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iDRIVE: COMFORT AREA

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Model: E65 - 745i

Production Date: 11/2001 - Start of Production

Objectives:

After completing this module you should be able to:

• Recognize which controls and displays are contained in the Comfort Area.

• Understand the operating principles of the Controller and Control Display.

Comfort Area: Control Display and Controller

Introduction

Improved display systems and digital technology enable new control functions and display options. In addition, the number of vehicle functions is increasing. This growth is likely to be concentrated in the area of convenience and communication functions such as multi-media applications and information services.

In order to be able to make use this abundance of functions without having an unmanage-able array of controls and displays, the following concept has been developed:

1. Combination of user interfaces into a single multifunctional display in the form of the Control Display offering centralized screen-based control of functions.

2. Screen-based control of functions performed by means of a central operating control in the form of the Controller.

The Control Display and the Controller set new standards in driver-vehicle interface design.

This is a logical progression from the On-Board Monitor first introduced on the E38.

The most important characteristics of the centralized control and display system are the following:

• Standardized layout for all functions

• Standardized control strategy for all functions

• High-quality visualization and ergonomics

• Possibility for easy modification of user interface by software update

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The fundamental component of the Comfort Area is the Control Display and its associated operating control, the Controller.

The Control Display is built into the center of the dashboard. The Controller is on the center console, positioned ergonomicly in front of the center armrest.

All convenience functions are within easy reach of the driver and front passenger.

The following controls are in the Comfort Area:

- Control Display and Controller.

- Air conditioning control panel incorporating switches for hazard warning lights and central locking.

- Control panel for radio and compact disc (optional cassette) player.

- Telecommander (retractable telephone key pad).

1. **Control Display**

2. **IHKA panel with hazard light switch and central lock button**

3. **Audio System Controller (ASK)**
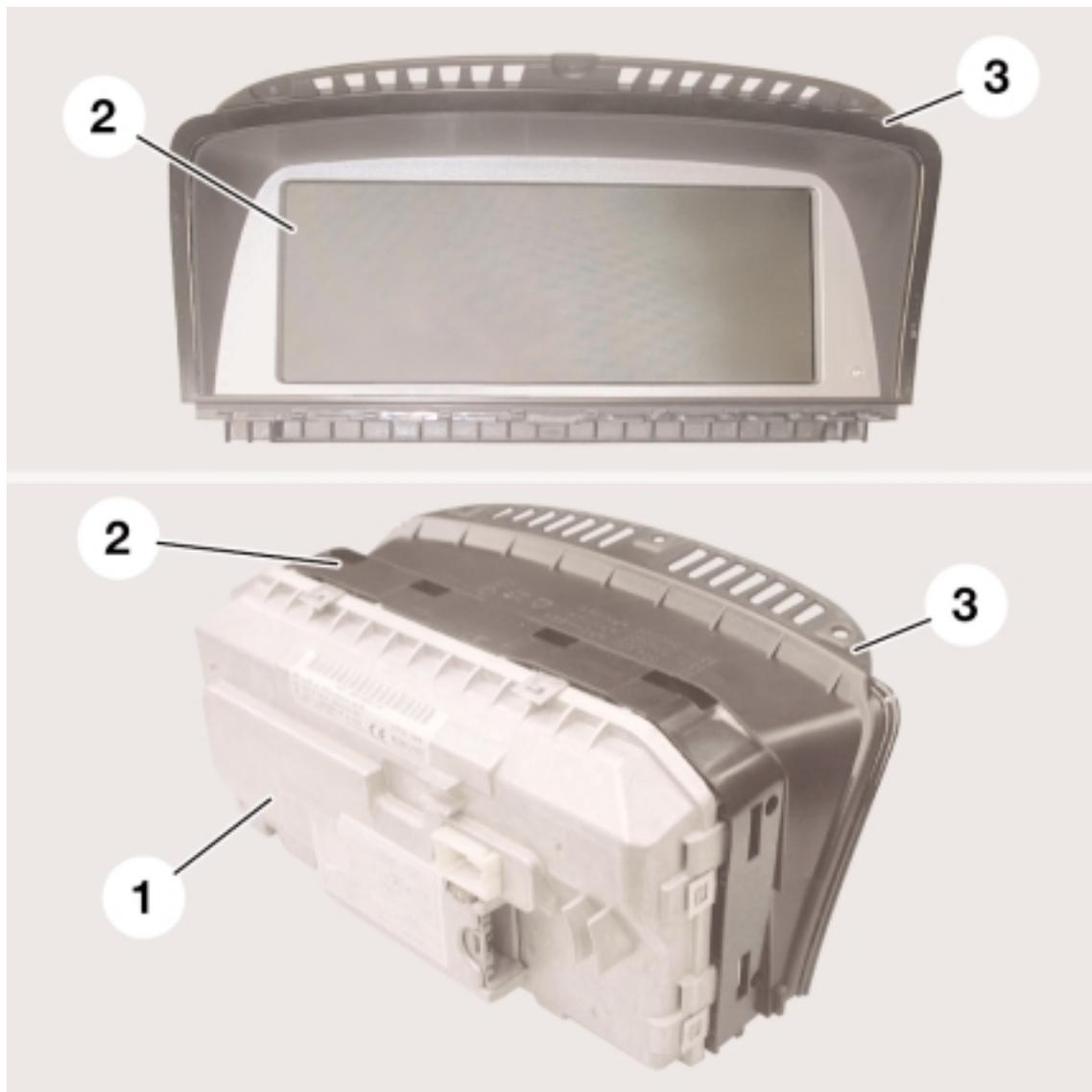
4. **Controller**

5. **Telecommander**

Components

Control Display

The Control Display consists of:

1. Metal casing with integral electronic module

2. LCD display

3. Hood with glass cover.

A 16-bit processor is responsible for communication (gateway function) between the MOST and K-CAN SYSTEM bus systems, it also performs the tasks of diagnosis processing and illumination dimming.

A 32-bit processor with 16 MB of RAM and a 16 MB graphics memory is responsible for display output and user guidance.

The Control Display is equipped with a Flash memory module. This means that software can be downloaded/updated via the diagnosis interface at any time.

The text and character sets for the language-specific elements of the user interface (country coded) are stored in the Flash memory.

The size of the LCD display is 8.8 inches (diagonal). The complete Control Display assembly is attached to the dashboard by three screws. The LCD display plus the hood and glass cover are removable, this means that if the glass cover becomes scratched the LCD display and hood can be replaced separately.

The LCD display plus hood clips onto the metal casing. A special tool is required to separate the two components. Internally, the LCD display is connected to the electronic module by a ribbon cable.

