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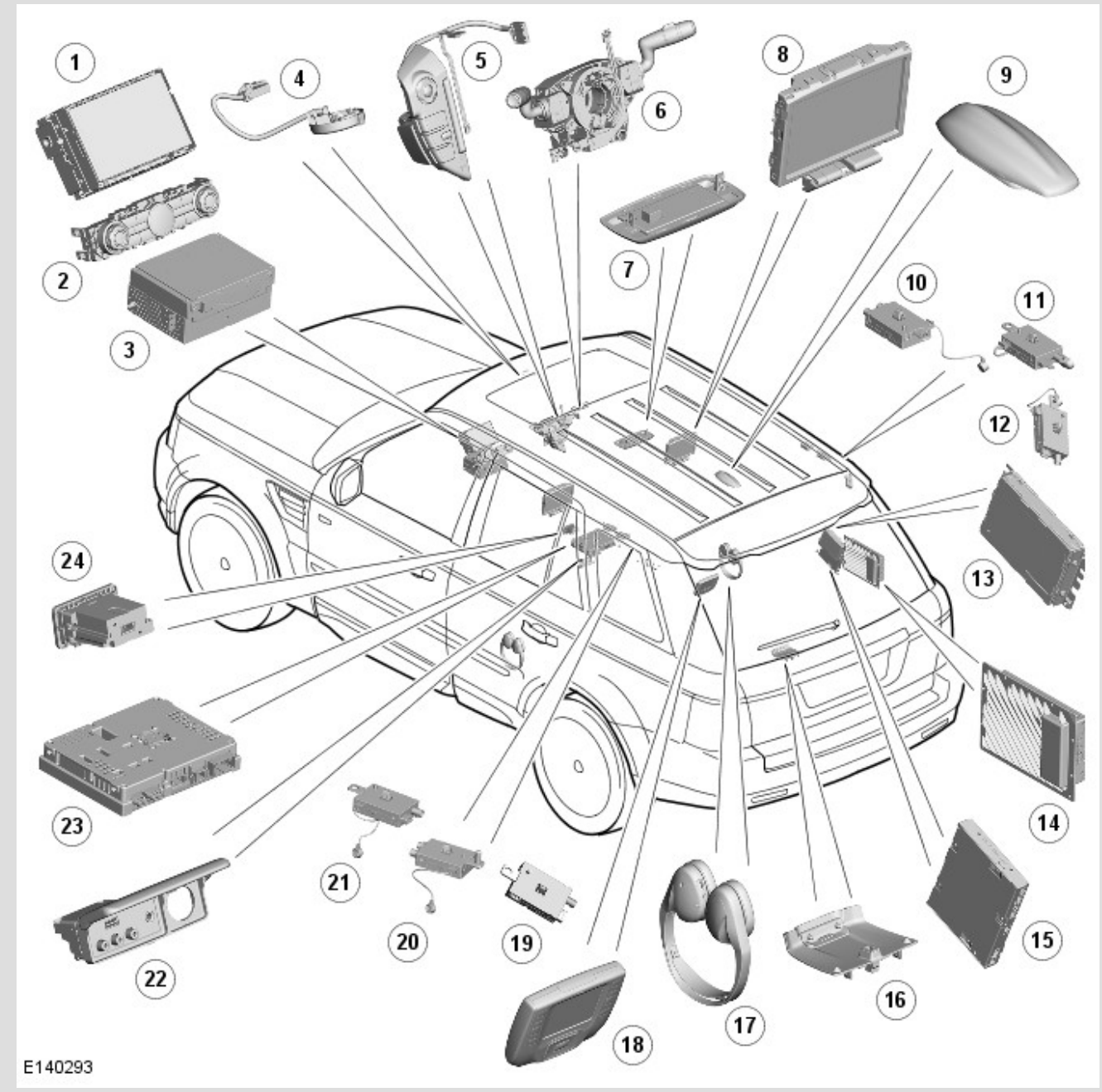
VIDEO SYSTEM (G1454171)

