



Audi virtual cockpit

The material in this Self Study Program (SSP) may contain technical information or reference vehicle systems and configurations which are not available in the Canadian market.

Please ensure you reference ElsaPro for the most current technical information and repair procedures.

The instrument cluster of the future

Everything is in full view of the driver:

Audi virtual cockpit combines the functions of a central MMI monitor and a conventional instrument cluster in a unique TFT display. All functions and services are represented by brilliant 3D-like graphics and detailed effects. The driver can choose between two display views – classic view and progressive view.

The mode of representation depends on the view selected.

Whereas in the classic view the gauges (speedometer and rev counter) dominate, in the progressive view additional functions such as Navigation, Telephone, Audi connect or Media feature prominently. The displays for ambient temperature, time and mileage (km) as well as warning and information symbols are firmly embedded at the bottom edge of the cockpit in both modes.

Fast, secure and fully digital

To enable content to be displayed quickly and in a valid format, Audi is the first car maker to use the quadcore Tegra 30 chip from the Nvidia Tegra 3 series. The graphics processor generates 60 frames per second and, thus, ensures that the needle of the speedometer and rev counter is rendered with absolute precision.

The Audi virtual cockpit is able to display a wide variety of information – from the graphics of the assistance systems and the images of the reversing camera system to dynamic vehicle animations.

The joy of use: intuitive and intelligent operation

As regards operation, "joy of use" plays an important role for Audi: the Audi virtual cockpit therefore comes onto the market with a new, intelligent MMI operating concept.

On the one hand, the driver can operate the Audi virtual cockpit using the advanced MMI; on the other, he/she can issue commands using the multifunction steering wheel.

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The Self Study Programme teaches a basic understanding of the design and mode of operation of new models, new automotive components or new technologies.

It is not a Repair Manual! Figures are given for explanatory purposes only and refer to the data valid at the time of preparation of the SSP.

This content is not updated.

For further information on maintenance and repair work, always refer to the current technical literature.



Message



Reference

Audi virtual cockpit (instrument cluster)

The launch of the Audi TT (Type FV) sees the rollout of a high-resolution display as a central display instrument for the first time in an Audi vehicle.

The official name for this innovation is Audi virtual cockpit. The display has a resolution of 1440 x 540 pixels. The display diagonal measures an impressive 12.3", which corresponds to 31.2 cm.

The Audi virtual cockpit replaces the previous instrument cluster with its classic instrument gauges and is standard equipment in the Audi TT (Type FV). It also replaces the MMI display unit in the

centre console. Navigation maps and other infotainment content are now displayed directly behind the steering wheel in the Audi virtual cockpit.

If the driver so wishes, the navigation map spreads out over the full area of the display panel.

At the same time, the speedometer and rev counter are minimised. The system can be operated using the multifunction steering wheel or the MMI operating unit in the centre console.



628_001

Variants of the Audi virtual cockpit

The rollout of the Audi virtual cockpit sees Audi significantly reduce the number of instrument cluster variants.

Where there were eleven instrument cluster variants for the predecessor model, this number has been reduced to two for the Audi TT (Type FV).

1. In North America temperatures are measured and displayed in the physical unit of degrees Fahrenheit. As a result, the coolant temperature display scale for the North American Region looks different to that in other markets where temperature is measured in degrees Celsius. Since the coolant temperature gauge is not displayed on the freely programmable instrument cluster display, but rather in a separate area with fixed text, the instrument clusters for the North American Region are different to those of other markets.

Two instrument cluster variants are, however, still required. There is an instrument cluster variant for the North American market and a variant for the other markets. A separate instrument cluster variant is necessary for North America for the following three reasons.

2. There are differences between the fuel tank gauges for the North American Region and other markets.

3. Some warning symbols used in the North American Region differ from the warning symbols used in other markets. Since the warning symbols appear in a separate display bar above the instrument cluster, the instrument clusters also differ for this reason.



Coolant temperature gauge for North American Region

628_003



Coolant temperature gauge for other markets

628_002



Bar with warning symbols for North American Region

628_004



Bar with warning symbols for other markets

628_005

Classic and progressive views

There are two different views of the Audi virtual cockpit:

- ▶ The **classic view**
(also referred to hereinafter as the classic view)
- ▶ The **progressive view**
(also referred to hereinafter as the progressive view)

The **classic view** is based heavily on the design of previous instrument clusters. The layout and size of display content are very

similar to the design of conventional instrument clusters.



