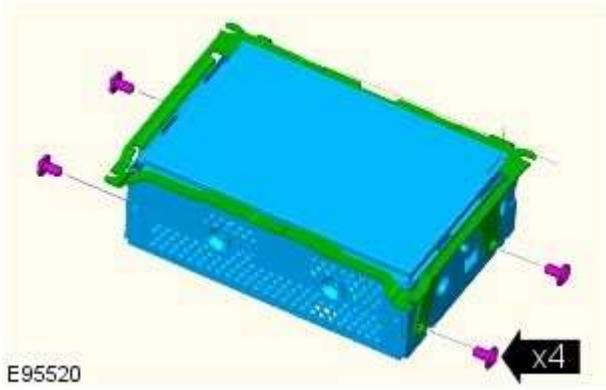
5. △NOTE: Do not disassemble further if the component is removed for access only.

   Torque: 3 Nm

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Information and Entertainment Module

Removal and Installation

Removal

⚠ NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Audio Unit (415-01A Information and Entertainment System, Removal and Installation).

3. *Torque:* 3 Nm
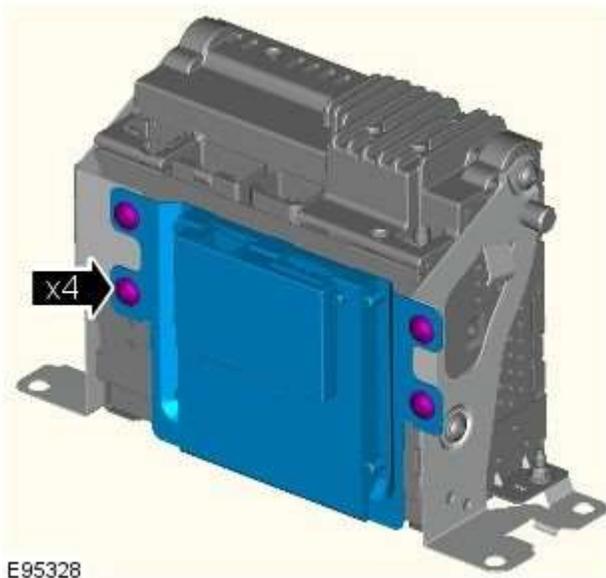
E95328

Installation

1. NOTE: New units must be configured using the Programmable Module Installation Routine in the diagnostic tool.

   To install, reverse the removal procedure.

Information and Entertainment System - Instrument Panel Speaker

Removal and Installation

Removal

⚠ NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Instrument Panel Speaker Grille (501-05 Interior Trim and Ornamentation, Removal and Installation).
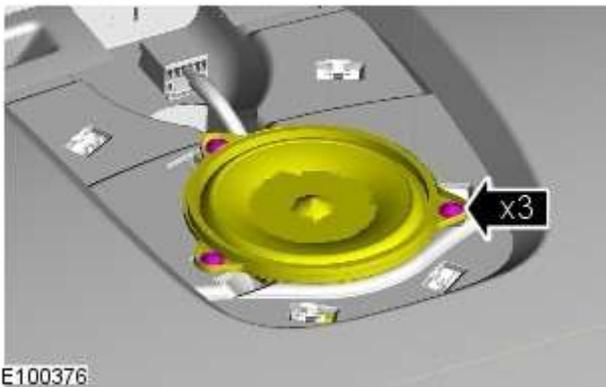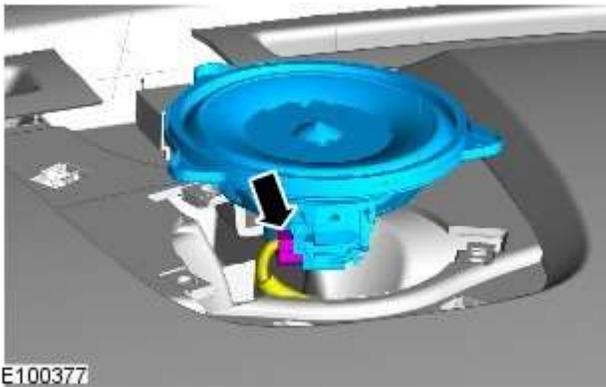
3. *Torque:* 2 Nm

E100376

E100377

4.

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Rear Door Speaker

Removal and Installation

Removal

⚠️NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Rear Door Trim Panel (501-05 Interior Trim and Ornamentation, Removal and Installation).
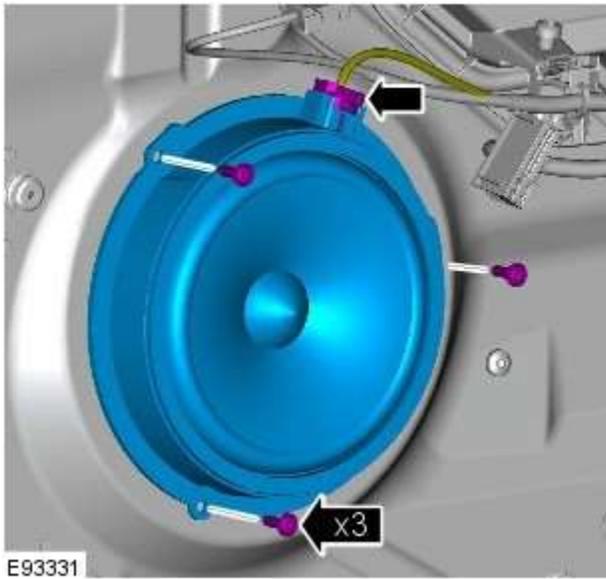
2.

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Steering Wheel Audio Controls

Removal and Installation

Removal

⚠️ NOTE: Removal steps in this procedure may contain installation details.

1. Make the SRS system safe.

   Refer to: Standard Workshop Practices (100-00 General Information, Description and Operation).

2. Refer to: Driver Air Bag Module (501-20B Supplemental Restraint System, Removal and Installation).

3. Refer to: Upshift Paddle Switch (307-05A Automatic Transmission/Transaxle External Controls - V6 3.0L Petrol, Removal and Installation).