DESCRIPTION AND OPERATION

Video System Component Location



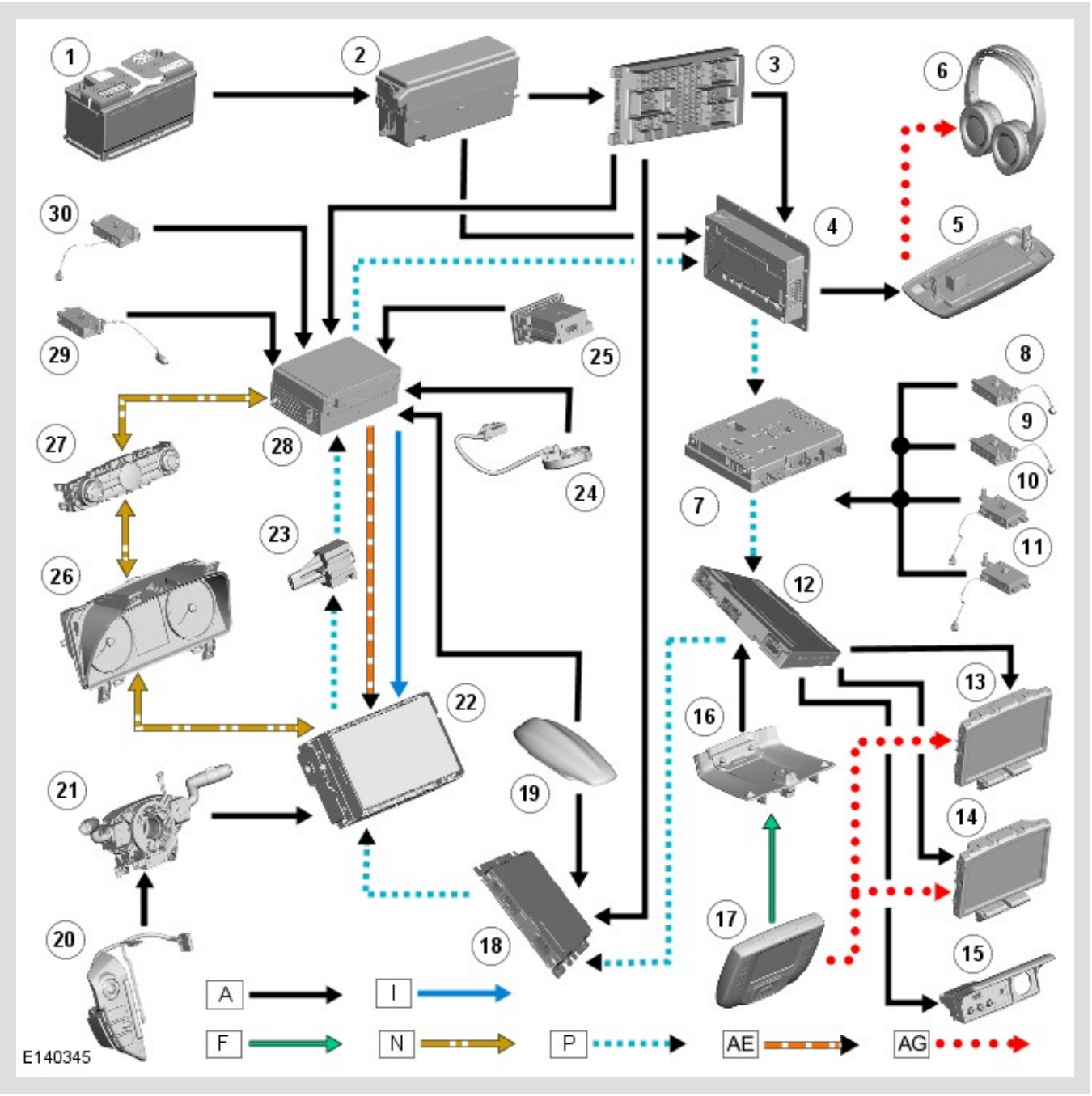
ITEM	DESCRIPTION
1	Touch screen display (TSD)
2	ICP (integrated control panel)

ITEM	DESCRIPTION
3	IAM (integrated audio module)
4	Microphone
5	Steering Wheel audio controls
6	Clockspring
7	Wireless Headphone Transmitter
8	Rear LCD screens
9	Digital Audio Broadcasting (DAB) L-Band/Satellite Digital Audio Radio Service (SDARS) antenna
10	TV antenna amplifier
11	AM/FM1 antenna amplifier
12	TV antenna amplifier
13	Digital Audio Broadcasting (DAB)/SDARS Receiver
14	Audio amplifier
15	Rear entertainment module
16	RSE remote control docking station
17	Wireless headphones
18	RSE remote control
19	TV antenna amplifier
20	FM2/DABIII/VICS antenna amplifer
21	TV antenna amplifier
22	Audio/Video input/output panel
23	Television tuner module
24	Portable audio module

Video System Control Diagram

NOTE:

A = Hardwired; **N** = Medium Speed CAN Bus; **P** = MOST **R** = SPDIF (Sony); **I** = CVBS