On the rear of the metal casing there are cooling fins. Next to them is a 5-amp fuse, this protects the Control Display against damage from excessive current.
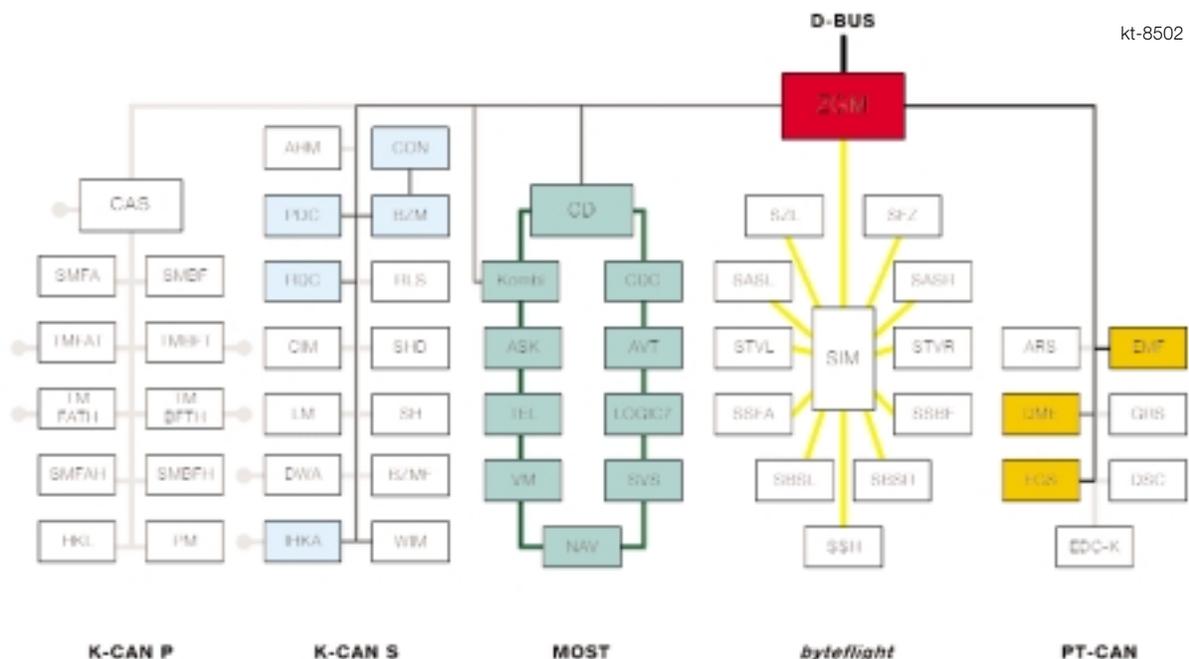
Brightness Control
There is a photo-cell on the front of the LCD to the right of the screen for detecting the ambient light so that the screen brightness can be adjusted accordingly.

The screen brightness also responds to manual adjustment of the instrument lighting dimmer control.

Control Display photo-cell location

kt-8504

iDrive: Comfort Area

The Control Display communicates via the MOST bus system with all other components on the MOST bus.

The Control Display is the system master for the MOST bus. The system master holds the knowledge of the complete system and links up the individual modules into a system.

The Control Display also performs the function of power master within the MOST network. That means that the Control Display wakes up all MOST nodes (control units). They then register with the Audio System Controller (= connection master, control function for establishing connection).

Once all nodes (MOST control units) have registered as awake, a message to that effect is sent to the Control Display by the ASK.

The Control Display is also responsible for sending the MOST nodes to sleep. The MOST bus is networked to the remaining bus systems via the K-CAN SYSTEM.

The Control Display contains the gateway module, MOST-CAN Gateway (MCGW) to function as an interface between the MOST and K-CAN-S busses.

The instrument cluster is an exception. It has a separate connection to the K-CAN S.

The Controller is connected by the K-CAN S via the Center Console Control Center module (BZM) to the Control Display.

The diagnosis interface for the Control Display is the ZGM via the diagnosis bus.

Connectors

The Control Display has a 14-pin (1) and a 12-pin (2) connector.

The 14-pin connector incorporates the connections for the MOST (fiber-optic) and K-CAN-System bus systems.

The 12-pin connector provides the RGB-format (RGB = red, green, blue) video input.

The Control Display is capable of digitizing analog video signals and displaying them on the LCD screen in full-screen or split-screen mode.
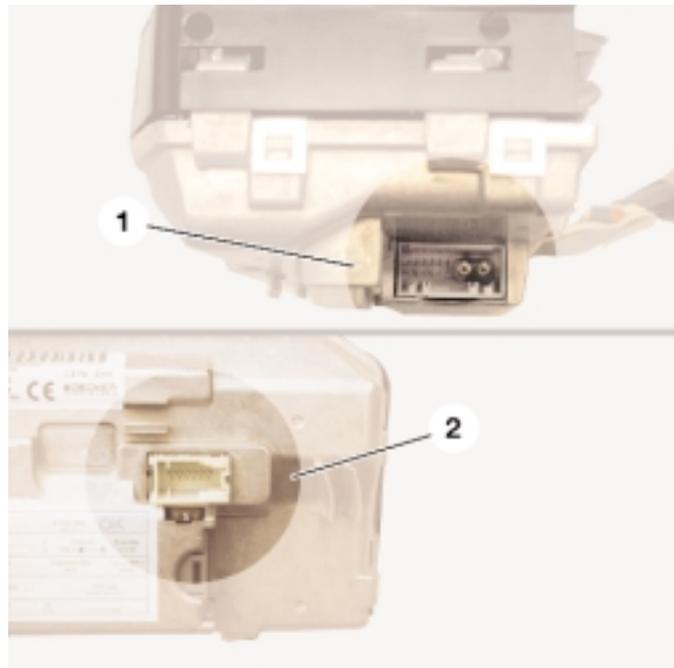
Controller

The Controller is an evolution of the rotary push button used on the previous On-Board Monitors.

It is the central operating control for all convenience functions and selected options for vehicle functions. The Controller is located in the most comfortable and ergonomic position for the user (driver or front passenger).

It is on the front portion of the armrest between the driver and front passenger seats.

kt-8506

iDrive: Comfort Area

Continued development of the practice-proven rotary push button principle has provided the Controller with an additional linear movement capability in the horizontal plane.

The Controller can be moved horizontally from its resting position (center position), to which it always returns when released.

The 8 main menus around the edge of the Control Display are arranged in a pattern resembling the points of a compass. There are 8 main directions in which the Controller is moved in the horizontal plane in order to select the main menus.

Controller direction of movement.

kt-8507

The 8 main directions of movement of the Controller are scanned by a switch unit. That switch unit consists of 8 individual switches. They are positioned at 45 degrees to each other.

If the Controller is moved to one of the main menus (option panels) and released at that point/moved back to its center position, the selected menu opens.

Generation of Touch Sensitive Feedback

Since there are a wide variety of ways in which the Controller can be held and moved, only the key movements are signalled to the user by touch sensitive feedback (simulated dial clicks).