628_006

In the **progressive view** the central display area between the two gauges is noticeably larger because the gauges are shown smaller.

The larger display panel offers new possibilities for the display of infotainment and vehicle information.



628_007

Toggleing between views

The customer can toggle back and forth between the classic and progressive views. The customer can change views by pressing the VIEW button on the multifunction steering wheel.

There are two versions of the multifunction steering wheel:

- ▶ The entry version as standard equipment
- ▶ The high version as optional equipment



Multifunction steering wheel (entry version)

628_008



Multifunction steering wheel (high version)

628_009

Main functions

The content and functions of the Audi virtual cockpit are subdivided into so-called main functions. Some of the main functions are a component part of the software in the dash panel insert control unit J285, while the others are integrated in the software of the information electronics control unit 1 J794. However, the displays all appear in the Audi virtual cockpit because there is no separate MMI display in the Audi TT. Displays of main functions implemented in the information electronics control unit 1 – J794 are transmitted via an

LVDS line to the control unit in dash panel J J285 and then output in the Audi virtual cockpit.

At launch in 2014, up to ten main functions will be available in the Audi TT. The actual number of main functions depends, among other things, on the individual vehicle's specification.

These are:



- ▶ Vehicle (including Owner's Manual)



- ▶ Message



- ▶ Tone



- ▶ Radio



- ▶ Media



- ▶ Telephone



- ▶ Navigation



- ▶ Map



- ▶ Audi connect



- ▶ Setup MMI

The main menu

The main functions can be selected via the so-called main menu. After opening the main menu, all available main functions are shown in the central display area.

Some main functions can be invoked directly using both switches on the MMI control panel.

The main menu can be opened using the MENU button on the MMI control panel in the centre console. There are two different control panels in the Audi TT, but the MENU button is always in the same position.

The main function to which this applies depends on the specific control panel.



basic control panel

628_012

The following main functions can be invoked using the toggle switches on the basic control panel:

- ▶ Main function "Car" (CAR)
- ▶ Main function "Tone" (TONE)
- ▶ Main function "Radio"
- ▶ Main function "Media"



MM touch control panel

628_011

The following main functions can be invoked using the toggle switch on the MMI touch control panel:

- ▶ Main function "Navigation" or "Map" (NAV/MAP)
- ▶ Main function "Telephone" (TEL)
- ▶ Main function "Radio"
- ▶ Main function "Media"

After pressing the MENU button, the main menu opens in the Audi virtual cockpit. It always appears in the progressive view. All available main functions can be selected in the main menu.

After a main function has been selected, the main menu disappears from the central display area and the selected main function is indicated.



Display of the main menu in the progressive view

628_013

When the main menu is displayed in the progressive view, the user can change over to the classic view using the VIEW button. The main menu is shown in this display, but main functions cannot be

selected here due to space constraints. If the user tries to select a main function, the Audi virtual cockpit returns automatically to the progressive view.



Display of the main menu in the classic view

628_014

Subdivision of the display panel into various display areas

The two graphics below show how the Audi virtual cockpit display panel is subdivided into various display areas. All display areas exist in both designs, but the size and position of elements can vary.

All display areas are described in detail in the following sections of the self study programme.



628_015

Subdivision of the Audi virtual cockpit in the classic view



628_016

Subdivision of the Audi virtual cockpit in the progressive view

Displays in the central display area

The central display area is the display panel between the two gauges. The display area is larger in the progressive view than in the classic view because the gauges are smaller. For this reason, the term "extended central display area" is used in the progressive view and "central display area" is used in the classic view.

The driver can customise what is shown in the "central display area" by selecting one of the main functions. Optimal use is made of the entire display panel in the progressive view, for example in order to display the navigation map.



628_017

Bar with turn signal symbols and warning symbols

The bar with turn signal symbols and warning symbols is not implemented on the Audi virtual cockpit display panel. There is a separate display bar with predefined symbols above the display for this purpose.

Behind the symbols there are LEDs which are activated in order to activate the relevant symbol.



628_018

The display bar has the following warning lights:

Yellow warning lamps:



Warning lamp for emissions-related faults



Glow plug indicator lamp for diesel engine



Anti-lock braking system warning lamp



Central warning lamp (pay attention to message displayed).