ITEM	DESCRIPTION
1	Battery
2	engine junction box (EJB)
3	central junction box (CJB)
4	Amplifier

ITEM	DESCRIPTION
5	Wireless headphone transmitter
6	Wireless headphones
7	TV tuner
8	TV antenna
9	TV antenna
10	TV antenna
11	TV antenna
12	Rear entertainment module
13	right-hand (RH) rear LCD screen
14	left-hand (LH) rear LCD screen
15	Audio/Video input/output panel
16	Remote control docking station
17	Remote control
18	TV Module
19	Digital Audio Broadcasting (DAB) L-Band/Satellite Digital Audio Radio Service (SDARS) Antenna
20	Steering wheel audio controls
21	Clockspring
22	TSD
23	MOST diagnostic connector
24	Microphone
25	Portable audio module
26	Instrument cluster
27	ICP
28	IAM
29	FM2/DAB3 Antenna
30	AM/FM1 Antenna

The Video system comprises:

- Touch screen Display (TSD)
- Television tuner module

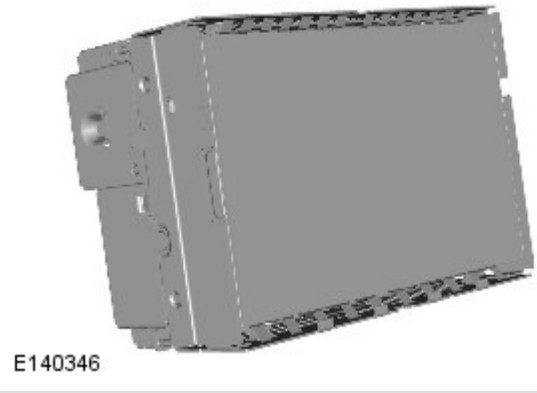
- Television antennas
- Rear remote control headphone modules

TELEVISION

The television system receives television signals from television antennas in the rear side screens. The antennas are connected to the television tuner via coaxial leads.

COMPONENT DESCRIPTION

TOUCH SCREEN DISPLAY



The Touch Screen Display (TSD) is located in the center of the instrument panel and is the driver control interface for the infotainment system. The TSD is connected to the MOST ring and communicates with the other components in the audio/infotainment system.

The TSD communicates with the RSE module via a co-axial cable. The TSD processes its own video for system operation but receives the video image data from the RSE via the co-axial cable.

The TSD also provides driver display and control of the audio system, telephone, the rear view camera, proximity cameras, the Traffic Message Channel (TMC) and the navigation system.

The RSE and other systems are operated by 'virtual' buttons displayed on the touch screen.

The front seat occupants can also view the TV transmissions on the TSD but only if dual view TSD is installed or the vehicle is stationary

Care should be taken with the TSD to ensure its correct operation

- The screen should be cleaned with a lightly, water moistened cloth. Do not use chemical agents or domestic products to clean the screen or any part of the surround.
- Only use your finger to operate the touch screen. Ensure you only use one finger to avoid incorrect entries.

- A short light press of the touch screen is sufficient. Excessive pressure can damage the screen.