4. Refer to: Downshift Paddle Switch (307-05A Automatic Transmission/Transaxle External Controls - V6 3.0L Petrol, Removal and Installation).

E96179

5. *Torque:* 3 Nm

E96180

6. *Torque:* 3 Nm

E96181

7. *Torque:* 6 Nm

E96184

8.

E96185
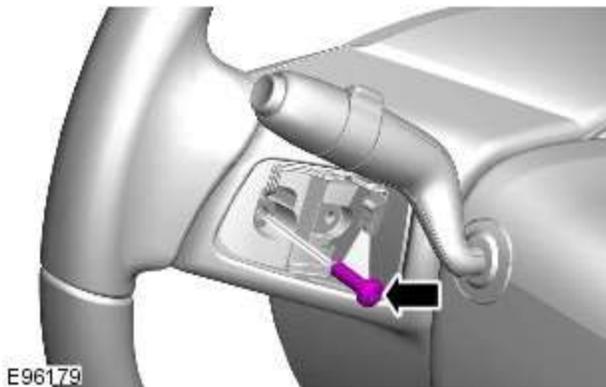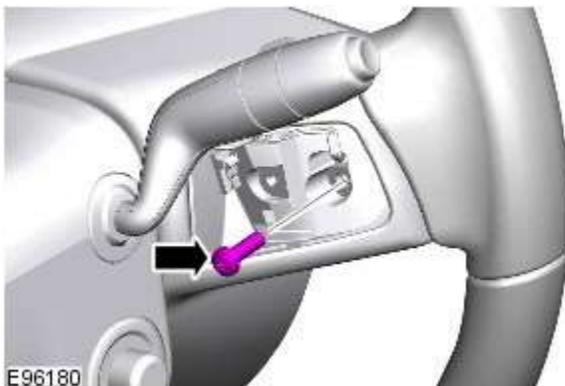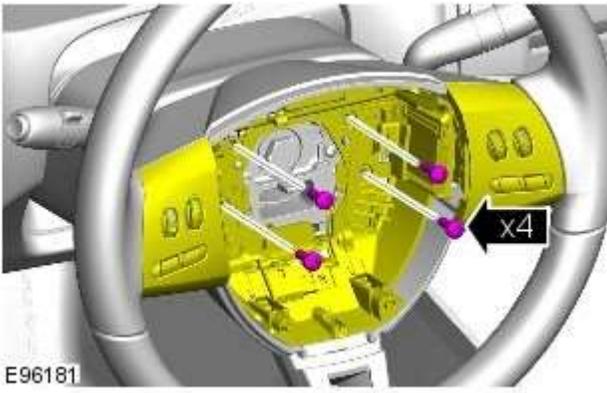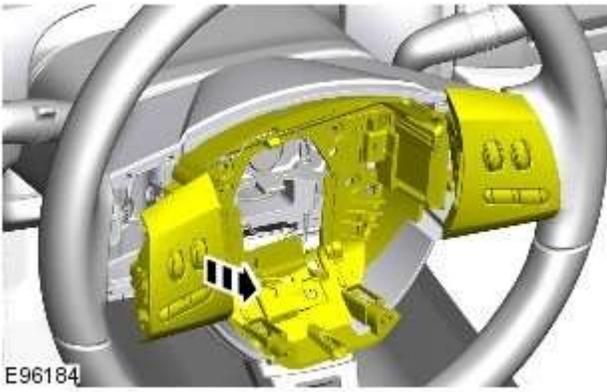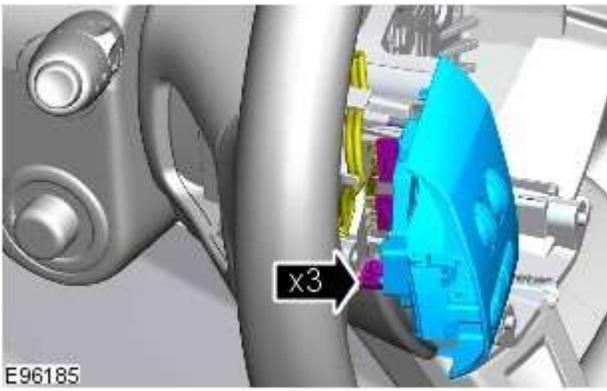
9.

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Subwoofer Amplifier

Removal and Installation

Removal

⚠ NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Loadspace Trim Panel LH (501-05 Interior Trim and Ornamentation, Removal and Installation).

3. *Torque:* 7 Nm

4. *Torque:* 7 Nm

5.