Warning lamp for indicating fault in airbag or seat belt pretensioner system

Red warning lamps:



Central warning lamp (pay attention to message displayed).



Warning lamp for indicating fault in electro-mechanical steering



Warning lamp for indicating fault in brake system



Warning lamp for electro-mechanical parking brake

Green warning lamps:

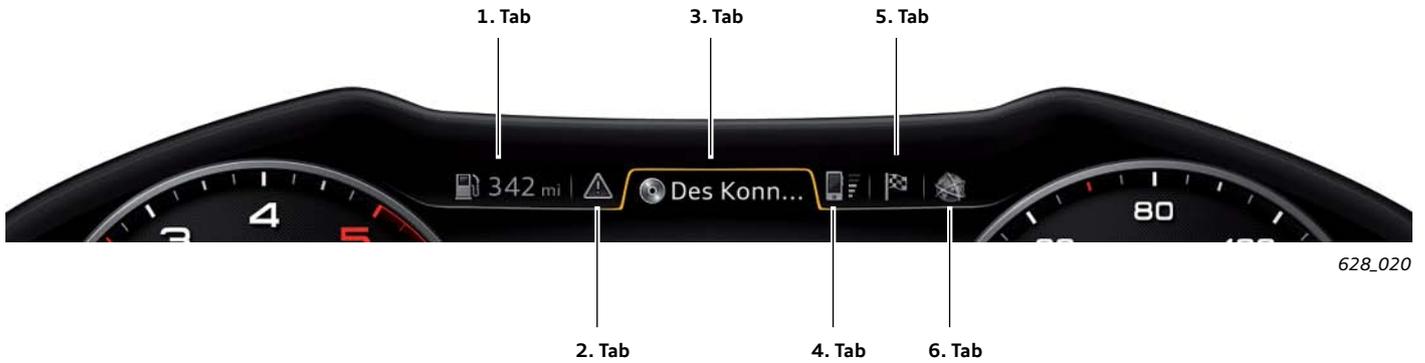


Warning lamp for electro-mechanical parking brake

Tab bar

The tab bar is a display bar comprising various tabs on the instrument panel display. The term "tab" originates from the projecting section of filing cards used for better sorting.

The tabs in the instrument cluster display on the Audi TT allow customers to select various main functions.



Up to six tabs can be displayed in the tab bar. There are one or more main functions concealed behind every tab. They are represented in the central display area after selecting the relevant tab.

The first five tabs in the tab bar are assigned one or more main functions. The sixth tab denotes one of the remaining three main functions.

The tabs of the Audi virtual cockpit are:

Car tab (1st tab)	Main function "Car" (this also includes the onboard computer)
Message tab (2nd tab)	Main function "Message" (appears only if messages are available)
Audio tab (3rd tab)	Main functions "Radio" and "Media"
Telephone tab (4th tab)	Main function "Telephone"
Navigation tab (5th tab)	Main functions "Navigation" and "Map"
Flexible tab (6th tab)	Main function "Tone", "Audi connect" or "MMI Setup"

The flexible tab appears in the tab bar for the first time after one of the three main functions assigned to it has been selected via the main menu. It stays displayed in the tab bar until the ignition has been turned off. If another of the three main functions is activated in the meantime, the symbol displayed in the tab changes accordingly.

The main function currently selected from the flexible tab is indicated by the symbol of the relevant main function in this tab.

Status information is also displayed in some tabs.

Examples of this are:

- ▶ Remaining range is displayed in the car tab
- ▶ A mute symbol is displayed in the audio tab if Audio output has been deactivated
- ▶ A scored-out telephone symbol is displayed in the telephone tab if no telephone is available

Example of a tab bar:



628_021

The following information can be obtained from the graphic shown above:

1. The main function "Car" is currently selected and the vehicle has a remaining range of 342 mi.
2. There is at least one message regarding the vehicle because the message tab is displayed.
3. The CD player is currently selected as the audio source.
4. A telephone is currently operational and the reception field strength is sufficient.
5. The chequered flag in the navigation tab indicates that the main function "Navigation" was previously used. Selecting this tab opens the destination entry field. Alternatively, the map symbol can also appear in this tab. This would be the case if the main function "Map" was previously used.
6. The main function "Audi connect" was previously used by the three main functions "Tone", "Audi connect" and "Setup MMI".