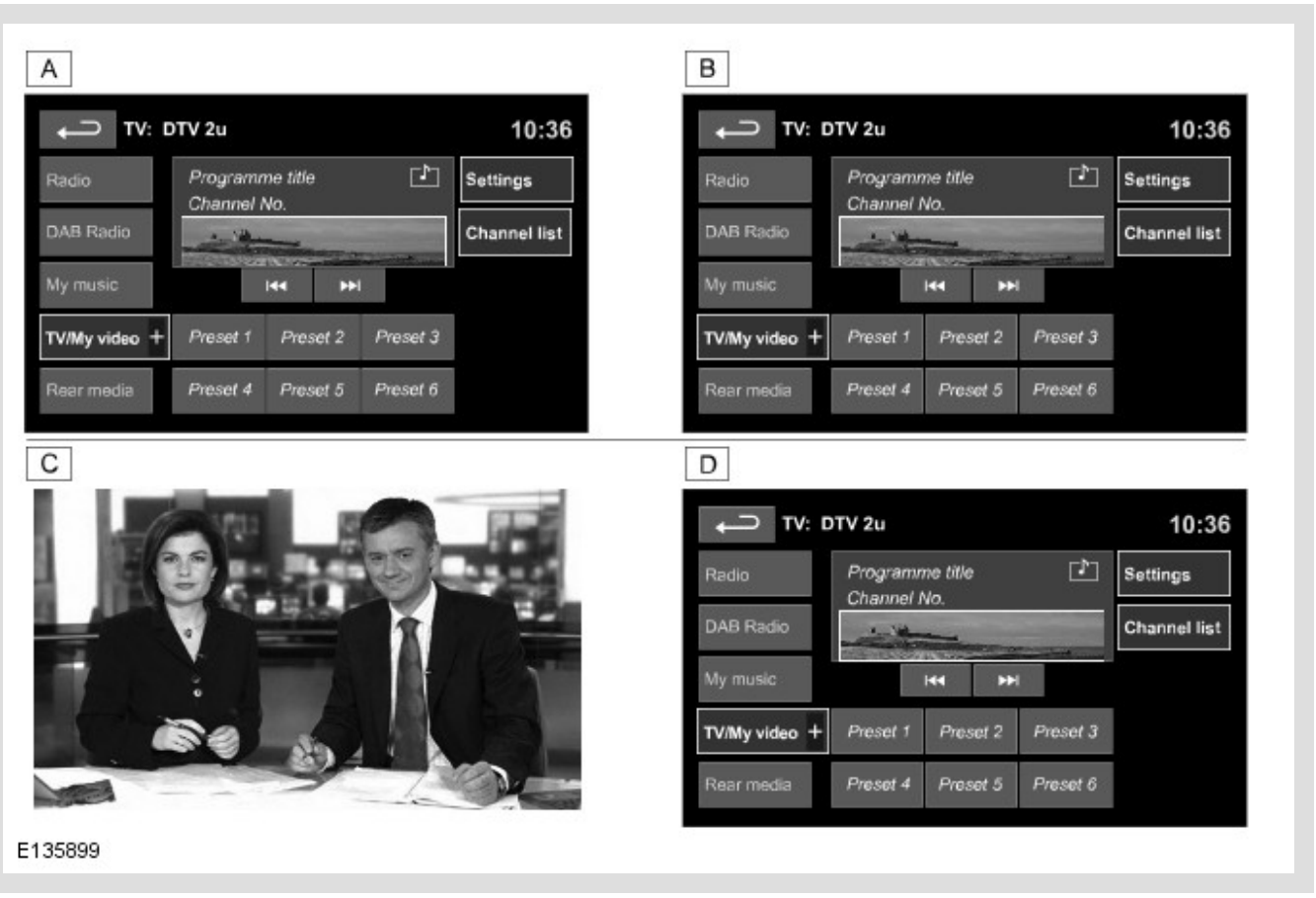
DUAL VIEW

The dual-view TSD enables the passenger and driver to view completely different images from their respective seating positions. This technology has provided a solution for the legal issues attached to viewing moving images whilst the vehicle is in motion. It is not possible for the driver to view moving images with an active speed signal but the passenger can.

> **NOTE:**
>
> Due to legislation the NAS markets will not receive this option. A single view display is available in these markets.

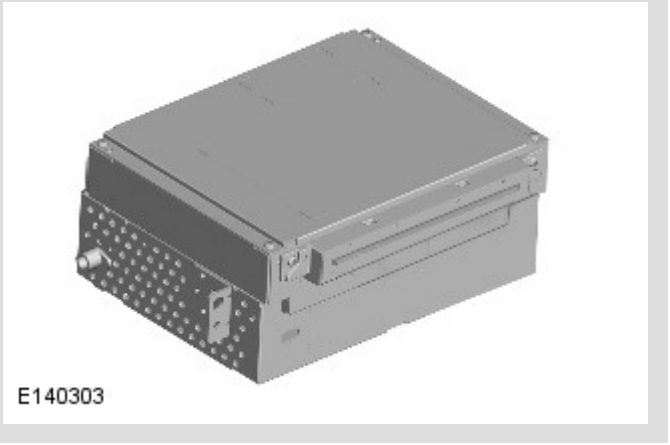
The dual-view TSD uses Parallax Barrier Shutter Technology to alternately hide and reveal columns of pixels to the left and right hand views of the screen. The display comes with a specially designed agar coating to help prevent sunlight bleaching.

To access a TV or video image when the vehicle is in motion and single view is selected, the dual view button on the TSD should be pressed by either the driver or the passenger. This will then switch the TSD to dual-view mode allowing the passenger to view TV or video, but not the driver. A second press of the button will change the TSD back to single view.