E99022
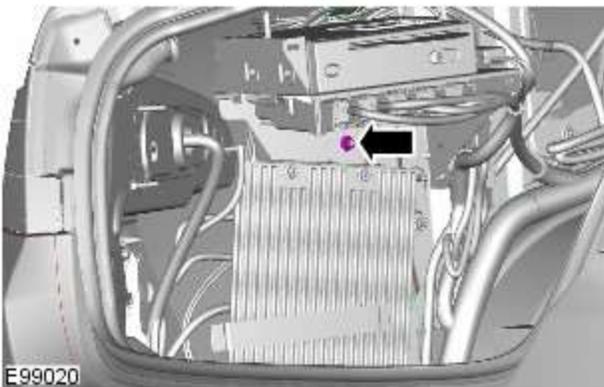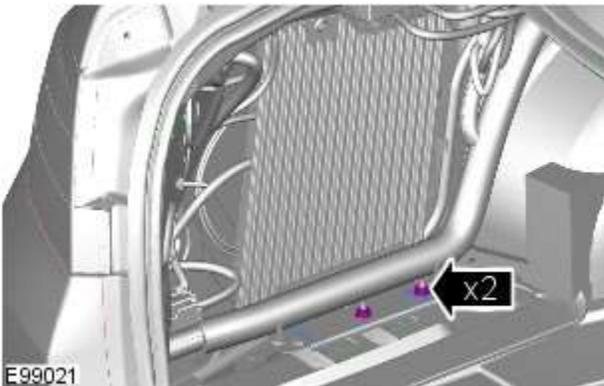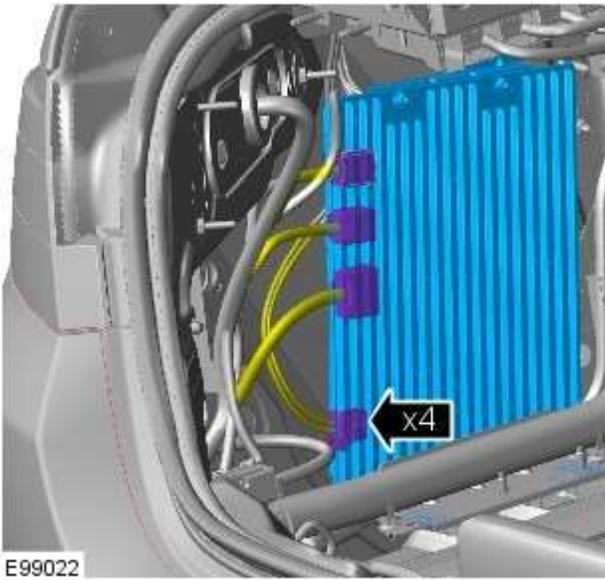
6. ⚠ NOTE: Do not disassemble further if the component is removed for access only.

   Torque: 7 Nm

E99023

7. *Torque:* 7 Nm

E99024

Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Subwoofer Speaker

Removal and Installation

Removal

⚠ NOTE: Removal steps in this procedure may contain installation details.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

E 93081

2.

E99286

3. *Torque:* 6 Nm

E99287
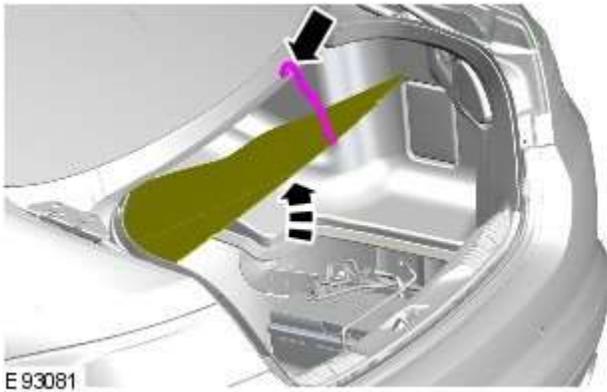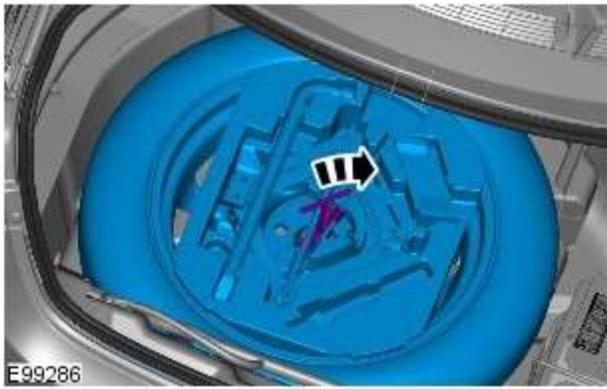
4. *Torque:* 6 Nm
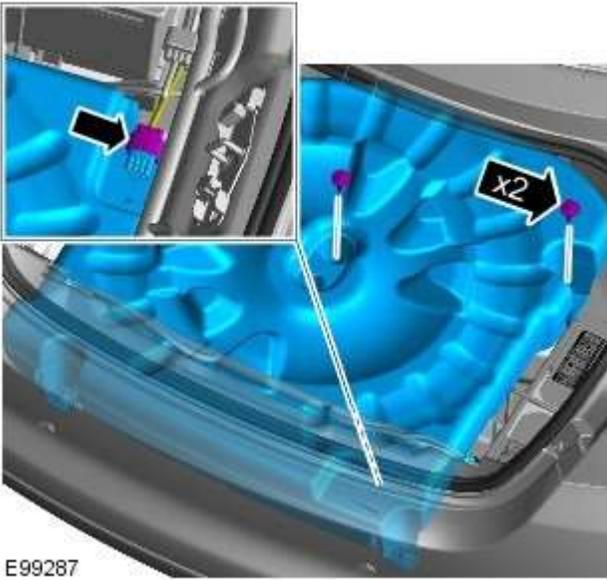
Installation

1. To install, reverse the removal procedure.

Information and Entertainment System - Satellite Radio Tuner

Removal and Installation

Removal

NOTES:

⚠️ Removal steps in this procedure may contain installation details.

⚠️ Some variation in the illustrations may occur, but the essential information is always correct.

1. Disconnect the battery ground cable.

   Refer to: <u>Battery Disconnect and Connect</u> (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: <u>Front Seat</u> (501-10 Seating, Removal and Installation).