Left side display

The left side display is a display area on the instrument cluster display showing various items of onboard computer information.

The driver can select from the following information:

1. No additional display
2. Current date
3. Current and average fuel consumption
4. Time elapsed since start of trip
5. Average speed since start of trip
6. Distance covered since start of trip

The left side display can be represented both in the classic view and in the progressive view. In the classic view, the left side display appears in the middle of the rev counter. In the progressive view, it

The desired item of information can be selected by the driver.

appears above the reduced-size rev counter. Display of average speed is currently set. This is 47 mph.



Left side display in the classic view

628_022



Left side display in the progressive view

628_023

Note the following distinction:

In the classic view, the selected onboard computer information is always displayed, regardless of what main function is currently active in the central display area.

In the progressive view, on the other hand, the left side display containing onboard computer information is shown only if the main function "Car" is currently active in the central display area.

Display priorities of the left side display

If the vehicle electronics determine that a vehicle door or lid is currently open, the relevant display has priority and overrides the onboard computer information on the left side display.

An active Audi parking system also has display priority over onboard computer information. As soon as the Audi parking system is activated and the Optical Parking System graphic

appears, the onboard computer information and rev counter disappear temporarily from the display.

As soon as the Audi parking system is deactivated, the rev counter and the set onboard computer information reappear. The same applies to the Audi park assist system.



Display of an Audi TT with open driver and front passenger door

628_024



Display of the Optical Parking System when reversing

628_025

Other display options of the left side display

1. Navigation



628_026

The left side display can also be used by the navigation system. In the example given here, the Navigation tab is activated and the available destination addresses are displayed. The destination address "Hauptbahnhof Ingolstadt" is currently selected.

Having made this selection, the Hauptbahnhof Ingolstadt is shown in map form in the left side display. This display is, however, only available in the progressive view.

2. Telephone

The left side display can also be used by the main function "Telephone". If the "Telephone" tab is activated and an entry is selected from the directory, a photo of the selected person appears

if available in the MMI. However, this function is only available in the progressive view.

Right side display

As with the left side display, the right side display is located in the middle of the speedometer in the classic view. If the progressive view is selected, the right side display appears above the reduced-size speedometer.

The right side display is only used by the main function "Navigation". If route guidance is active, it is used to display upcoming

driving manoeuvres including distance information or to display the remaining distance to destination including the estimated time of arrival. This information is always displayed when the route guidance function is active, regardless of the current display in the central display area.

Representation of upcoming driving manoeuvre ...



628_028

... in the classic view



628_029

... in the progressive view

Representation of remaining distance to destination and estimated time of arrival ...



628_030

... in the classic view



628_031

... in the progressive view

Selection menu

A selection menu offers the customer various selection options relating to a main function. Each selection menu is clearly assigned to a main function.

Each main function can have a selection menu, but there are also main functions which do not have their own options menu. These include, for example, the main function "Message".

Example: Selection menu of the main function "Car"



628_032

The selection menu of the main function "Car" offers various vehicle functions. In this selection menu, the driver selects the

function which he/she wants to have displayed or configure.

If the driver selects, say, the onboard computer function from this selection menu, the following will be displayed:



628_033

On the left edge of this display there is a bracket containing an icon denoting the function currently displayed. In this case, it is the

onboard computer. Press the corresponding button to return to the selection menu of the main function "Car".



628_034

The left control button on the high version of the multifunction steering wheel or on the MMI control panel can be used to return to the selection menu. It is also possible to use the joystick function of the turn-push button by pushing the latter anti-clockwise.



628_035

The bracket containing the function symbol on the left edge of the display is only shown in the progressive view. It is not shown in the classic view due to space constraints. However, the selection menu can also be opened in the classic view using the same buttons.

Options menu

The options menu offers the customer context-related options for a selected list element as well as general settings for the main function.

For space reasons, an option menu can only be displayed in the progressive view.

The form of representation and operation of the option menu are now explained using two examples.

As is the case with the selection menu, the options menu can be opened using the right control button on the multifunction steering wheel (high version) or via the MMI control panel. It is also possible to open the options menu using the joystick function of the turn-push button by pushing the latter clockwise.



628_036



628_037

First example: On-board computer options menu

The availability of an options menu is indicated in the progressive view by the bracket containing the + sign at the right edge of the display. The bracket is not shown in the classic view due to space constraints.

