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F01 Telephone System

Subject **Page**

Initial Print Date: 01/09 Revision Date:

Telephone System

Model: F01/F02

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Describe the telephone system of the F01/F02
- Describe the new functions of the telephone system of the F01/F02
- Identify the components of the telephone system of the F01/F02

System Overview

The Telematics Control Unit (TCU) and the interface box 'High' (ULF-SBX-H) control units are connected to the MOST bus. TCU and interface box 'High' may both be fitted in the vehicle for certain equipment options. In this case, the telephone function is always implemented in the TCU.

The head unit transmits the audio signal in analog form to the HiFi amplifier and the amplifier distributes the audio output to the loudspeakers in the car.

The HiFi system is fitted as standard in the F01/F02.

If the "Top HiFi system" is installed in the car, the audio signal is transmitted digitally on the MOST bus to the HiFi amplifier and the amplifier distributes this signal to all the loudspeakers.

Audio playback of the call recipient is via the front right, front left and center loudspeakers.

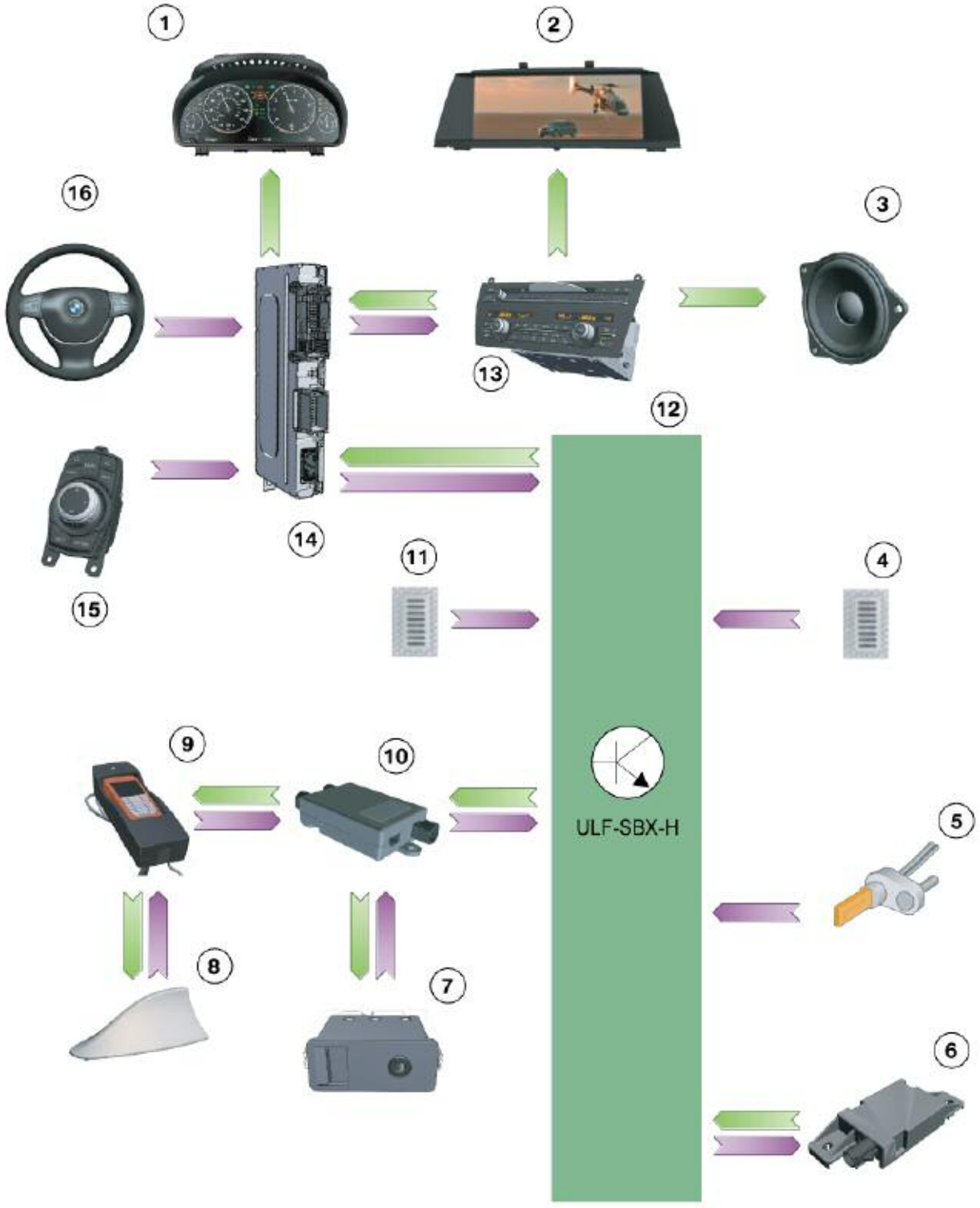
For the sake of clarity the various individual loudspeakers are not shown in the schematic circuit diagrams.