The positions/movements for which there is feedback are:

• Center position

• 8 main directions of movement in horizontal plane

• Clockwise/anti-clockwise rotation (with incremental divisions for selection function)

• Depressed position (confirmation function)

The touch sensitive feedback for the center position, the main horizontal directions of movement and the depressed position are created mechanically. Only the feedback for the rotation movement is generated electrically.

When the Controller is rotated in a control menu it provides touch sensitive feedback for the user. This is for the purpose of simulating the familiar mechanical stops of a conventional rotary control knob.

When items on the Control Display screen are selected, there is a difference between the strength of the feedback for different items such as lists, function buttons, screen areas and end stops. This difference is used as a method of confirmation so that changes in the Control Display can be made with a minimal amount of visual distraction

When the Control Display is switched off, the controller rotates freely without any incremental stops.

Inside the Controller there is a DC motor which is controlled by pulse-width modulation (PWM) signals. That motor generates a rotational force opposite to the direction of rotation. That opposing force or torque is perceived by the user as a mechanical resistance.

Connection to the Controller

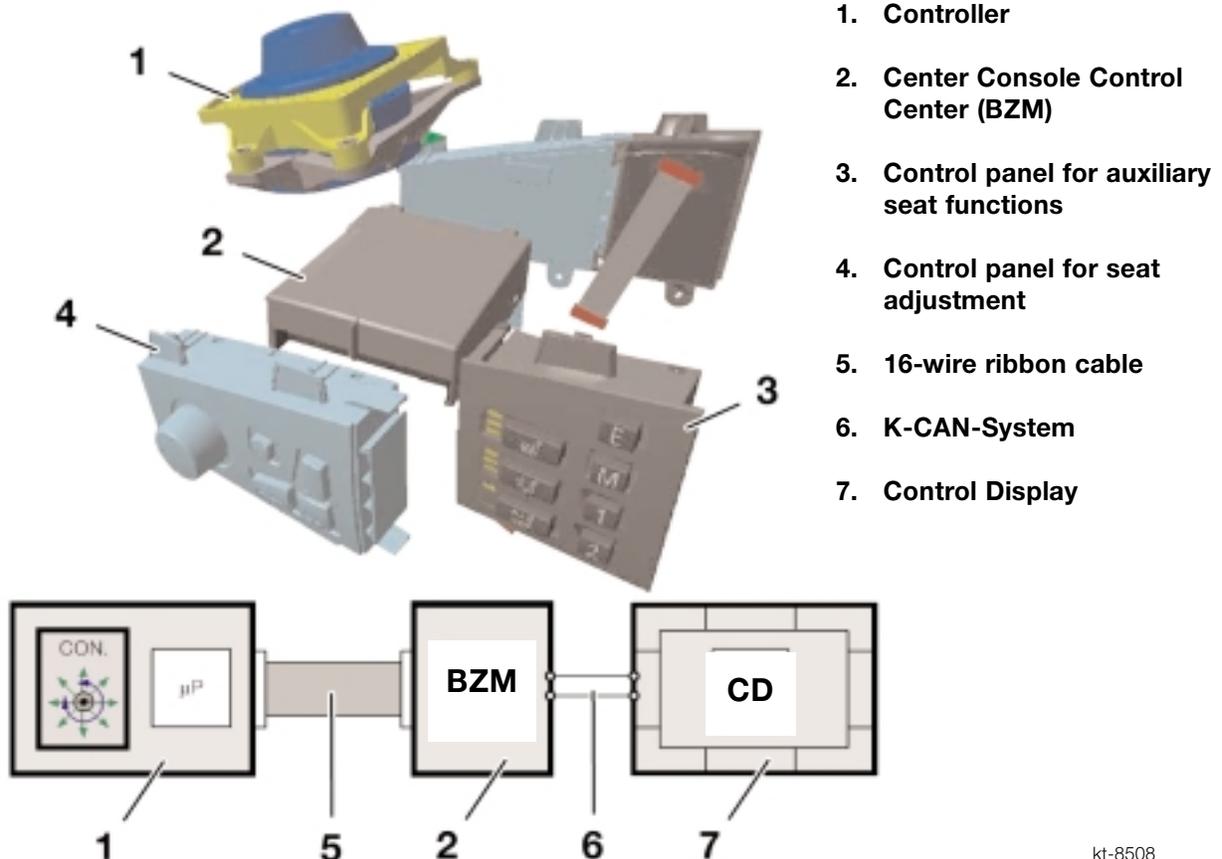The Controller is connected directly to the BZM by a 16-wire ribbon cable.
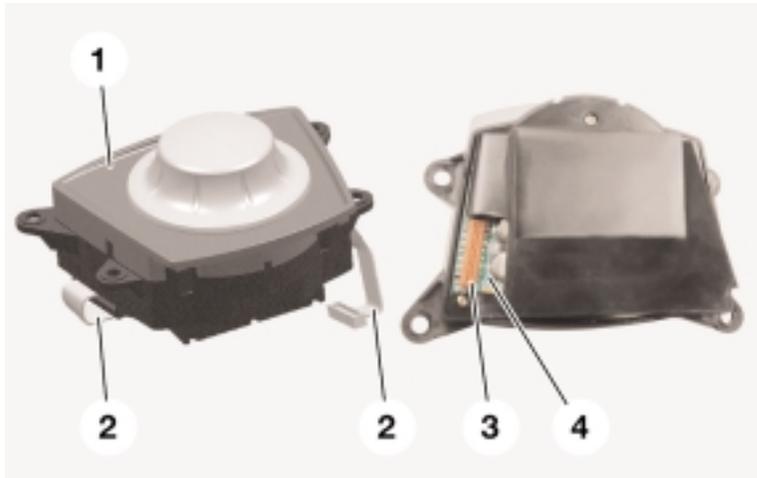
1. **Controller**

2. **16-wire ribbon cable**

3. **Connector**

4. **Circuit board**

kt-8950

The BZM is fitted inside the center console underneath the Controller. The control panel units for seat adjustment and auxiliary seat functions are also connected to the BZM.

The BZM has no connection with the functions of the Controller. The bus leads from the K-CAN-S to the Controller are simply looped through the BZM.