However, the driver can, after pressing the right control button, see whether an options menu is available in the classic view or not.



628_038

Pushing the right control button opens the following options menu:



628_039

The customer now has two options:

- ▶ **Additional display:** select onboard computer information to be shown in the left side display
- ▶ **Reset values:** reset the onboard computer values

If the customer selects the first option, the following display appears:



628_040

In this menu, the driver can determine which onboard computer information is to be shown in the left side display.

Second example: options menu of a selected track on the SD card

The selection menu of the main function "Media" was initially activated and the cursor was moved to the source "SD card".

The "1" next to the yellow SD card symbol means that the SD card is in SD card slot 1.



628_041

After the source "SD card" is selected, a further selection menu is displayed. In this menu, the user selects the criteria according to which the tracks are to be sorted. Tracks can be sorted, among other things, by artist, album, genre and playback list.

In this specific case, the criterion "album" was chosen. The album "2 Hearts beat as one" by the group "2 Hearts" was selected from the albums offered. The album track list was subsequently displayed. The track "For this time" was selected from the track list, and is currently playing.



628_042

A bracket containing a + sign appears on the right edge of the list element "For this Time". The + sign indicates that an options menu

is available for the list element.

If the options menu is now opened with the right control button, the following display appears.



628_043

The options available appear in the right side menu. There are content-dependent options which apply directly to the track or album currently playing.

These include the following options:

- ▶ Store as favourite
- ▶ Change play position
- ▶ Repeat track
- ▶ Random playback

The vertical white line at the right edge of the options menu indicates that there are more options available than are currently displayed.

There are also options which have overriding priority and are not dependent on the track or album currently playing.

These include the following options:

- ▶ Sound settings
- ▶ Play entire medium
- ▶ Media settings
(this item cannot be seen in the graphic shown here because the display area is limited to six rows)

The options currently still concealed can be displayed by scrolling through the options menu with the left roller or the turn-push button.



Reference

This Self Study Programm (SSP 628, "Audi virtual cockpit") explains how infotainment content is displayed and how the Audi virtual cockpit is operated using the MMI control panel.

You will find an overview of the topic of infotainment in the Audi TT in Self Study Programme 629.

This booklet gives a detailed description of the new, second-generation Modular Infotainment System (MIB) in the high version.

Status bar

By default, the status bar comprises only one display bar. It contains the following information:

1. Time
2. Ambient temperature
3. Various warning lamps (if required)
4. Relevant traffic signs (if the speed limit display is active)
5. Reception strength, connection status and active data link of the data module.
6. Update symbol if a software update is currently in progress.



628_044

In the case of following displays and events, the status bar has two lines:

1. For display of onboard computer content in the central display area
2. For the welcome and goodbye screens
3. After pressing the trip counter Reset button

The following information is also provided via the two-line status display:

1. Current total mileage (km)
2. Current trip mileage (km)



628_045

Other displays of the Audi virtual cockpit



Settings menu for ambient lighting level

628_047



Representation of the system status of Audi active lane assist

628_048



Representation of the reversing camera image in the Audi virtual cockpit.

628_046



Message

In the case of an Audi TT equipped with a reversing camera, the system always changes over to the progressive view in order to display the reversing camera image.

Display of warnings and fault messages

If the self diagnostics system diagnoses a faulty vehicle component, a fault memory entry is generated in the applicable control unit. Depending on what fault is detected, the driver is provided with feedback. In this case, the control unit in dash panel insert J285 signals for the warning lamp to be activated and, if necessary, for a text message to be displayed in the instrument cluster.

For this purpose, the text message displaces the content previously displayed and remains visible on the display for between six and ten seconds.

If the driver actuates a control element on the Audi virtual cockpit while a warning is displayed, the warning disappears earlier; the minimum display time is approx. two seconds.

The display of fault messages looks identical in the classic view and in the progressive view. The text message appears without any need for driver input, hence the name "popup display".



Popup display of a fault message in the classic view

628_049



Popup display of a fault message in the progressive view

628_050

Given the importance of fault messages, it must be possible for the customer to retrieve fault messages at any time after they have been displayed for the first time.

For this purpose, the customer must select the tab "Information" in the tab bar or select the main function "Information" in the main menu.

If there are multiple warnings for the driver, the driver can alternately view these warnings using either the left roller on the multifunction steering wheel or the turn-push button of the MMI control panel.