3.
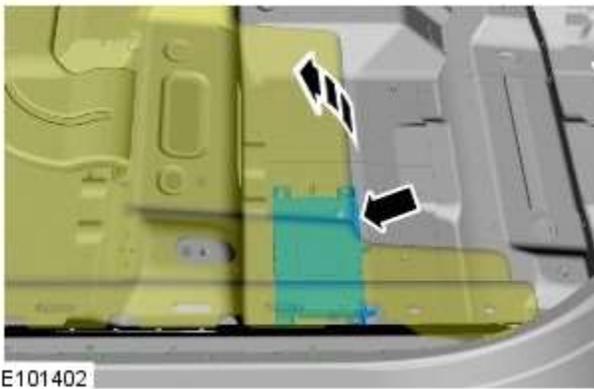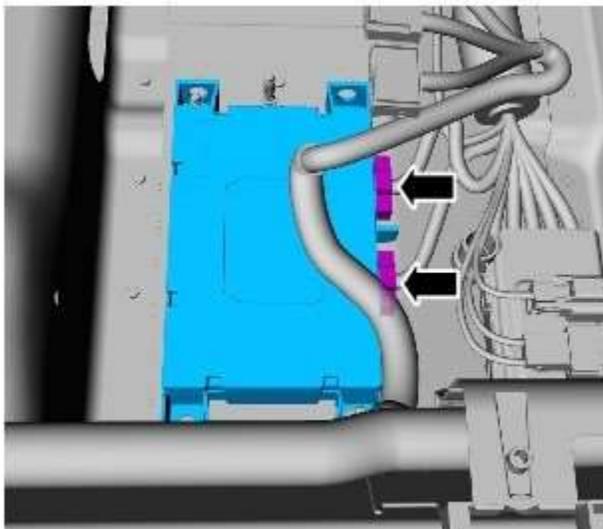
E101402

4. ⚠️ NOTE: If equipped.
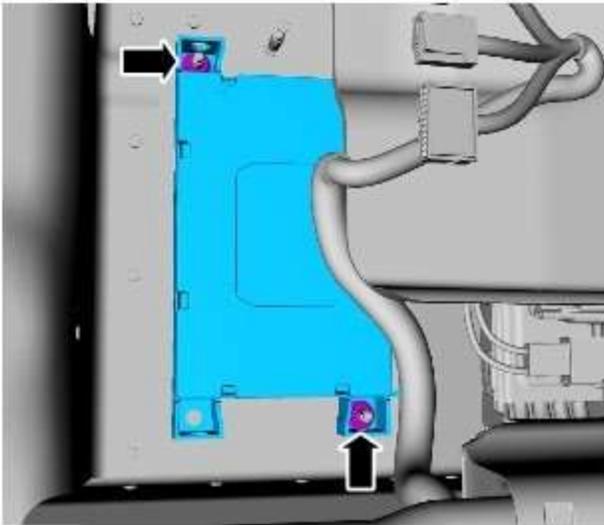
E101404

E101403

5. ⚠️ NOTE: If equipped.

   Torque: 10 Nm
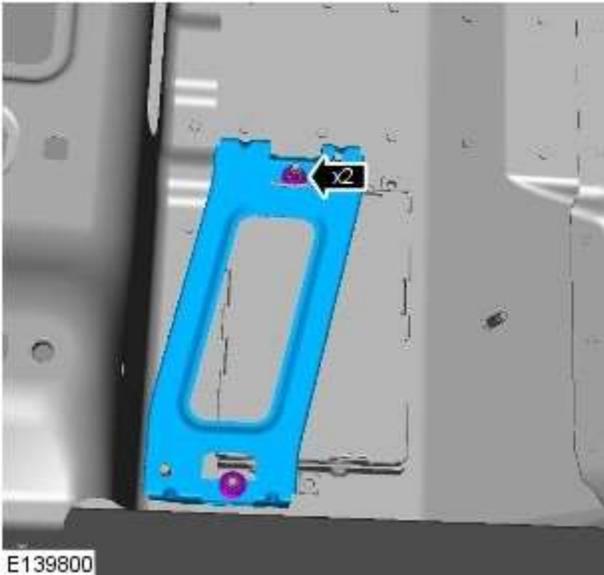
E139800

6. *Torque:* 10 Nm

E139799

7.
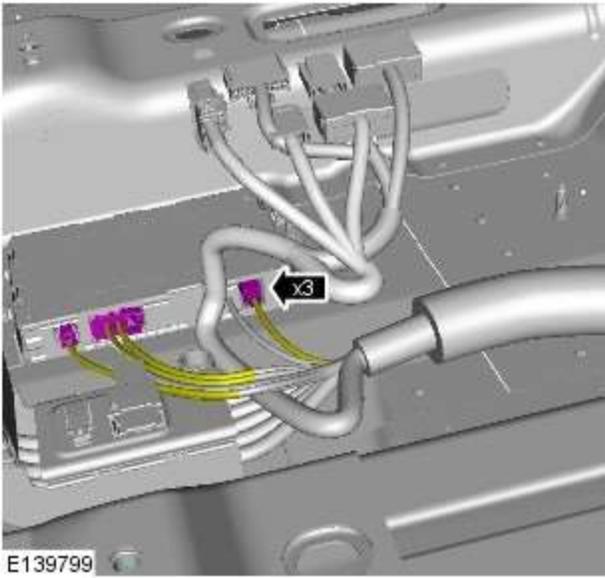
Installation

E139902

1. ⚠ NOTE: If a new component is installed, a link lead must be installed to the module in the position shown.

2. To install, reverse the removal procedure.

Information and Entertainment System - DTC: Audio Input Control Module – Audio Input Control Module

Diagnosis and Testing

Principle of Operation

This section of the manual concerns diagnostic procedures for the Dension audio input control module. For a detailed description of the information and entertainment system, refer to the relevant description and operation sections in the workshop manual

Inspection and Verification

⚠ CAUTION: Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle

1. Verify the customer concern

2. Visually inspect for obvious signs of damage and system integrity

Visual Inspection

Mechanical	Electrical
• Audio input control module • Audio amplifier module • Integrated audio module • Integrated control panel • Touch screen display • Loudspeakers	• Fuses • Loose or corroded connector(s) • Audio amplifier module • Integrated audio module • Integrated control panel • Touch screen display • Loudspeakers

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step

4. If the cause is not visually evident, check for diagnostic trouble codes and refer to the relevant diagnostic trouble codes index

Audio Input Control Module Diagnostics

△ NOTE: If problems are reported with the audio input control module, prior to further diagnostic checks or replacement of components, first perform a hardware reset by depressing the reset button for a minimum of two seconds. If problems persist, refer to the symptom charts below

Performing A Hardware Reset

E141500

Symptom Chart - Intermittent Fault With iPOD® Playback

Symptom	Possible Cause	Action
Intermittent fault with iPOD® playback	• The connected iPOD® unit has crashed or frozen	• See diagnostic procedures as specified in pinpoint test A1 "Check The Operation Of The iPOD®" below GO to Pinpoint Test A.