1. **Controller**

2. **Center Console Control Center (BZM)**

3. **Control panel for auxiliary seat functions**

4. **Control panel for seat adjustment**

5. **16-wire ribbon cable**

6. **K-CAN-System**

7. **Control Display**

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Heating and Air Conditioning (IHKA) Control Panel

The heating and air conditioning control panel is part of the Comfort Area. Integrated in the heating and air conditioning control panel are the buttons for the hazard warning lights and Central Locking.
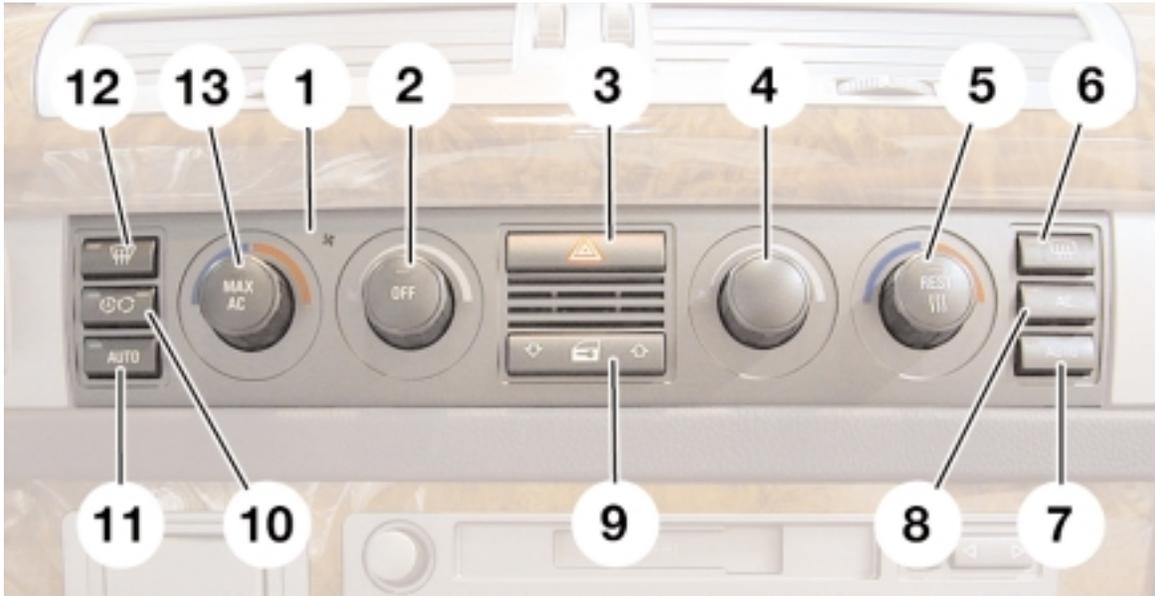
kt-8514

Index	Description	Index	Description
1	Parked car ventilation LED Indicator	8	A/C Button
2	Rotating control knob (endless) for left-side air volume and off push button with status LED	9	Central Locking rocker switch
3	Hazard switch	10	Button for selection of re-circ, fresh air or AUC (automatic re-circulation).
4	Rotating control knob (endless) for right-side air volume	11	Left-side Auto button
5	Rotating control knob for right-side temperature selection and push button for Rest function	12	Max defrost button for windshield
6	Rear window defogger button	13	Rotating control knob for left-side temperature selection and push button for Max A/C function
7	Right-side Auto button		

When the hazard warning lights are on, the direction indicator function has priority over the hazard warning lights when the electrical system status is at least KL R.

The Central Lock button is a rocker switch and enables the vehicle to be locked/unlocked (doors, trunk lid) centrally from inside.

Audio System Controller (ASK) Control Panel

The control panel for the ASK is underneath the heating and air conditioning control panel on the right and is part of the Comfort Area.

1. **Rotary/push button for ON/OFF and volume.**

2. **Eject button**

3. **Rocker button for station search, track selection or fwd/rwd.**

kt-8515

The control panel and the ASK control module are a single unit. The control panel incorporates the main rotary/push-button control for switching on all audio sources. It is also the volume control.

The control panel also has a rocker button for fast forwarding/ rewinding cassettes/CDs and an Eject button for cassettes/CDs.

Note: The E65 will be equipped with an in-dash CD player as standard. There is a cassette player available as a no cost option.

Telecommander

The Telecommander is a retractable telephone key pad and is also part of the Comfort Area. Pressing on the phone board opens it out.

It is moved back in by pushing it back into its slot by hand until it locks into place.

The key pad is a 3 x 5 numeric pad for manual dialing and operating the telephone. All keys on the key pad have back lighting.

kt-8516

Principle of Operation

Control Display Format

The 8.8" screen with a resolution of 640 x 240 pixels (width x height) can be divided into four areas.


kt-8510

The area on the left between the two status bars is the control area in which the options of the selected main menu (e.g. Entertainment) are displayed and selected.

The area on the right is the assistance screen. This is where individually selected functions from the "Vehicle Data" menu such as On-Board Computer, or the route display for the navigation system or the short description and Help info. are displayed.

The two status bars permanently display the status of the most important functions such as outside temperature or time. The top and bottom status bars extend across the entire screen.

The Status Bars

The status of the most important functions operated by means of the Control Display are indicated permanently on the top and bottom status bars once the ignition is ON.
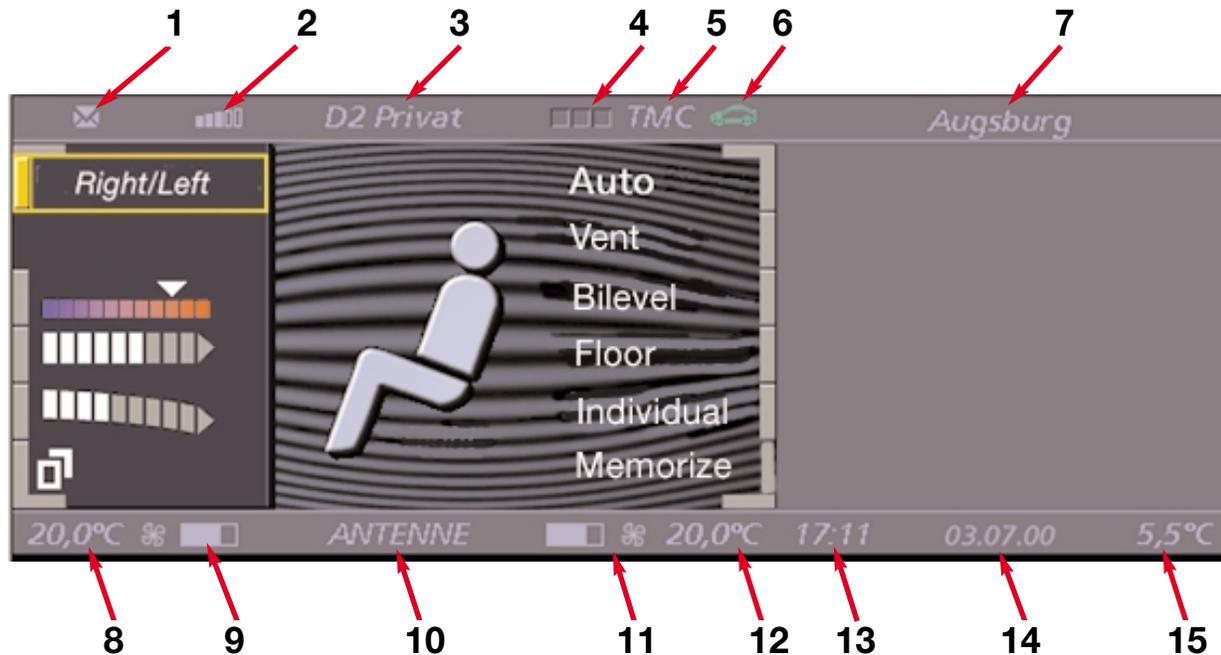
Index	Description	Index	Description
1	Unread e-mail text messages	9	Ventilation setting for left zone
2	Telephone signal strength	10	Entertainment system status (radio station, CD track etc.)
3	Name of telephone provider or Phone number dialed or phone number of Incoming call	11	Ventilation setting for right zone
4	Telephone status: Green=phone on Yellow=roam Red=no service	12	Set temperature for right zone
5	Traffic message channel (not used in U.S.)	13	Time display
6	Vehicle status (Check control and Condition Based Service)	14	Date display
7	Destination when navigation system active	15	Outside temperature display
8	Set temperature for left zone		