The existence of multiple warnings is indicated by the scroll bar on the right margin of text messages.



Fault message in the Information tab in the classic view

628_051

In the progressive view, the display area on the right adjacent to the fault message is used to visualise the fault by an animation.



Fault message in the Information tab in the progressive view

628_052

In addition, existing warnings are alternately displayed in the status bar by means of appropriate symbols.



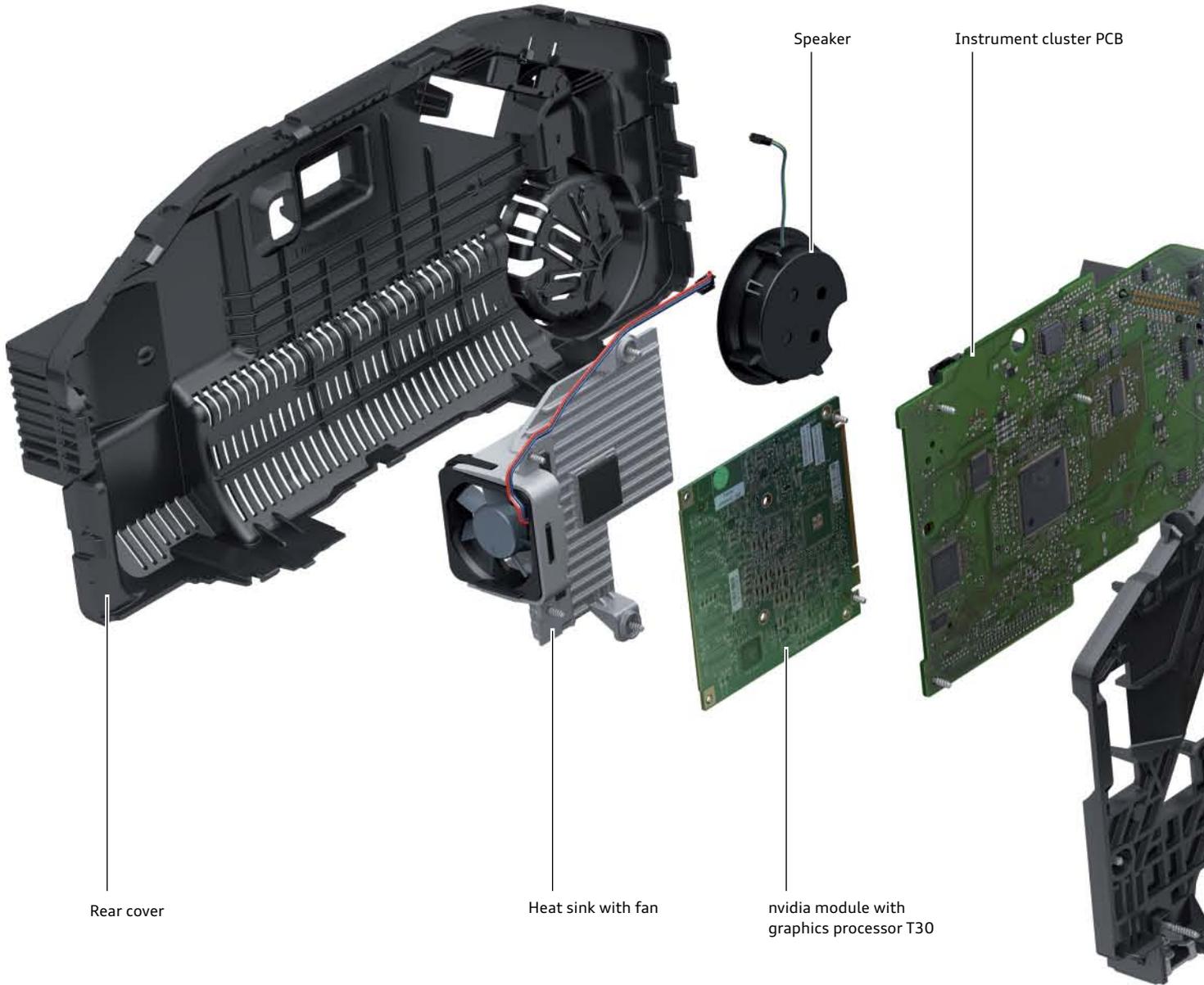
Message

The existence of warnings is indicated by a warning triangle symbol in the Information tab. If a wrench symbol is shown in this tab, this means that current service messages are available, but no warnings. If neither warnings nor service messages are available, the Information tab does not appear in the tab bar.