The Telematics Control Unit (TCU) used in the F01/F02 is similar to one used in the E70.

The pairing wizard is again integrated in the F01/F02 to assist the customer in pairing the mobile phone.

Note: The specified range of functions will only be achieved with Bluetooth-enabled mobile phones recommended by BMW. See a list of compatible phones at www.wireless4bmw.com.

Inputs/outputs, ULF- SBX High Interface Box



Index	Explanation	Index	Explanation
1	Instrument cluster	9	Snap-in adapter with mobile phone or Smartphone Integration
2	Central Information Display (CID)	10	USB hub
3	Speaker	11	Microphone (driver's side)
4	Microphone (passenger's side)	12	Interface box 'High' (ULF-SBX-H)
5	Wheel speed sensor	13	Car Information Computer (CIC)
6	Bluetooth antenna (Connects to TCU in US cars)	14	Central gateway module (ZGM)
7	USB audio interface; if no USB hub is installed the connection is to the ULF-SBX-H	15	Controller (CON)
8	Roof antenna (for snap-in adapters mobile phone	16	Multifunction steering wheel (MFL)

Optional extras “USB/Audio interface” and “Smartphone Integration” require the installation of the ULF-SBX-High Interface box.

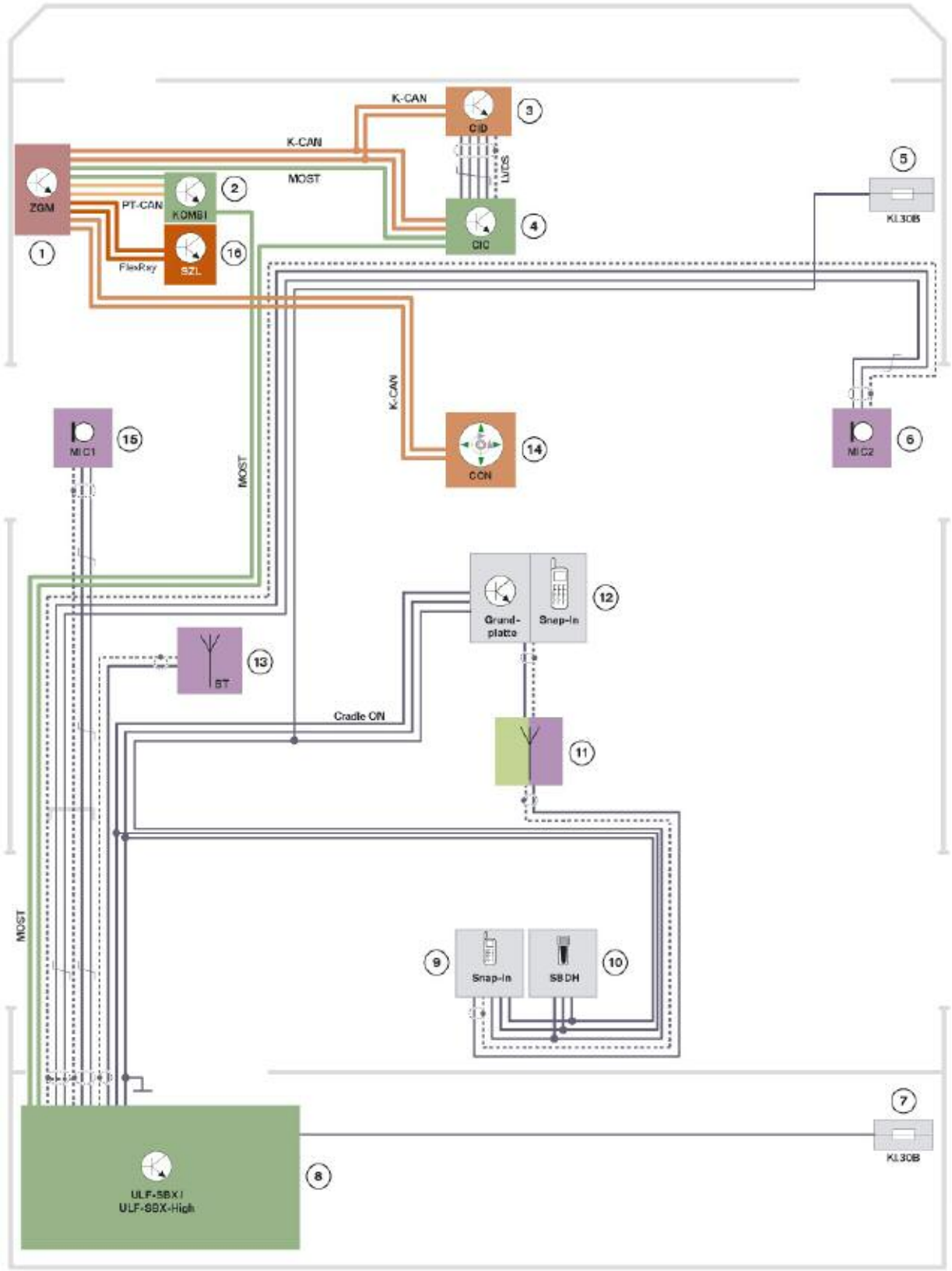
The USB hub is installed only if the car is ordered with the “Smartphone Integration” optional extra.