ITEM	DESCRIPTION
A	Passenger view before dual-view button pressed
B	Driver's view before dual-view button pressed
C	Passenger view after dual-view button pressed
D	Driver's view after dual-view button pressed

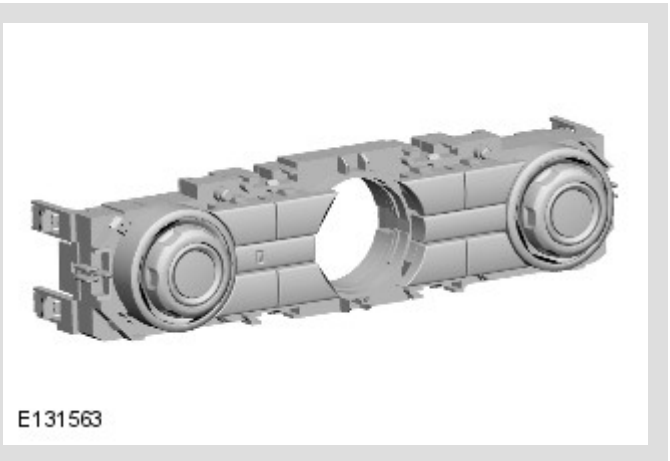
IAM (INTEGRATED AUDIO MODULE)



The IAM is located in the Instrument panel and incorporates the following systems:

- HD Radio (where fitted)
- Bluetooth® receiver (telephone and audio streaming)
- 40 Gb Hard drive
- USB controller (front)
- Audio AUX
- CD player

ICP (INTEGRATED CONTROL PANEL)



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 IAM on the medium speed CAN (controller area network) . The IAM 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 Land Rover approved diagnostic equipment.

REAR SEAT ENTERTAINEMNT MODULE

The Rear Seat Entertainment (RSE) module is located in the rear right-hand (RH) side of the luggage compartment. The RSE module is an interface between the video and audio inputs from other system components and the video display and audio outputs.

The RSE module communicates with the audio systems via the MOST connection. Audio output from the DVD player or the AVIO panel is processed by the RSE module and passed on the MOST ring to the audio amplifier to allow audio output to be played through the vehicle speakers or the headphones.

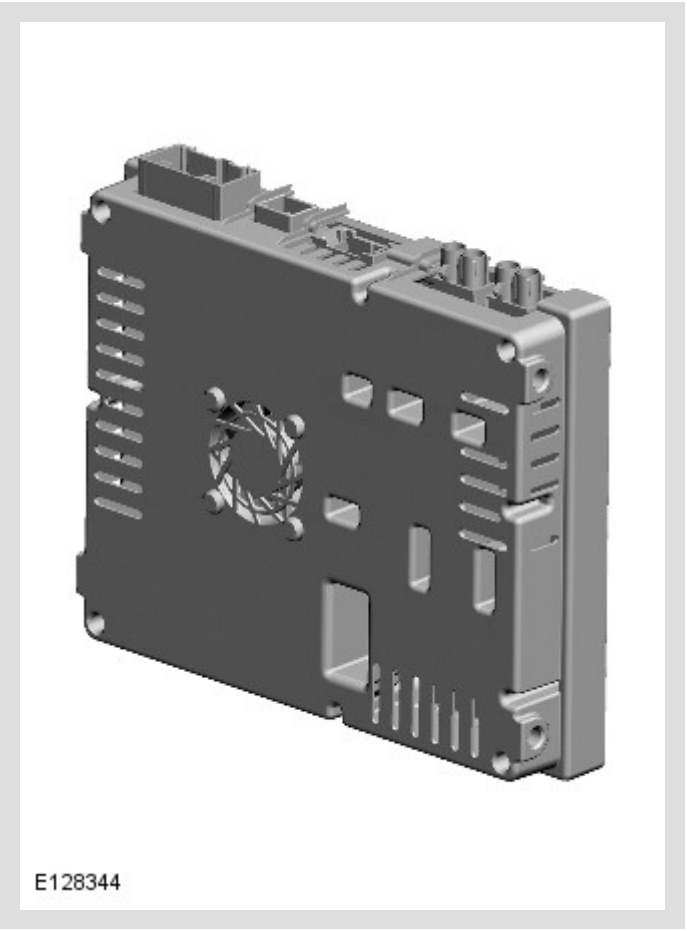
Video input from the TV tuner and the Audio Video Input/Output (AVIO) panel is also processed by the module and passed to the two RSE liquid crystal display (LCD) screens and the TSD on separate video connections. The RSE module also controls the power supplies to the RSE LCD screens and infra-red remote control signals received by the RSE LCD screens. The infra-red signals are passed from the RSE LCD screens to the RSE module on a local CAN bus system

The RSE module has two modes of operation; engine running mode and reduced operation mode. With the engine running the RSE module has full functionality. When the engine is not running the RSE module has reduced functionality to prevent excessive drain on the vehicle battery. The reduced functionality comprises a reduced audio volume and time limit on system operation.