Design of the Audi virtual cockpit

The diagram shows the key components of the Audi virtual cockpit. The Audi virtual cockpit can, however, only be replaced completely in the event that a component is faulty.

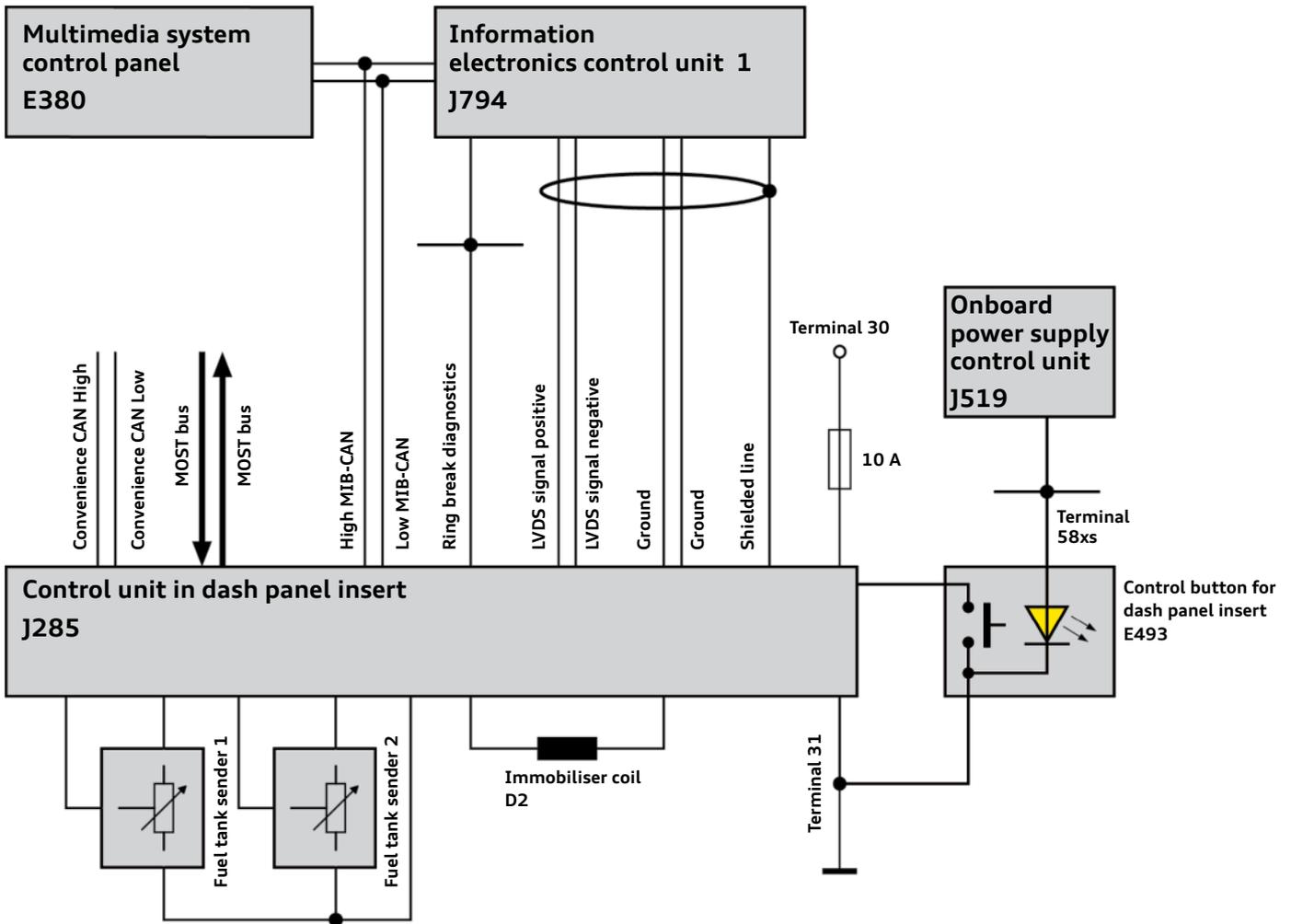
The instrument cluster loudspeaker is an exception. It can be ordered as a spare part and can be replaced without opening the Audi virtual cockpit.