The mobile phone and the interface communicate via the Bluetooth antenna.

Voice output by the telephone system is via the vehicle’s front right, front left and center loudspeakers. Volume can be adjusted by means of the multifunction steering wheel and the CIC. Speed-related volume control is also active.

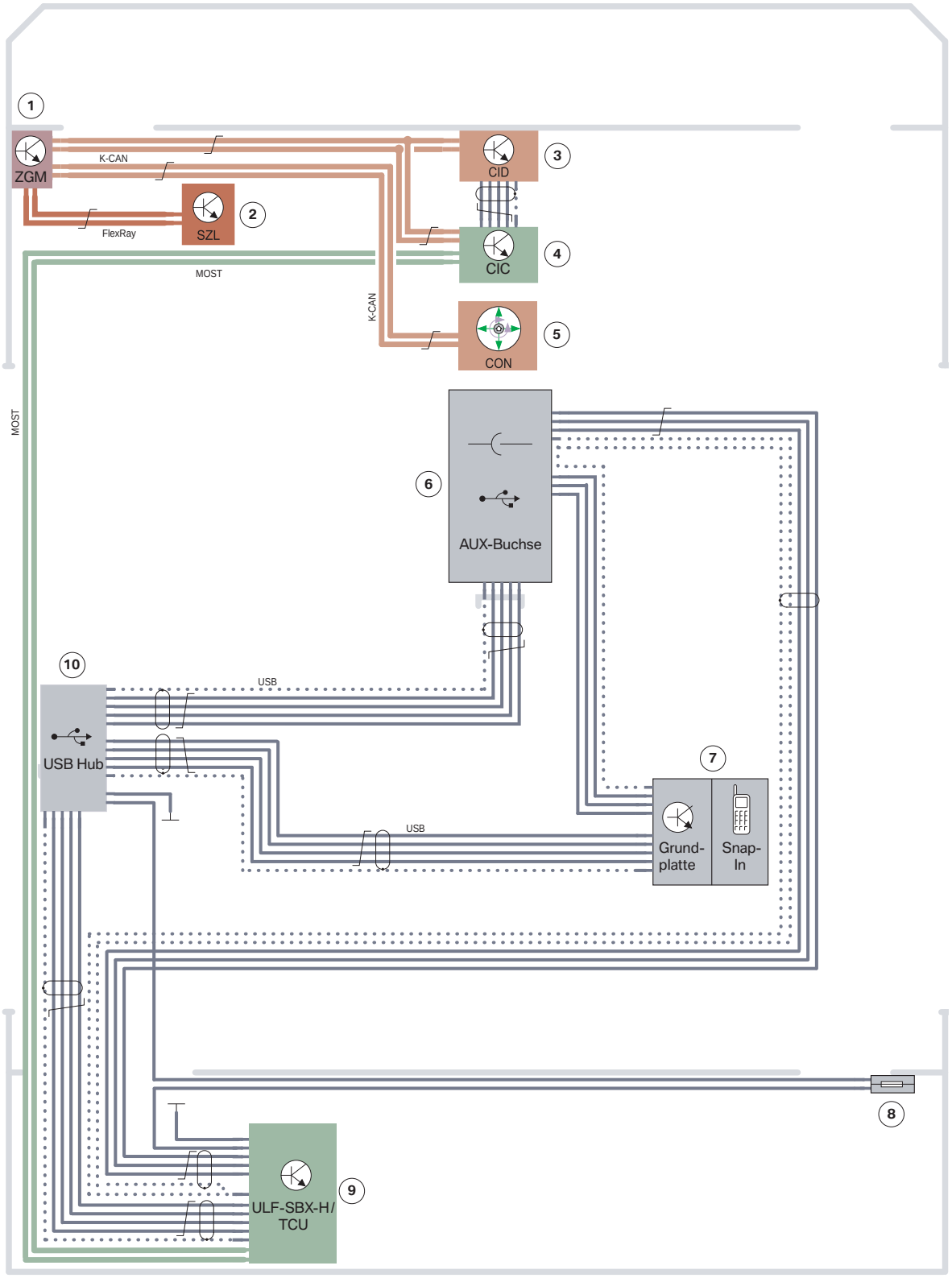
Although both the ULF-SBX-H and the TCU may be fitted in a vehicle at the same time, the TCU always provides the telephone functions. In this case the telephone functions are not available in the ULF-SBX High and the module is only installed to provide the "USB audio interface" option.