The reduced audio volume is only active when the engine is not running. The audio volume is limited reduce battery consumption. If the volume was set at a higher level than this when the engine was running, when the engine is subsequently started, the volume level will gradually increase to the previously selected setting. This prevents the user being distracted by a sudden increase in volume.

A time limit operation is active when the ignition is off and the system is manually switched on using the TSD. The system will operate for a maximum of ten minutes. The battery voltage is continually monitored by the IAM. If the IAM detects that the battery voltage has fallen to a predetermined level, the IAM will shut the infotainment system down to prevent further battery drain. Once the system has shut down due to low battery voltage, it can only be restarted when the engine is running and the battery voltage has risen above the threshold level for more than one minute.

TELEVISION TUNER



The TV tuner is located under the RH side front seat. The TV tuner allows the rear seat occupants to view television transmissions on the RSE LCD screens. The front seat occupants can also view the TV transmissions on the TSD but only if dual view TSD is installed or the vehicle is stationary. The TV tuner is capable of receiving analogue and DVB-T digital broadcasts in one unit where transmissions allow or ISDB-T digital broadcasts in Japan in a separate unit.

The TV tuner is connected on the MOST ring which it uses to output its audio signals to the amplifier. Video output from the tuner is on a LVDS cable to the RSE module or a screened co-axial cable to the TSD in vehicles without RSE. Four further connections provide for the signal input from four TV antenna amplifiers and four antennae.

The TV tuner contains three internal tuners. All of the tuners are connected to the antennae. These tuners receive the audio and visual signals. The tuner with the strongest signal is automatically used to display the required TV channel.

One of the internal tuners (connected to two of the antennae) is used to scan the locality for receivable channels (background scanning). The tuner can detect different frequencies transmitting the same channel and can select the strongest signal for use.

The TV tuner is able to receive both analogue and digital TV signals. In certain areas both analogue and digital signal strengths will vary. When in an area of weak reception, you may experience a break-up in picture and sound quality, or a blank screen and audio muting. It may be of benefit to possibly switch between analogue and digital TV stations.

The TV tuner is connected to the infotainment system using one harness connector, one LVDS connector, one MOST connector and two dual FACRA connectors for the antennae connections.

Television audio can be heard through the vehicle speakers and the wireless headphones.

JAPAN TV TUNER

Japanese market vehicles are fitted with a TV tuner unique to that market. The tuner has a slot to allow a B-CAS (BS Conditional Access Systems Co., Ltd.) card to be inserted.

All digital TV's in Japan (home systems included) require a conditional B-CAS access card. This card decrypts the TV broadcast signal to allow it to be displayed as all broadcasts in Japan are encrypted. Without this card there is no picture or audio.

B-CAS (BS Conditional Access Systems Co., Ltd.) is a vendor and operator of the Integrated Services Digital Broadcasting (ISDB) CAS system in Japan. All ISDB receiving apparatus requires a B-CAS card under regulation, the B-CAS card is supplied as the standard accessory in Japan.

Integrated Services Digital Broadcasting (ISDB) is a Japanese standard for digital television and digital radio used by the country's radio and television stations.

DIGITAL WIRELESS HEADPHONES

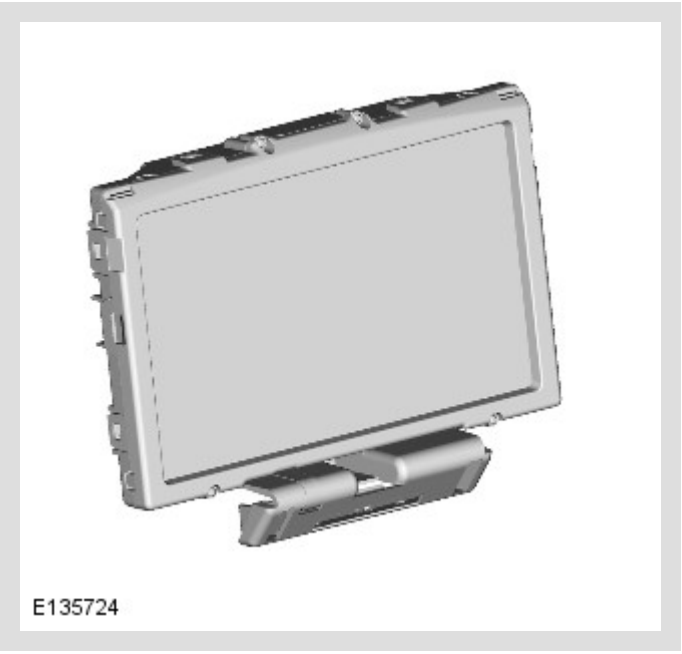
The Infrared Headphones Transmitter is located in the roof headlining near the interior lighting console assembly.