Symptom	Possible Cause	Action
	• The connected iPOD® unit's battery is not holding charge and requires replacement	• See diagnostic procedures as specified in pinpoint test A2 "Check The iPOD® Battery" below GO to Pinpoint Test A.
	• The iPOD® dock cable is not securely installed • The iPOD® dock cable is faulty	• See diagnostic procedures as specified in pinpoint test A3 "Check The iPOD® Is Charging When Connected To The Audio Input Control Module" below GO to Pinpoint Test A.

Symptom Chart - Intermittent Fault With Playback From USB Device

Symptom	Possible Cause	Action
Intermittent fault with USB playback	• The USB memory stick is damaged or faulty • The USB memory stick is incompatible with the audio input control module	• Check for correct operation by connecting another working USB memory stick loaded with a compatible test file (files may be downloaded from Dension website). If fault clears, then the original USB stick should be replaced. If problem persists, suspect a fault with the USB extension cable
	• The USB extension cable is not securely installed • The USB extension cable is faulty	• See diagnostic procedures as specified in pinpoint test B3 "Check The USB Extension Cable Is Operational And Securely Installed" below GO to Pinpoint Test B.
	• The audio input control module power harness is not securely installed • The audio input control module power harness is faulty	• Ensure all connectors of the audio input control module power harness are correctly secured • If problem persists, check and install a new audio input control module power harness
Not all sound files on the USB are played	• Sound files may be saved in an incompatible file format	• Check that affected sound file is encoded in a compatible file format - Compatible file formats: AAC (up to 320 kbit/s); MP3 (up to 320 kbit/s); MP3 variable bit rate (up to 320 kbit/s); WAV - uncompressed files; OGG (up to 320 kbit/s); WMA - except DRM protected files (up to 320 kbit/s)
	• Sound files may be corrupted	• Check integrity of affected files and remove any damaged files from the memory stick

Symptom Chart - No Response From CDC Button

Symptom	Possible Cause	Action
No response when the CDC button is pressed	• USB input or iPOD® input faulty	• First check operation of iPOD® playback. If iPOD® operates normally but USB playback is faulty, then follow diagnostic procedures as specified in pinpoint test B GO to Pinpoint Test B. • If iPOD® playback is faulty but USB playback operates normally, then follow diagnostic procedures as specified in pinpoint test A GO to Pinpoint Test A.
	• The auxiliary input may be switched to bypass mode	• See diagnostic procedures as specified in pinpoint test A5: "Check If The Bypass Switch On The Auxiliary Input Unit Is Activated" below GO to Pinpoint Test A.
	• The audio input control module power harness is not securely installed • The audio input control module power supply/harness is faulty	• Ensure all connectors of the audio input control module power harness are correctly secured • See diagnostic procedures as specified in pinpoint tests C1: "Check The Integrity Of Power Supply From Vehicle" and C2: "Check The Integrity And Operation Of The Audio Input Control Module Power Harness" below GO to Pinpoint Test C.
	• Optical cables/connectors (if fitted) are not securely installed • Optical cables/connectors (if fitted) are faulty	• Ensure the optical cables are routed appropriately to avoid pinching the cable and with no excessive bends or kinks. Ensure all connectors of the optical cables are correctly secured. Replace any damaged or faulty optical cables and/or connectors as required • If no CD changer is fitted, ensure that the optical cables are configured in a closed loop so that the optical circuit is intact

Symptom Chart - iPOD® Related Faults

Symptom	Possible Cause	Action
iPOD® inoperative	• iPOD® configured or connected incorrectly	• If iPOD® playback is faulty but USB playback operates normally, then follow diagnostic procedures as specified in pinpoint test A GO to Pinpoint Test A.
iPOD® does not operate and in-car display shows "99" on the screen	• The connected iPOD® unit has crashed or frozen	• See diagnostic procedures as specified in pinpoint test A1 "Check The Operation Of The iPOD®" below GO to Pinpoint Test A.
	• The connected iPOD® unit's battery is flat and requires charging • The connected iPOD® unit's battery is not holding charge and requires replacement	• See diagnostic procedures as specified in pinpoint test A2 "Check The iPOD® Battery" below GO to Pinpoint Test A.
	• The iPOD® unit is not compatible with the audio input control module	• See diagnostic procedures as specified in pinpoint test A4 "Check The iPOD® Is Compatible With The Audio Input Control Module" below GO to Pinpoint Test A.
iPOD® playback drops out and system reverts to radio input	• USB input or iPOD® input faulty	• First check operation of iPOD® playback. If iPOD® operates normally but USB playback is faulty, then follow diagnostic procedures as specified in pinpoint test B GO to Pinpoint Test B. • If iPOD® playback is faulty but USB playback operates normally, then follow diagnostic procedures as specified in pinpoint test A GO to Pinpoint Test A.
	• The connected iPOD® unit has crashed or frozen	• See diagnostic procedures as specified in pinpoint test A1 "Check The Operation Of The iPOD®" below GO to Pinpoint Test A.
	• The connected iPOD® unit's battery is flat and requires charging • The connected iPOD® unit's battery is not holding charge and requires replacement	• See diagnostic procedures as specified in pinpoint test A2 "Check The iPOD® Battery" below GO to Pinpoint Test A.
	• The auxiliary input unit is faulty	• See diagnostic procedures as specified in pinpoint test A6 "Check The Operation Of The Auxiliary Input Unit" below GO to Pinpoint Test A.
iPOD® unit will not charge when connected to the audio input control module	• The iPOD® unit is not compatible with the audio input control module	• See diagnostic procedures as specified in pinpoint test A4 "Check The iPOD® Is Compatible With The Audio Input Control Module" below GO to Pinpoint Test A.
	• The iPOD® dock cable is not securely installed • The iPOD® dock cable is faulty	• See diagnostic procedures as specified in pinpoint test A3 "Check The iPOD® Is Charging When Connected To The Audio Input Control Module" below GO to Pinpoint Test A.
iPOD® unit keeps cutting out and rebooting	• The iPOD® unit is not compatible with the audio input control module	• See diagnostic procedures as specified in pinpoint test A4 "Check The iPOD® Is Compatible With The Audio Input Control Module" below GO to Pinpoint Test A.
	• The iPOD® dock cable is not securely installed • The iPOD® dock cable is faulty	• See diagnostic procedures as specified in pinpoint test A3 "Check The iPOD® Is Charging When Connected To The Audio Input Control Module" below GO to Pinpoint Test A.
	• The connected iPOD® unit's battery is flat and requires charging • The connected iPOD®	• See diagnostic procedures as specified in pinpoint test A2 "Check The iPOD® Battery" below GO to Pinpoint Test A.