The Basic Menu

The basic menu shows a graphical representation of the Controller in the center with arrows indicating its directions of horizontal movement for selecting any of the 8 main menus arranged around the edge. To the right is the assistance screen.
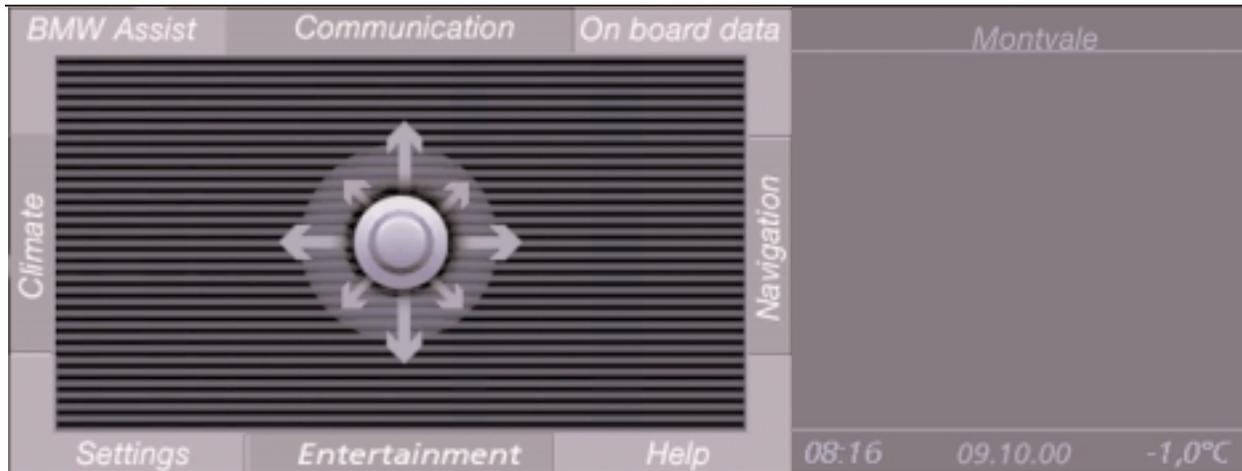
The basic menu always remains behind the currently selected menu as a ninth menu and can be recalled by moving the Controller in the direction of the active main menu.

Pressing the Controller when the basic menu is active switches off the Control Display. However, the bottom status bar showing the status of the air conditioning, entertainment system, time and date remains visible!

When the Control Display is switched off, pressing the Controller or moving it horizontally switches the Control Display on.

If the Controller is moved in the direction of one of the main menus, this not only switches the Control Display on, it also opens the menu that is located in that direction.

The following actions also cause the Control Display to switch on:

- Display of a priority 1 message box, e.g. a check control message such as "Engine oil pressure too low"

- Operation of the PDC (Park Distance Control).

- An incoming/outgoing telephone call or operation of the Send/ End button on the MFL/Telecommander

- Operating the audio system in KL 30.

Help System

There is a help system for using the Control Display. It is activated by moving the Controller towards the bottom right ("south east") to the "Help" menu.

The help is in the form of short text information. The help provides explanations of the selected menu options. When the help is activated, context-related explanations appear on the assistance screen according to the position of the highlighted function.

1. **Brief Info**

2. **Menu Name**

3. **Help text on display screen.**

kt-8512
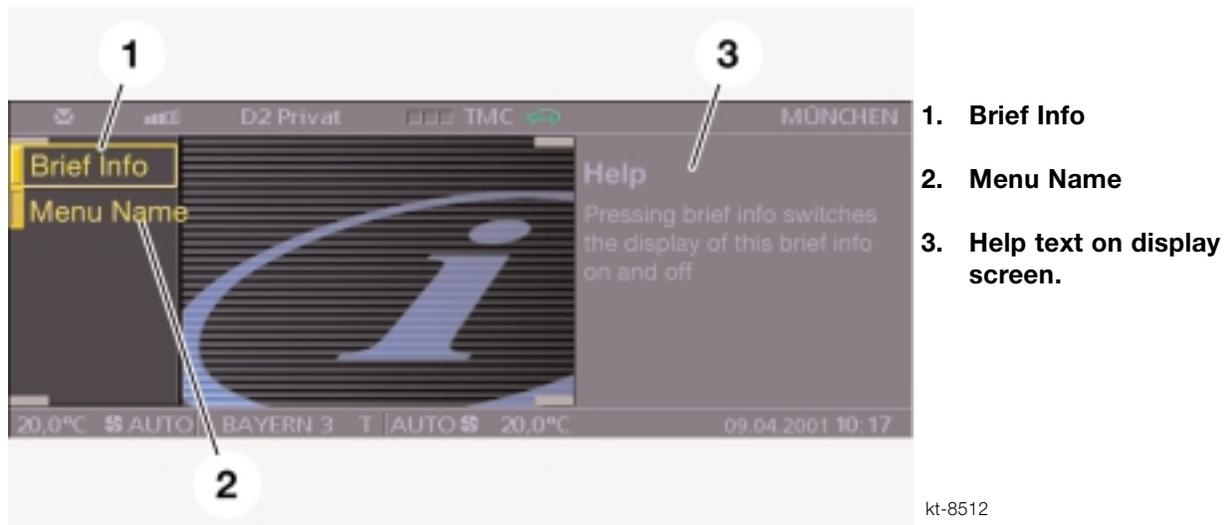
The help is activated by selecting the "Brief Info" button with the Controller and then depressing the Controller to confirm the selection.

If the On-Board Computer or the navigation system road map is displayed on the assistance screen, the "Brief Info" is automatically deactivated.

It then has to be re-activated by means of the Help menu.

If "Menu name" is deactivated, touching the controller briefly in a horizontal direction no longer highlights the menu button but instead enters directly in to the menu.