ULF- SBX High Interface Box Circuit Diagram



Index	Explanation	Index	Explanation
1	Central gateway module (ZGM)	9	Not for US
2	Instrument cluster	10	Not for US
3	Central Information Display (CID)	11	Roof antenna
4	Car Information Computer (CIC)	12	Base plate with snap-in adapter
5	Fuse in the junction box	13	Bluetooth antenna
6	Microphone (passenger's side)	14	Controller (CON)
7	Power distributor, rear	15	Microphone (driver's side)
8	Interface box 'High' (ULF-SBX-H)	16	Steering column switch cluster (SZL)

Smartphone Integration Option Circuit Diagram



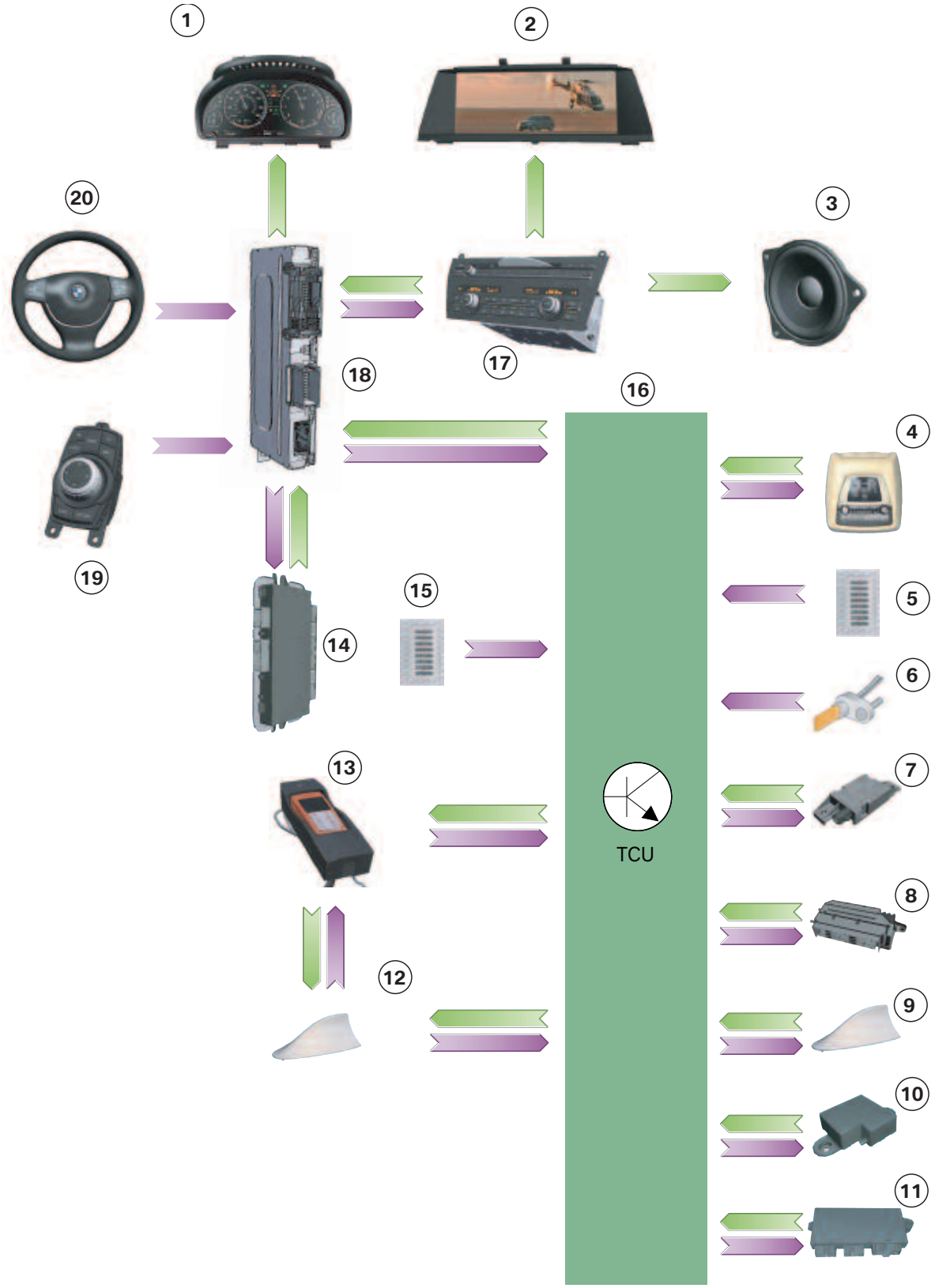
Index	Explanation	Index	Explanation
1	Central gateway module (ZGM)	6	USB audio interface (AUX)
2	Steering column switch cluster (SZL)	7	Base plate with snap-in adapter
3	Central Information Display (CID)	8	Fuse in fuse carrier at rear right
4	Car Information Computer (CIC)	9	Interface box (ULF-SBX-H)
5	Controller (CON)	10	USB hub