The system can support up to three pairs of wireless headphones. When dual-view screen is fitted, the front passenger can listen to TV/DVD and when RSE is fitted, rear passengers can listen to selected source on RSE screen. The headphones have an adjustable headband which operates on a ratchet mechanism.

The headphones house the infra-red receiver sensors which receive the transmitted signals from the headphone transmitter, two AAA batteries located below a sliding cover and the power on/off switch. When inserting the batteries it is important that the battery polarity is observed as marked in the battery compartment.

The RH side of the headphone houses the volume control, a channel switch and a power 'ON' light emitting diode (LED). The channel switch allows the user to select alternative audio channels (rear left/right, dual-view audio source) when active. The power 'ON' LED is illuminated when the on/off switch on the RH side of headphone is pressed. This will remain on and the headphones powered until the switch is pressed for a second time. If the headphones have not received an infra-red signal from the transmitter for several minutes, they will automatically switch off to prevent battery drain.

LCD SCREENS



The RSE screens are located in the rear of the front seat head restraints. The screen is secured in the head restraint with one screw and two metal clips which are covered by a removable surround. The screens are a 8 inch, auto dimming (selectable via remote control settings), 800X480 resolution monitor.

An infra-red receiver sensor is located centrally in the bottom portion of the upper screen surround. The receiver sensor receives infra-red transmissions from the remote control and passes them to the RSE module on a private CAN bus system which is only connected between the RSE module and the RSE screens. The RSE module can then transmit any relevant messages onto the MOST ring. All screen settings can be changed using the RSE remote control.

The screen should be cleaned with a lightly, water moistened cloth. Do not use chemical agents or domestic products to clean the screen or any part of the surround.

AVIO (AUDIO VISUAL INPUT OUTPUT) PANEL

The AVIO panel is located at the rear of the floor console. The panel provides for the connection of auxiliary audio and video inputs from an external source, such as a games console, via plugs on the panel. The plugs are covered by a lift up panel.

Video and audio phono plugs are provided and are designated as AV. The plugs are connected to the RSE module and allow the auxiliary input video to be played on the RSE LCD screens and the audio to be played on the vehicle speakers or on the cordless headphones. The auxiliary input video cannot be displayed on the TSD.

An additional single, 3.5mm jack plug allows for the attachment of an auxiliary audio input, such as a personal stereo or MP3 player. This plug is connected directly to the IHU and allows audio to be played on the vehicle speakers.