Menu Selection

As soon as a certain degree of deflection of the Controller in a particular direction is detected, a graphical indication of the movement is displayed.
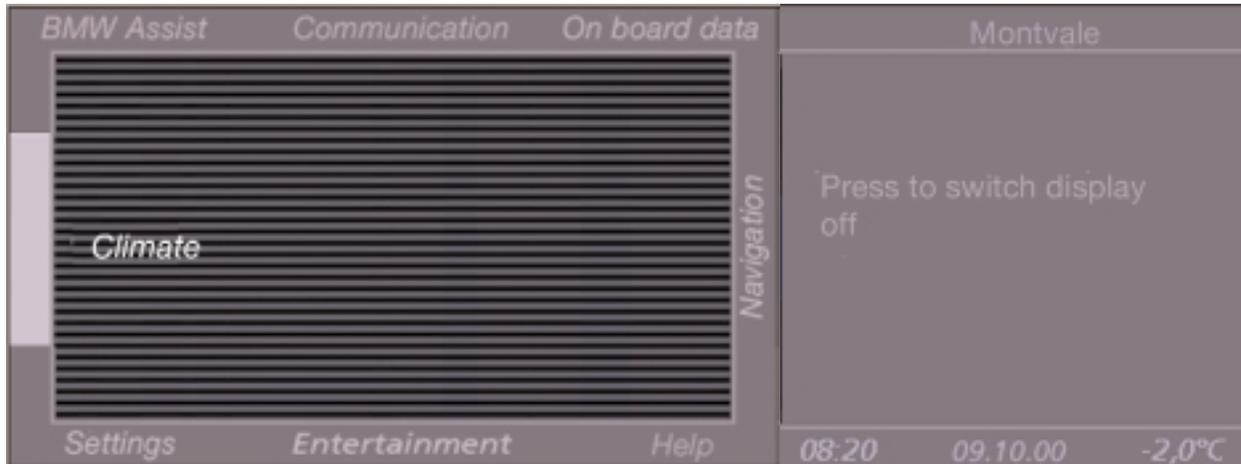
The button for the selected menu is visually highlighted and the menu name displayed in the control area. This applies only if the function Menu Name has been activated in the Help system or if the Controller is held in the deflected position for more than 1 second.

Releasing the Controller or returning it to the center position starts the menu selection and it is then displayed on the Control Display.

If the wrong menu is selected by accident (e.g. "BMW ASSIST" instead of "Climate"), this is easily corrected. Since the movement of the Controller is not restricted by a rigid "gate", the individual menus can be selected successively by moving the Controller around in a circle.

If the Controller is in the center position, the menu corresponding to the last direction it was moved in is displayed.

Additional information from other functions such as On-Board Computer or Help (as in the example shown) can be displayed simultaneously on the assistance screen.

The following pages contain a summary of the remaining menus in clockwise order with details of the screen displays for the first page of each menu.

More detailed information about those menus and the functions they offer can be found in the relevant information chapters and of course, in the Owners Manual.

Climate

The various pages of the "Climate" menu contain the following functions:

- Vent position selection

- Center vent stratification

- Customization of air volume distribution

- Parked car ventilation settings

- Seat heating proportioning (seat bottom/seat back)
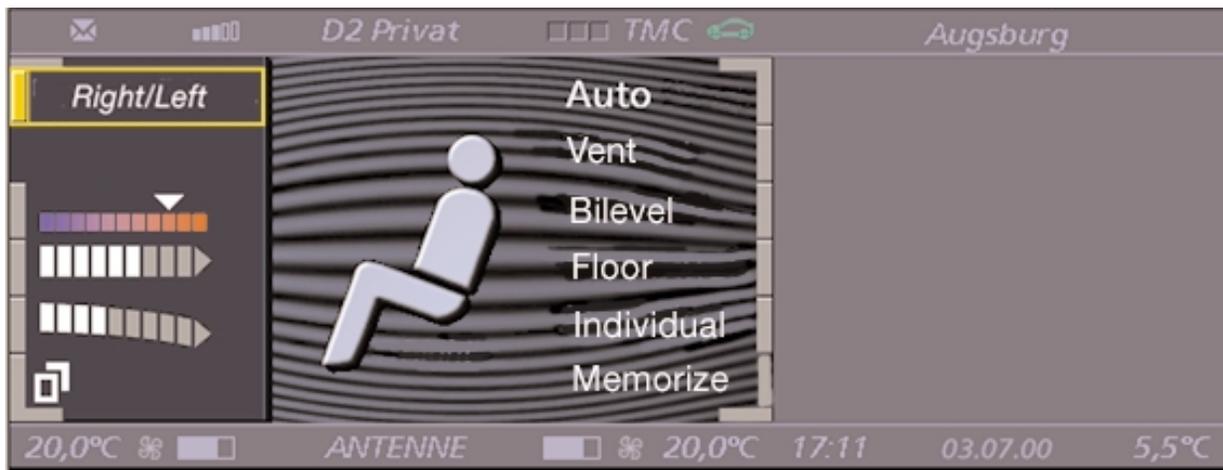
Certain selected climate control settings such as air volume are both available from the Control Display as well as the IHKA control panel.

If a menu has has more than one page, this is indicated by a button in the bottom left corner. The button is selected rotating the Controller and the selection confirmed by depressing the Controller.

The next menu page then appears.

To return to the previous page select the button again.

BMW ASSIST

"BMW ASSIST" is the menu from which the Service utilities can be selected.

That includes:

- "BMW Service" (breakdown assistance) with links to the Roadside Assistance, "Home BMW center", BMW center and Emergency Call.

- "BMW Info" with details of special offers (technical services) from the BMW Service department (planned).

- "Traffic Info" with up-to-date, route-specific traffic news. (Planned)

- "Information Plus", a more comprehensive information service with up-to-date information on topics such as parking availability, news headlines, hospitals, overnight accommodation. (Planned)
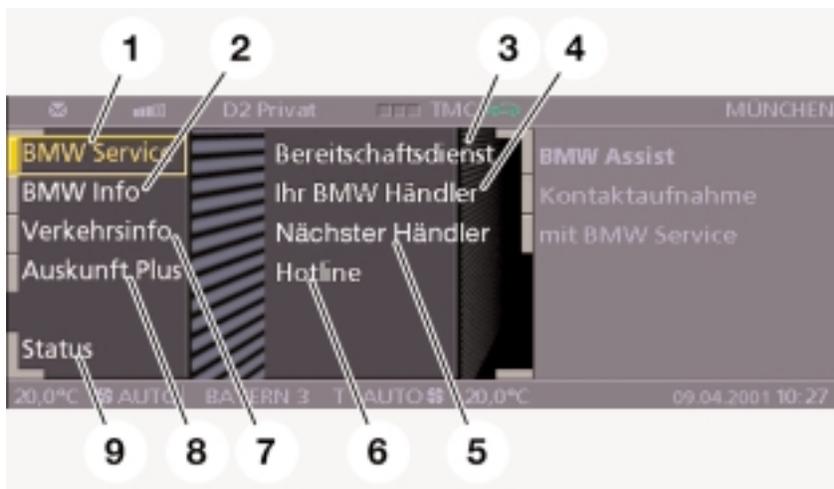
1. BMW Service
2. BMW Information
3. Roadside Assistance
4. Home BMW center
5. BMW center
6. Emergency Call

kt-8536

In the future, this menu will also incorporate "ASSIST Online" offering Internet access and e-mail .