MOST signals to the ULF-SBX/ULF-SBX-H control units

In/out	Signal	Source/sink	Function
In	Control signals	CIC	Phone book connection set-up, incoming-call acceptance
In	Control signals	CAS	Terminal control
Out	Control signals	CIC	Audio signals, call recipient, mobile phone

Note: For detailed information on the Smartphone Integration optional extra (option 6NF), refer to the F01/F02 Audio systems training material.

Input/outputs, Telematics Control Unit

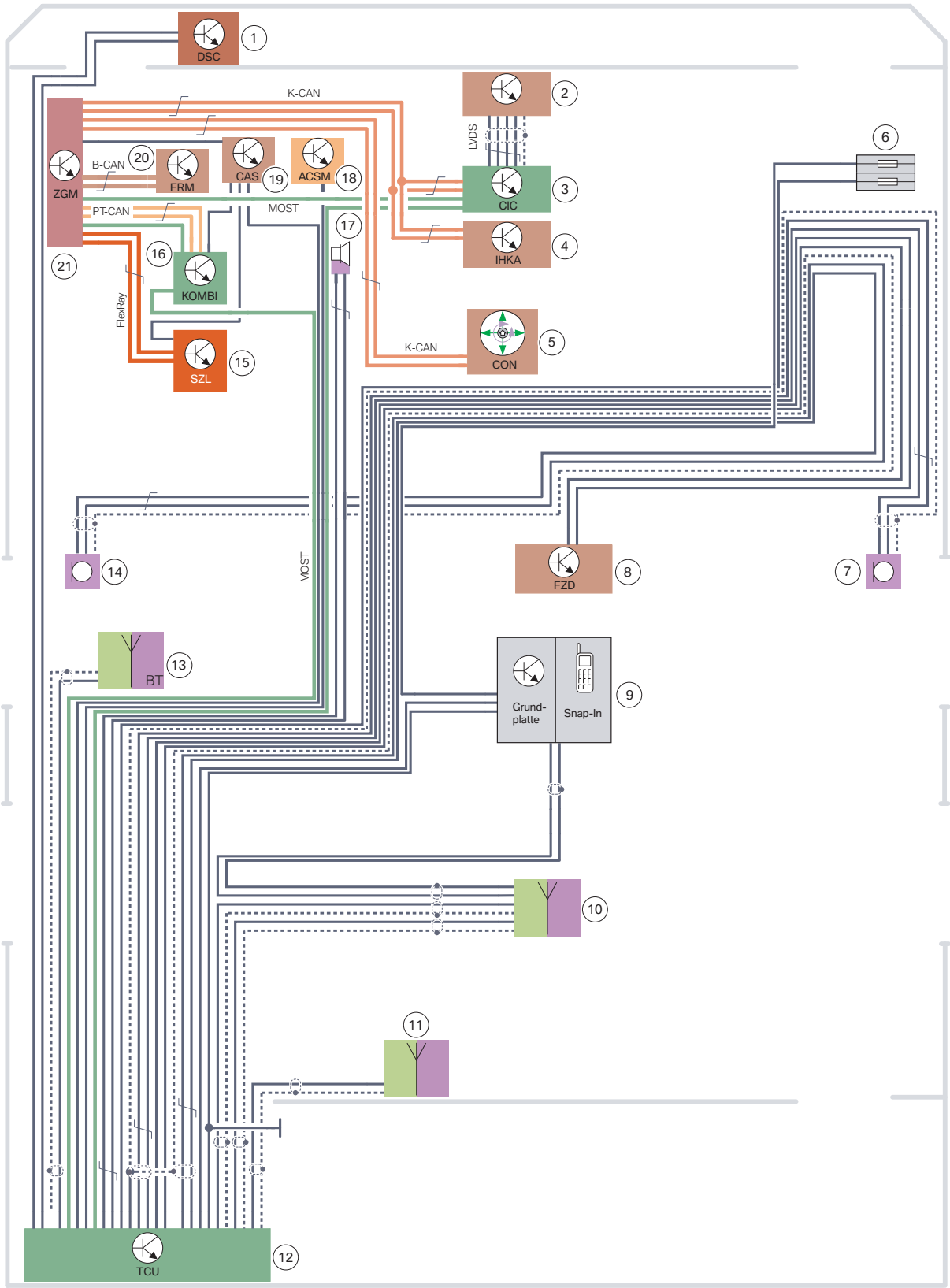


Index	Explanation	Index	Explanation
1	Instrument cluster	11	Car Access System (CAS)
2	Central Information Display (CID)	12	Roof antennal for TCU and snap-in cradle adapter and internal telephone module of the TCU
3	Speaker	13	Snap-in adapter cradle with mobile phone
4	Roof function module (FZD)	14	Footwell module (FRM) for remote door unlocking and remote door locking
5	Microphone (passenger's side)	15	Microphone (driver's side)
6	Wheel speed sensor	16	Telematics Control Unit (TCU)
7	Bluetooth antenna	17	Car Information Computer (CIC)
8	Crash safety module (ACSM)	18	Central gateway module (ZGM)
9	GPS antenna	19	Controller (CON)
10	Emergency-call GSM antenna (back-up)	20	Multifunction steering wheel (MFL)

Voice output by the telephone system is via the vehicle’s front right, front left and center speakers.

Volume can be adjusted by means of the multifunction steering wheel and the IHKA/ audio control unit.

Telematics Control Unit (TCU) Circuit Diagram



Index	Explanation	Index	Explanation
1	Dynamic Stability Control (DSC)	12	Telematics Control Unit (TCU)
2	Central Information Display (CID)	13	Bluetooth antenna