Symptom	Possible Cause	Action
	unit's battery is not holding charge and requires replacement	
Unable to select specific content on the iPOD® (ie: an individual artist, album or song)	• Content/sound files corrupted or incompatible with the iPOD®	• Check if files/content can be accessed by iPOD® when it is disconnected from the audio input control module. If fault persists, advise customer to renew or replace the affected files
iPOD® not recognised when connected	• The connected iPOD® unit has crashed or frozen	• See diagnostic procedures as specified in pinpoint test A1 "Check The Operation Of The iPOD®" below GO to Pinpoint Test A.
	• USB input or iPOD® input faulty	• First check operation of iPOD® playback. If iPOD® operates normally but USB playback is faulty, then follow diagnostic procedures as specified in pinpoint test B GO to Pinpoint Test B. • If iPOD® playback is faulty but USB playback operates normally, then follow diagnostic procedures as specified in pinpoint test A GO to Pinpoint Test A.
	• The auxiliary input may be switched to bypass mode	• See diagnostic procedures as specified in pinpoint test A5: "Check If The Bypass Switch On The Auxiliary Input Unit Is Activated" below GO to Pinpoint Test A.
	• The auxiliary input unit is faulty	• See diagnostic procedures as specified in pinpoint test A6 "Check The Operation Of The Auxiliary Input Unit" below GO to Pinpoint Test A.
	• The connected iPOD® unit's battery is flat and requires charging • The connected iPOD® unit's battery is not holding charge and requires replacement	• See diagnostic procedures as specified in pinpoint test A2 "Check The iPOD® Battery" below GO to Pinpoint Test A.
	• The iPOD® unit is not compatible with the audio input control module	• See diagnostic procedures as specified in pinpoint test A4 "Check The iPOD® Is Compatible With The Audio Input Control Module" below GO to Pinpoint Test A.
iPOD® connector pins are misaligned	• The iPOD® dock cable is faulty	• Replace dock cable as required. To ensure optimum compatibility, the cable with the white mini-DIN connector - Part No C2S51762 - should be used
iPOD® not working at all. If reset, the system will work for 6 songs then cuts out again. CDC button inoperative and CD sometimes cuts off for 2-3 seconds	• Optical cables/connectors (if fitted) are not securely installed • Optical cables/connectors (if fitted) are faulty	• Ensure the optical cables are routed appropriately to avoid pinching the cable and with no excessive bends or kinks. Ensure all connectors of the optical cables are correctly secured. Replace any damaged or faulty optical cables and/or connectors as required • If no CD changer is fitted, ensure that the optical cables are configured in a closed loop so that the optical circuit is intact
iPOD® inoperative. Display shows no magazine	• The auxiliary input may be switched to bypass mode	• See diagnostic procedures as specified in pinpoint test A5: "Check If The Bypass Switch On The Auxiliary Input Unit Is Activated" below GO to Pinpoint Test A.
iPOD® inoperative. Display shows menu for CD6 and has to load all the tracks	• Audio input control module software requires updating	• Download and install the latest system software. Software releases are available on the Dension website - http://www.dension.com/jaguar/

Symptom Chart - USB Memory Stick/Storage Device Related Faults

| Symptom	Possible Cause	Action
No playback from memory stick/storage device	• Memory stick/storage device configured or connected incorrectly	• If iPOD® operates normally but USB playback is faulty, then follow diagnostic procedures as specified in pinpoint test B GO to Pinpoint Test B.