REMOTE CONTROL

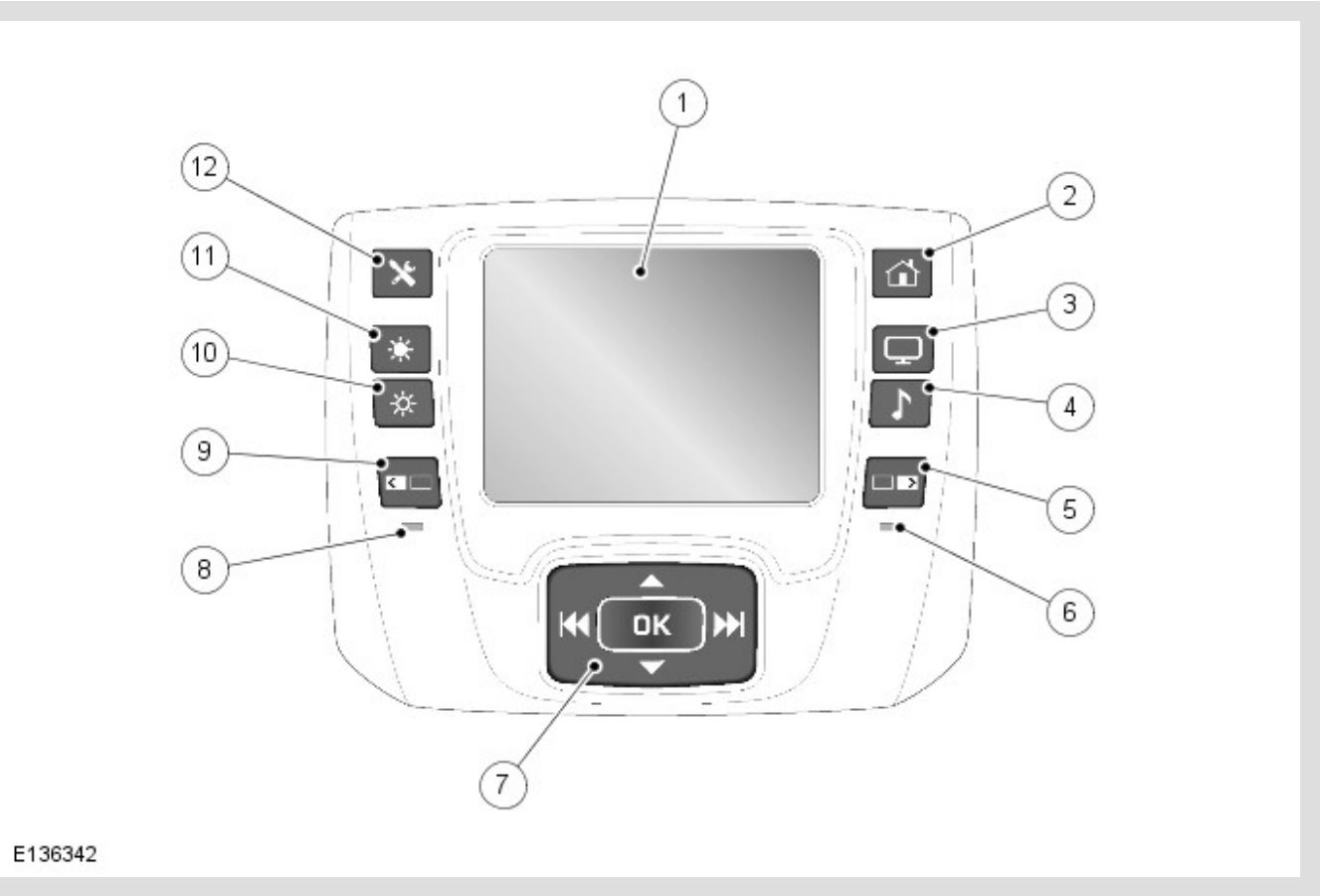
The RSE remote control allows independent multimedia control for left and right rear seat passengers.

The remote control is a dockable unit with a small TsRC (touchscreen remote control) and a number of buttons to control the audio/video functions. The remote control is stored in the rear center panel and, due to its location, the remote control cannot be used in the docked position (only handheld). When the unit is docked, charging is provided to the 3.7 volt 1200mAh Li-ion battery. When fully charged the remote control can have up to 3 hours 20 minutes of continuous use. From empty to 90% charge takes approximately 2.5 hours.

The charging is powered via an infotainment relay which is located in the Rear Fuse Box directly to the RSE docking station. If the battery charge becomes low, a message is displayed on the remote control advising to dock and recharge the remote control. The remote control has three power modes as follows:

POWER MODE	OPERATING CONDITION
Operation mode	Fully operational
Sleep mode	Screen and backlight illumination off

POWER MODE	OPERATING CONDITION
Shut down mode	Internal sleep mode (will take approximately 3 seconds to reboot)



ITEM	DESCRIPTION
1	Touch Screen Display (TSD)
2	Home button
3	Video button
4	Audio button
5	RH screen select button
6	RH screen selection indicator
7	Five-way switch - Cursor movement and option selection button
8	LH screen selection indicator
9	LH screen select button
10	Touch screen display brightness decrease button
11	Touch screen display brightness increase button
12	Touch screen display settings button

The remote control operates the radio, CD (compact disc)/DVD (digital versatile disc), plug-in audio devices and TV selection by displaying options on the remote control. The options then activate menus in the RSE headrest mounted screen which can be navigated using a five-way switch on the remote control. For example, the user can select and press a soft key on the remote control to activate a list of available radio stations in the RSE screen and then use the five-way switch to browse the list and select a radio station.

The remote control is powered by a rechargeable battery located in the rear of the control and is accessible by removing a sliding cover. Located behind the battery cover is a reset button which restores the default settings.

The remote control transmits an infra-red digital signal in response to operation of a button or soft key. The infra-red signal is received by a sensor located on each of the RSE rear screens. The remote control also allows selection of an auxiliary input from the AVIO panel (video or games console) or selection of audio (radio or CD).

When docked, communication from the remote control takes place via two data lines into the RSE module. This link also enables software updates and configurations sent from the RSE module, for example, a language change requested by the user. This link from the RSE module to the docking station is a basic two-wire interface designed for remote control data rates (approx. 38Kbit/sec). It is protected against short to battery or ground on the output pin.

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