3	Head unit (CIC)	14	Microphone (driver's side)
4	Integrated automatic heater and A/C control (IHKA)	15	Steering column switch cluster (SZL)
5	Controller (CON)	16	Instrument cluster
6	Fuse in the junction box	17	SOS speaker
7	Microphone (passenger's side)	18	Crash safety module (ACSM)
8	Roof function module (FZD)	19	Car Access System (CAS)
9	Base plate phone snap-in adapter	20	Footwell module (FRM)
10	Roof antenna	21	Central gateway module (ZGM)
11	Emergency-call GSM antennal (back-up)		

MOST signals on the control unit TCU

In/out	Signal	Source/sink	Function
In	GPS signals	GPS antenna to CIC	Position data
In	Control signals	CIC	Phone book, connection set-up, incoming-call acceptance, terminal control, etc.
Out	Audio signals	CIC	Audio signals, call recipient BMW ASSIST
Out	Audio signals	CIC	Audio signals, call recipient mobile phone

The TCU receives its power supply via terminal 30F. The power supply via terminal 30F is necessary for the provision of the BMW ASSIST services, including for example:

- Remote Door Unlock
- Vehicle Finder/Stolen Vehicle Recovery
- Remote Climate Control.

These services are implemented via the MOST bus. The TCU reacts to a call from the provider, placed at the customer's request. The TCU sends a signal via the MOST bus to the Car Access System (CAS). The CAS then wakes up the vehicle.

Functions

Bluetooth Pairing (pairing wizard)

The pairing wizard presents the step-by-step instructions for the entire pairing process via the Central Information Display (CID). Detailed help texts and instructions for further assistance are available in case pairing is not successful.