Communication

"Communication" is likely to be a very frequently used function.

This menu contains the telephone functions. It allows the user to list the phone book entries arranged in various orders, e.g. alphabetically or stored order.

On the next page of the menu (button in bottom left corner) you can view text messages (SMS messages) received or incoming calls that were not accepted.

1. **Top 8 frequently called numbers.**

2. **Last (most recent call)**

3. **Search in alphabetical order**

4. **Search in stored order**

5. **Phone book display**

6. **Button to display next page**

kt-8537

On-Board Data (and Vehicle Data)

The On-Board Data menu contains the following functions:

- On-board Computer
- Travel computer
- Speed limit
- Stopwatch
- Check Control
- CBS data

1. **On-Board Computer**

2. **Travel Computer**

3. **Speed Limit**

4. **Stopwatch**

5. **Move contents of control screen over to assistance screen.**

6. **Next page**

kt-8538

The button with the arrow symbol can be used transfer the current display in the control area to the assistance screen.

The button in the bottom left corner is used to go to the next page of the menu.

There, you can view detailed information relating to the Condition Based Service (CBS) and Check Control systems.

The function "Service" provides more detailed information on the statuses monitored by the CBS system.

The function "Check" provides more detailed information about the Check Control messages issued.


Expanded Check Control text.
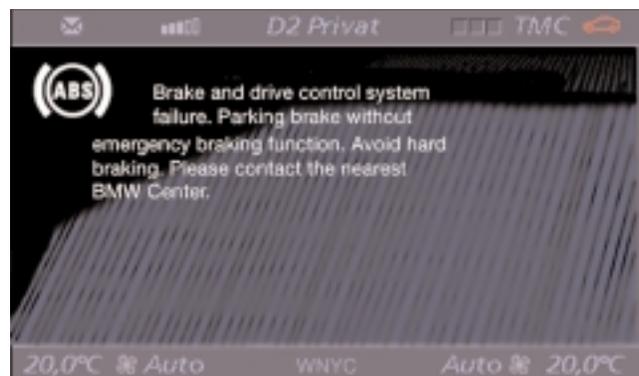
Navigation

The Navigation menu provides access to all functions necessary to operate the navigation system.

The road map can be displayed in the control area and it can also be displayed in the same scale on the assistance screen (though with a smaller visible area).

This menu contains the following functions:

- View
- Destinations
- Directions
- Services (possibly traffic info in the future)
- New route
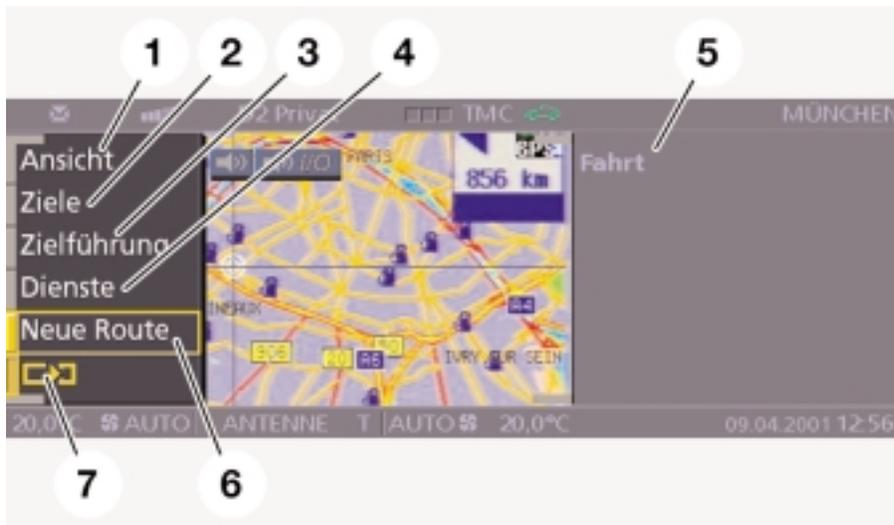
1. **View**

2. **Destinations**

3. **Directions**

4. **Services (planned)**

5. **Assistance directions**

6. **New route**

7. **Move contents of control screen over to assistance screen.**
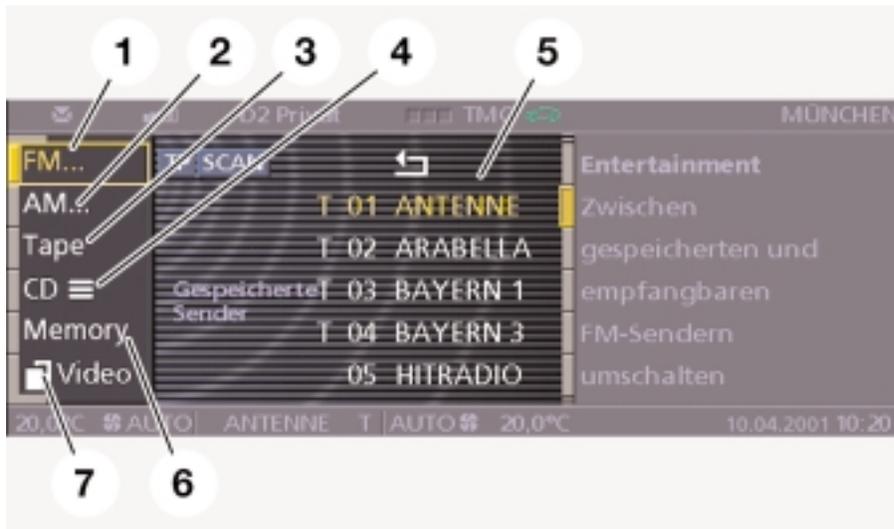
kt-8539

Help
Contents already described on page 15.

Entertainment

The "Entertainment" menu contains the following functions:

- Audio functions such as radio, cassette and CD player

- Memory for storing radio stations and all equalizer and tone settings

- Video functions such as TV and ultimately DVD (Planned for rear Control Display)

1. **FM selections**

2. **AM selections**

3. **Tape or in-dash CD**

4. **CD changer**

5. **List of stored stations using RDS names**

6. **Memory page for storing stations and settings**

7. **Button for next page**

kt-8540

Note: enabling of RDS is done in the service function described later in Workshop Hints.