Symptom Chart - System Faults

Symptom	Possible Cause	Action
System defaults to Audio/CD Changer	• The auxiliary input unit may be switched to bypass mode	• See diagnostic procedures as specified in pinpoint test A5: "Check If The Bypass Switch On The Auxiliary Input Unit Is Activated" below GO to Pinpoint Test A.
	• The auxiliary input unit is faulty	• See diagnostic procedures as specified in pinpoint test A6 "Check The Operation Of The Auxiliary Input Unit" below GO to Pinpoint Test A.
	• The memory stick/storage device is not correctly formatted	• See diagnostic procedures as specified in pinpoint test B1 "Check For Correct Formatting" below GO to Pinpoint Test B.
	• The USB extension cable is not securely installed • The USB extension cable is faulty	• See diagnostic procedures as specified in pinpoint test B3 "Check The USB Extension Cable Is Operational And Securely Installed" below GO to Pinpoint Test B.
	• The USB memory stick is damaged or faulty • The USB memory stick is incompatible with the audio input control module	• Check for correct operation by connecting another working USB memory stick loaded with a compatible test file (files may be downloaded from Dension website). If fault clears, then the original USB stick should be replaced. If problem persists, suspect a fault with the USB extension cable
	• The storage capacity of the memory stick/storage device is close to or exceeds 8 Gigabytes	• See diagnostic procedures as specified in pinpoint test B4 "Check The Capacity Of The Memory Stick/Storage Device" below GO to Pinpoint Test B.
	• The connected iPOD® unit's battery is flat and requires charging • The connected iPOD® unit's battery is not holding charge and requires replacement	• See diagnostic procedures as specified in pinpoint test A2 "Check The iPOD® Battery" below GO to Pinpoint Test A.
	• The iPOD® unit is not compatible with the audio input control module	• See diagnostic procedures as specified in pinpoint test A4 "Check The iPOD® Is Compatible With The Audio Input Control Module" below GO to Pinpoint Test A.
	• The connected iPOD® unit has crashed or frozen	• See diagnostic procedures as specified in pinpoint test A1 "Check The Operation Of The iPOD®" below GO to Pinpoint Test A.
• No sound from speakers (either front/rear or left/right) during playback from iPOD®/memory stick • Audio system loses connection to iPOD®/memory stick during playback • iPOD® and radio playback skips after unit has been operating for 4 minutes	• The audio input control module power harness is not securely installed • The audio input control module power supply/harness is faulty	• Ensure all connectors of the audio input control module power harness are correctly secured • See diagnostic procedures as specified in pinpoint tests C1: "Check The Integrity Of Power Supply From Vehicle" and C2: "Check The Integrity And Operation Of The Audio Input Control Module Power Harness" below GO to Pinpoint Test C.
	• Optical cables/connectors (if fitted) are not securely installed • Optical cables/connectors (if fitted) are faulty	• Ensure the optical cables are routed appropriately to avoid pinching the cable and with no excessive bends or kinks. Ensure all connectors of the optical cables are correctly secured. Replace any damaged or faulty optical cables and/or connectors as required • If no CD changer is fitted, ensure that the optical cables are configured in a closed loop so that the optical circuit is intact
	• The iPOD® dock cable is not securely installed • The iPOD® dock cable is faulty	• See diagnostic procedures as specified in pinpoint test A3 "Check The iPOD® Is Charging When Connected To The Audio Input Control Module" below GO to Pinpoint Test A.

PINPOINT TEST A : IPOD® INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A1: CHECK THE OPERATION OF THE IPOD®	
	1 Check if the iPOD® has crashed or frozen (it is unresponsive to any control commands)
	Has the iPOD® crashed or frozen? **Yes** Reset the iPOD® or refer to Apple service procedures **No** GO to A2.
A2: CHECK THE IPOD® BATTERY	
	1 Check the charge state of the iPOD® battery
	Is the iPOD® battery flat? **Yes** Charge the iPOD® battery for at least 10 minutes either by connecting to the charger supplied with the iPOD® or by connecting to the audio input control module. If iPOD® will not charge when connected to the audio input control module and with the ignition on then GO to A3. **No** GO to A3.
A3: CHECK THE IPOD® IS CHARGING WHEN CONNECTED TO THE AUDIO INPUT CONTROL MODULE	
	iPOD® Dock Connector - Pin Configuration
	1 Check that the iPOD® is charging when connected to the audio input control module
	2 Ignition switch in position II.
	3 Ensure the iPOD® dock cable is securely connected
	Does the iPOD® charge up while connected to the audio input control module? **Yes** GO to A4. **No** Check the integrity of the iPOD® dock cable and its connections. Disconnect the iPOD® and check the voltage readings of the iPOD® dock cable using a multimeter (Pin B8: 5 volts/Pin B15: GND). If a fault is noted, replace dock cable as required. To ensure optimum compatibility, the cable with the white mini-DIN connector - Part No C2S51762 - should be used. If iPOD® will not charge after replacement, then GO to A4.
A4: CHECK THE IPOD® IS COMPATIBLE WITH THE AUDIO INPUT CONTROL MODULE	

NOTES:

⚠ Some of the earlier (pre-2004) iPOD® models may not be compatible with the audio input control module. In order to optimise functionality the audio input control module may require a firmware update and/or connection via the latest iPOD® dock cable with the white mini-DIN connector - Part No C2S51762. See the manufacturer website for further details - http://www.dension.com/jaguar/

⚠ Some of the earlier (pre-2004) iPOD® models may not be compatible with the audio input control module. In order to optimise functionality the audio input control module may require a firmware update and/or connection via the latest iPOD® dock cable with the white mini-DIN connector - Part No C2S51762. See the manufacturer website for further details - http://www.dension.com

	1 Determine whether the iPOD® model being used is compatible with the audio input control module installed in the vehicle
	2 Ensure the latest firmware updates are installed and an appropriate iPOD® dock cable is securely connected
	3 For advice, check details on the Dension website - http://www.dension.com/jaguar/

	Is the iPOD® compatible with the audio input control module?
	Yes
	GO to A5.
	No
	Advise customer that an alternative device is required

A5: CHECK IF THE BYPASS SWITCH ON THE AUXILIARY INPUT UNIT IS ACTIVATED

	Auxiliary Input Unit - Bypass Switch
	1 Check the status of the bypass switch on the auxiliary input unit
	Is the switch on the auxiliary input unit to the active mode position?
	Yes
	GO to A6.
	No
	Toggle the switch on the auxiliary input unit to the active mode position. Turn off the ignition and wait two minutes until the blue LED on the auxiliary input unit is extinguished. Switch ignition back on the complete the switching process

A6: CHECK THE OPERATION OF THE AUXILIARY INPUT UNIT

1	Check the operation of the auxiliary input unit
2	Disconnect the auxiliary input unit from the audio input control module.
3	Ignition switch in position 0.
4	Wait two minutes
5	Install a new auxiliary input unit
6	Ignition switch in position II.

	Is the iPOD® now working?
	Yes
	No further action required
	No
	Check the integrity of the iPOD® dock cable and its connectionsGO to A3.