This pairing wizard for Bluetooth is found by selecting the “Telephone” menu and then selecting “Bluetooth”.

Pairing process:

- Once “Add new device” has been selected, the in-car display shows the Vehicle Identification Number (VIN). At the same time, the pairing wizard issues a message to the effect that from this point on the mobile phone has to be used in the process.
- The mobile phone should now be used to search for new Bluetooth devices.
- If the search is successful, the VIN appears in the display of the mobile phone.
- The next step is to key a freely selectable PIN code into the mobile phone, and then key the same PIN code into the vehicle.
- If pairing is successful the data of the newly paired mobile wireless device appear in the vehicle’s phonebook.
- This can take from a few seconds to several minutes to complete, depending on how many entries there are in the phonebook.
- The telephone entries for the entries from the “Contacts” menu are also shown.

Up to four mobile phones can be paired with the car. Before a fifth mobile phone can be paired, one of the other four entries must be removed from the list.

Note: Not all system compatible phones are capable of these features. For more information see a list of compatible phones at www.wireless4bmw.com

Calls with Multiple Users

This function can be used to conduct two phone conversations at the same time. Services such as call waiting, toggle calls and teleconferencing are possible in this way.

Call Waiting

If a second call is incoming while a call is in progress this is indicated by a call waiting tone and also by an accept/reject prompt in the display. The user can now reject the second call and continue the active call or accept the second call. In which case the first caller will hear a call waiting melody and is placed on hold.

Toggle Calls

When calls with multiple users are in progress, one call can be “active” and one “on hold”.

The “toggle calls” function can be used to toggle these calls between the “active” status and the “on hold” status.

Display showing active calls

Teleconference

If the user has an active call and a call on hold, the "Conference" menu item can be selected to place all phone users in a shared conference call.

Display showing a teleconference

Phonebook Contacts

Contacts

All contact information can be viewed and saved under ‘Contacts’. Contacts transferred from the user’s mobile phone to the car are also listed here. A symbol after the contact shows where the information for this contact is saved. When the mobile phone is removed from the car the contacts from the phone/ Bluetooth pairing can no longer be selected in the vehicle.

Display showing ‘My contacts’

Index	Explanation	Index	Explanation
1	Contacts from phone/Bluetooth pairing	4	Contact on the hard disc of the CIC

Other information, including e-mail addresses and postal addresses can be saved and administrated along with the phone numbers on the CIC contacts. This information can only be transferred from the mobile phone to the car if the former supports the PBAP (Phone Book Access Profile) function.

Note: Not all system compatible phones are capable of these features. For more information see a list of compatible phones at www.wireless4bmw.com.

Phonebook

The entries in the phonebook show only contacts for which a phone number has been saved. These can be either entries from mobile phones or contacts saved in the car. Up to four telephone numbers can be saved for each contact and the individual numbers retrieved using the phonebook functionality.

Display showing the phone numbers for a contact

Call Register (Dialled numbers, missed calls)