628_053

Circuit diagram of the instrument cluster



628_054



Reference

The Audi virtual cockpit (control unit in dash panel insert J285) is the master control unit of the immobiliser system in the Audi TT. For more information about the immobiliser system, please refer to Self Study Programme 629 "Audi TT (Type FV) Vehicle electrics, electronics and infotainment".

The following lines are connected to the control unit in dash panel insert J285:

Lines to the power supply:

- ▶ Line to the power supply with terminal 30, which is protected by a 10 ampere fuse
- ▶ One ground line

Bus lines:

- ▶ Two convenience CAN bus lines for communicating and exchanging data with other control units
- ▶ Two MIB-CAN bus lines for communicating with the information electronics control unit 1 - J794 and the multimedia system control panel E380
- ▶ Two LVDS lines for receiving image data from the information electronics control unit 1 - J794
- ▶ Two glass-fibre MOST bus lines; the MOST bus in the new Audi TT is exclusively used for flashing the control unit in the dash panel insert J285. J285 is flashed via an SD card in the card slot of the information electronics control unit 1 - J794.
- ▶ Ring break diagnostics line for diagnosis of MOST bus users through the MOST bus master control unit, the information electronics control unit 1 - J794

Discrete lines to connected components:

- ▶ Two lines to fuel tank sender 1
- ▶ Two lines to fuel tank sender 2
- ▶ One ground line to both fuel tank senders
- ▶ Two lines to immobiliser coil D2 (required for emergency starting; for this purpose, the vehicle ignition key is held in a marked position)
- ▶ One line to control button for dash panel insert E493 (button for resetting the trip counter)
- ▶ Two ground lines to information electronics control unit 1 - J794
- ▶ One line for shielding the LVDS lines to information electronics control unit 1 - J794



Message

If necessary, the Audi virtual cockpit can be flashed in a service environment using an SD card available to order from Audi. While flashing is in progress, the SD card must be inserted in the card slot of the information electronics control unit 1 - J794. Flash programming is controlled via the diagnostic tester, but the data for flash programming is stored on the SD card.

Test your knowledge

All of the following questions may have one or more correct answer.

Question 1: Which of the following statements regarding the Audi virtual cockpit is correct?

- a) It offers the customer three different display views.
- b) The Audi virtual cockpit is optional.
- c) It combines the instrument cluster displays and the MMI displays into one display.
- d) The customer can customise the representation and position of the various views.
- e) Not all instrument cluster displays are implemented on the high-resolution display.

Question 2: How do you open the menu in the Audi virtual cockpit?

- a) By pressing the MENU button on the multifunction steering wheel.
- b) By pressing the MENU button on the MMI control panel.
- c) By selecting the relevant tab in the Audi virtual cockpit.
- d) By selecting the relevant menu and pushing the left roller on the multifunction steering wheel.

Question 3: Which main functions are available in the Audi virtual cockpit?

- a) Media
- b) TV
- c) Tone
- d) Setup MMI

Question 4: Which of the following statements regarding the tabs in the tab bar is correct?

- a) The number of tabs displayed depends, among other things, on the individual vehicle's specification.
- b) Not all available tabs are displayed in the Audi virtual cockpit.
- c) Each tab is assigned to exactly one function.
- d) At least three tabs are always displayed, regardless of the vehicle's specification.

Question 5: Which of the following statements regarding the circuit diagram of the Audi virtual cockpit is correct?

- a) The Audi virtual cockpit reads in the ambient temperature sensor.
- b) The Audi virtual cockpit reads in the fuel tank sender.
- c) The Audi virtual cockpit is integrated in the MOST bus.
- d) The Audi virtual cockpit is connected to two different CAN bus systems.

Self study programmes

For more information, i.e. information supplementary to this self study programme, please refer to the following self study programmes:



SSP 611 Audi A3 '13 Vehicle Electronics and Driver Assist Systems

Order number: A12.5500.95.20



SSP 629 Audi TT (Type FV) Vehicle Electrics, Electronics and Infotainment

Order number: A14.5501.14.20



SSP 630 Audi TT (Type FV)

Order number: A14.5501.15.20

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AUDI AG
I/VK-35
service.training@audi.de

AUDI AG
D-85045 Ingolstadt
Technical status 07/14

Printed in Germany
A14.5S01.13.20