PINPOINT TEST B : USB/STORAGE DEVICE DOES NOT POWER UP WHEN CONNECTED

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
B1: CHECK FOR CORRECT FORMATTING	
	NOTE: The storage device needs to be configured to FAT16 or FAT32 format
	1 Check if the memory stick/storage device is correctly formatted
	Is the storage device/memory stick configured to the FAT16 or FAT32 format?
	Yes
	GO to B2.
	No
	Reformat the storage device as required
B2: CHECK FOR FAULTY OR INCOMPATIBLE MEMORY STICK/STORAGE DEVICE	
	NOTE: Test files may be downloaded from Dension website
	1 Check the operation of the USB port on the auxiliary input unit by connecting another working USB memory stick/storage device loaded with a compatible test file
	Does the system operate normally when another USB memory stick/storage device is connected?
	Yes
	Replace the original USB memory stick/storage device
	No
	GO to B3.
B3: CHECK THE USB EXTENSION CABLE IS OPERATIONAL AND SECURELY INSTALLED	
	1 Check the integrity of the USB extension cable and its connections

|	Is the USB extension cable securely pushed into the USB connection port on the audio input control module
	Yes
	    Replace the USB extension cable
	No
	    Secure connections and retest

B4: CHECK THE CAPACITY OF THE MEMORY STICK/STORAGE DEVICE	
	⚠️ NOTE: The higher the capacity of the memory stick is the longer it takes to register with the audio input control module and power up. The maximum permitted capacity is 8 Gigabytes
	1 Check the storage capacity of the memory stick/storage device does not exceed 8 Gigabytes

	Is the storage capacity of the memory stick/storage device 8 Gigabytes or less?
	Yes
	    High capacity devices may require longer to register and should be allowed up to two minutes to power up following connection to the USB port. If memory stick fails to power up after two minutes, suspect a faulty memory stick GO to B2. or USB extension cable GO to B3.
	No
	    The memory stick/storage device exceeds the maximum permitted capacity. Replace with a device with a capacity of 8 Gigabytes or less

B5: CHECK IF THE BYPASS SWITCH ON THE AUXILIARY INPUT UNIT IS ACTIVATED	
	Auxiliary Input Unit - Bypass Switch E141502
	1 Check the status of the bypass switch on the auxiliary input unit

	Is the switch on the auxiliary input unit to the active mode position?
	Yes
	    GO to B6.
	No
	    Toggle the switch on the auxiliary input unit to the active mode position. Turn off the ignition and wait two minutes until the blue LED on the auxiliary input unit is extinguished. Switch ignition back on the complete the switching process

B6: CHECK THE OPERATION OF THE AUXILIARY INPUT UNIT	
	1 Check the operation of the auxiliary input unit
	2 Disconnect the auxiliary input unit from the audio input control module.
	3 Ignition switch in position 0.
	4 Wait two minutes
	5 Replace auxiliary input unit
	6 Ignition switch in position II.

	Is the USB memory stick/storage device now powering up?
	Yes
	    No further action required
	No
	    Check the integrity of the USB extension cable and its connectionsGO to B3.

PINPOINT TEST C : POWER SUPPLY CIRCUIT/POWER HARNESS CHECKS	
TEST CONDITIONS	**DETAILS/RESULTS/ACTIONS**
C1: CHECK THE INTEGRITY OF PRIMARY POWER SUPPLY	
	1 Remove the retrofitted audio input control module power harness
	2 Reconnect the original power harness

	Are the standard infotainment components on the vehicle operating normally?
	Yes
	    GO to C2.
	No
	    Check power and ground connections to the affected modules. Check for related power or lost communications DTCs and refer to the relevant DTC index. Check fuses and battery charging system. Rectify as necessary

C2: CHECK THE INTEGRITY AND OPERATION OF THE AUDIO INPUT CONTROL MODULE POWER HARNESS		
	1	SELECT APPROPRIATE HARNESS TYPE BASED ON CONFIGURATION OF MICROFIT CONNECTOR
	Audio Input Control Module Power Harness - 2x11 Microfit Connector E141504	
	2	Reconnect the retrofit audio input control module power harness
	3	Check the voltages of the 2x11 audio input control module microfit connector using a multimeter • Red wire: permanent 12 volts supply • Black wire: GND • Blue wire: switched 12 volts
	Audio Input Control Module Power Harness - 2x2 Microfit Connector E141505	
	4	Reconnect the retrofit audio input control module power harness
	5	Check the voltages of the 2x2 audio input control module microfit connector using a multimeter • Red wire: permanent 12 volts supply • Black wire: GND • Purple wire: switched 12 volts
	Are the voltage readings correct? **Yes** No further action **No** Replace the audio input control module power harness	
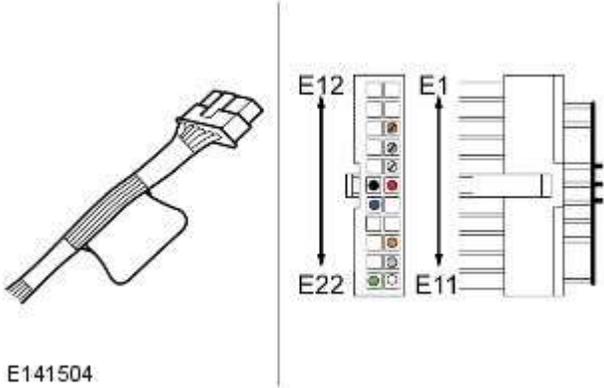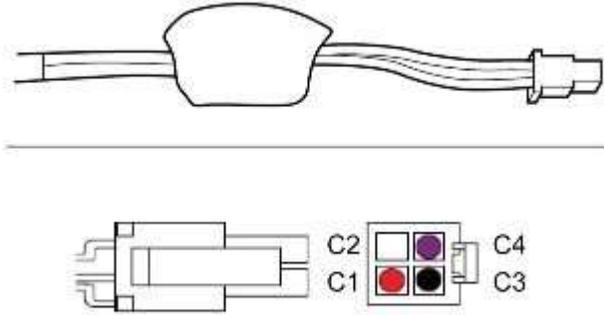
DTC Index

For a list of diagnostic trouble codes that could be logged on this vehicle, please refer to the relevant DTC index