Settings

The Settings menu is where the individual user settings are made. This menu contains the following functions:

- Date/time entry and adjustment.

- Choice of language for Control Display and instrument cluster.

- Choice of units for Control Display and instrument cluster.

- Additional options such as:
  - Assign function to the "free" programmable button on the MFL
  - Enable/disable automatic parking brake operation ("Automatic Hold")
  - Enable/disable PDC graphic display
  - RDC initialization and monitor display (optional)
  - EDC program selection

kt-8541
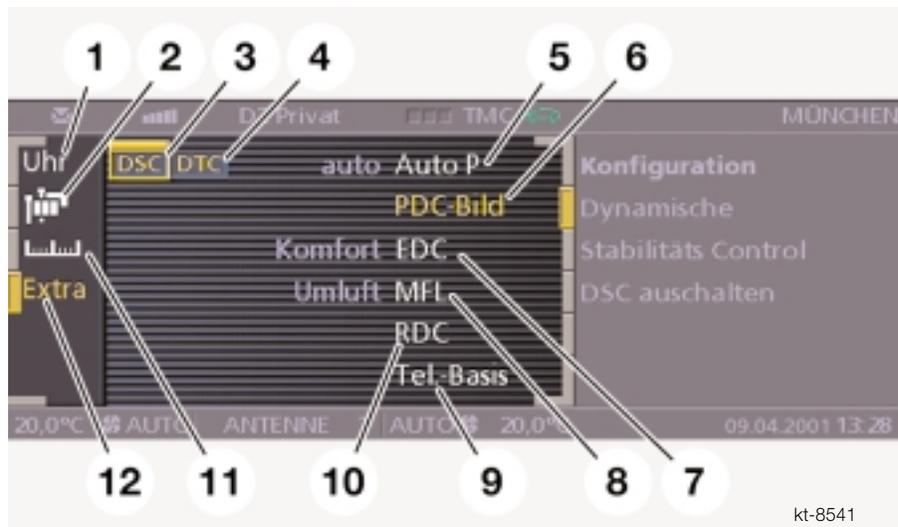
1. **Time/Date/Memo set**

2. **Language selection**

3. **Enable/disable DSC**

4. **Enable/disable DTC**

5. **Enable/disable Automatic hold.**

6. **Enable/disable PDC graphic display**

7. **EDC program selection Comfort or sport**

8. **Assign function to MFL programmable button**

On this menu, you can also switch the DSC on or off and, when the DSC is active, switch the Dynamic Traction Control (DTC) on or off.

9. **Not used in U.S.**

10. **RDC initialization and display**

11. **Display units setting**

12. **Displays menu for option items 5-10.**

Workshop Hints

Service Mode

The Controller can be used to gain access to Service mode functions of the Control Display. Service mode is a special function that provides information about the status of the display and MOST system.

It is designed for use by Service Technicians and is not intended to be accessible to vehicle owners.

Service mode provides access to details of the hardware/ software versions for the control display and the control units in the MOST network.

As an addition to the Test Modules of the Diagnosis Program, Service mode is a simple means of quickly accessing control module data without the need for a diagnosis tester.

Starting the service mode is somewhat like opening a safe:

- In the Basic menu display, press down the Controller for approximately 6 seconds. This step initializes the tactile feedback of the motor. (Hint: The help text flashes briefly when it is ready).

- Turn Controller 3 increments clockwise (to the right).

- Turn Controller 3 increments anti-clockwise (to the left).

- Turn Controller 1 increment clockwise (right).

- Turn Controller 1 increment anti-clockwise (left).

- Turn Controller 1 increment clockwise (right).

- Depress Controller to confirm.
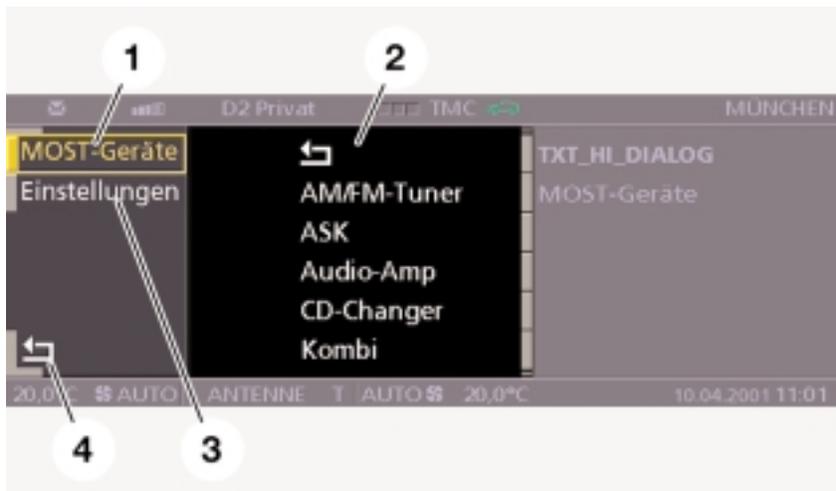
1. **MOST devices menu**

2. **List of found MOST nodes**

3. **Settings menu**

4. **"Back" button**

kt-9039

The Control Display knows how many MOST nodes there are, i.e. how many MOST nodes there are on the MOST ring bus. When retrieving the list of MOST control units fitted, the Control Display waits for a response from each MOST node. Every control unit on the MOST bus contains a MOST communication chip.

The navigation system control unit has two internal MOST nodes. The query which produces the list of MOST control units is answered by only one of the MOST nodes in the navigation system control unit.

The responding MOST node is represented as "Navigation" and the other MOST node as "wait." This entry is not an error.

The function "MOST devices" provides a list of all nodes on the MOST network.

When a control unit is selected, a scrollable list containing the following information appears:

- Part number
- Hardware number
- Coding Index
- Diagnosis index
- Variant index
- Date of Manufacture
- Manufacturer number
- Message catalog version
- Software version
- Operating system version

1. **Settings menu**

2. **Master default**

3. **Enable/disable RDS**

4. **Not used for U.S. phone.**

5. **Back-button.**

kt-9040

The function "Settings" provides access to the following service settings:

- Reset all Vehicle and Key memory functions to default settings (Master default).

- Enable/disable audio system RDS (Radio Data System) function.

- Register/de-register cordless handset (SBDH). (not used in the U.S.)

The service mode is exited by selecting the "Back" button (arrow symbol) at the bottom left of the display or by moving the Controller horizontally.

Review Questions

1. List the components contained in the Comfort Area of iDrive.

2. What is the task of the Control Display on the MOST network?

3. How does the Controller create a different mechanical detent feeling (tactile feedback) depending on the items selected in the Control Display?

4. If the Control Display is switched off by the user what type of items will automatically cause the display to switch back on?

5. What type of information can be displayed on the assistance screen?

6. Describe the procedure to switch off the DSC.

7. How is RDS enabled (activated)?