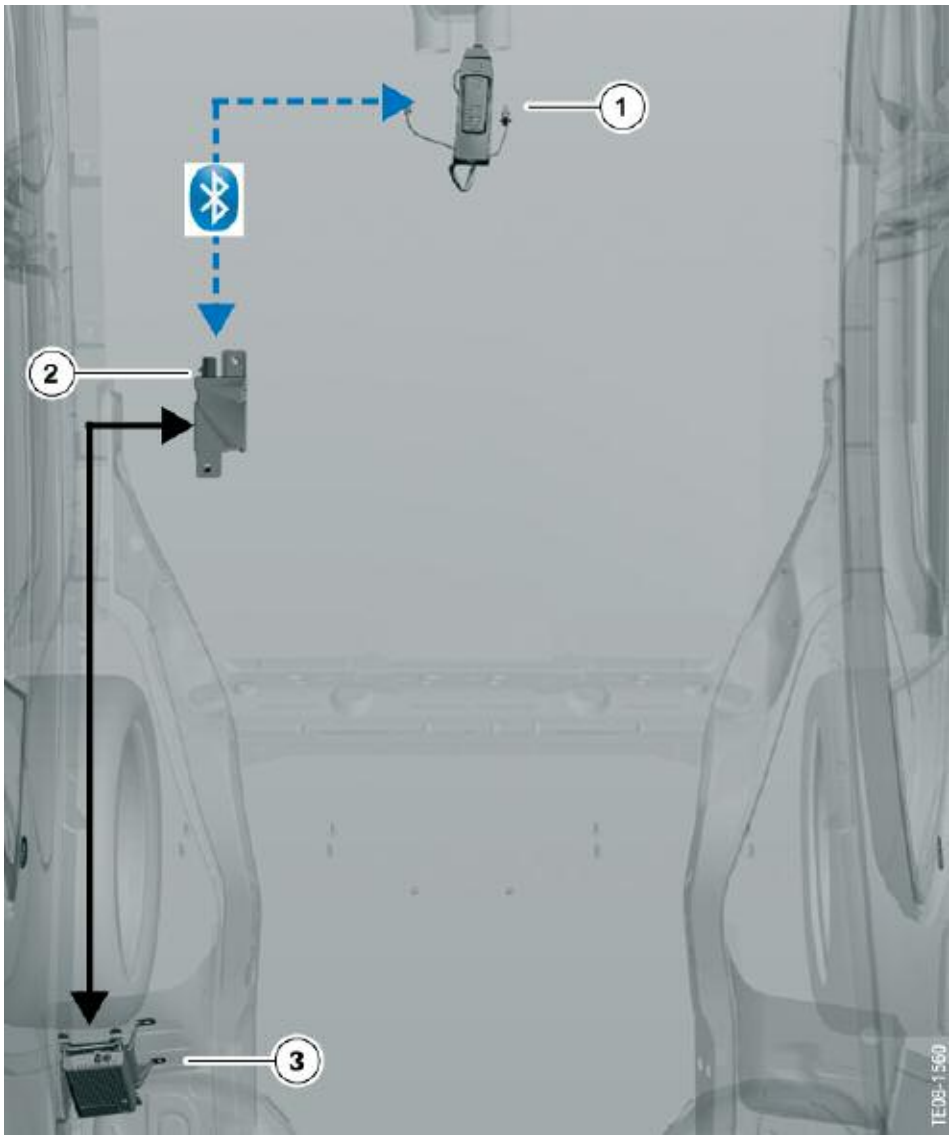
All dialled numbers and missed calls in the car are listed clearly in the call register under “Dialled numbers” and “Missed calls”. The entries are sorted by date and time.

The driver uses the controls on the multifunction steering wheel to select from the dialled numbers list shown in the instrument panel.

Displaying showing a missed call

The graphic below shows Bluetooth connections between the Mobile phone in the center console and TCU are through the Bluetooth antenna.

Bluetooth connections in the vehicle



Index	Explanation	Index	Explanation
1	Front center console with mobile phone	3	Telematics Control Unit (TCU)
2	Bluetooth antenna		

Note: Although up to four phone may be paired to the vehicle, only one device can be active at any given time.

BMW Services

These services are offered to customers under the generic term “BMW Assist”.

From the customer’s point of view, “BMW Assist” is a convenient service guaranteeing more safety, more mobility and comprehensive information.

In an emergency or a breakdown, “BMW Assist” helps save crucial time in might well be a life-or-death situation, and it also helps the driver in day-to-day situations, such as searching for a parking space in congested urban areas.

“BMW Assist” is split into two services:

- Safety Plan (Standard)
- Convenience Plan (Optional)

Safety Plan

- Automatic Collision Notification:
  Is an emergency calling Service which, in the event of an accident, forwards the relevant GPS data to a rescue-services command post to ensure optimum deployment of rescue and recovery facilities. If airbags deploy this is fully automatic.
- Emergency Request (SOS):
  Pushing the SOS button in an emergency will transmit the vehicle location and information. A response specialist will contact the driver to aid in the situation.
- Enhanced Roadside Assistance:
  Is used when stranded on the road, to request a tow truck, fuel or a flat tire replacement.
- Stolen Vehicle Recovery:
  This service makes it simple to track a stolen vehicle via GPS. The GPS data are forwarded to the police.
- Remote Door Unlock:
  New service enabling the customer to have the doors of the car opened by remote control in the event of the identification transmitter being locked inside.
- TeleService:
  With TeleService the vehicle’s operating status and upcoming service needs are transmitted to the BMW center automatically or manually with the push of the “Service Request” menu option in the iDrive display.

- Customer Relations:
  This service can be used to request day-to-day information about the locality. Pressing the SOS button or the Customer Relations menu option will contact the Customer Relations staff.
- My Info:
  This enables the customer search Google Maps from a home PC and to send business listings, street addresses and phone numbers as well as messages to the vehicle. This information appears on the “My Info” menu and can be exported to the Navigation system as a new destination.

Convenience Plan (Optional)

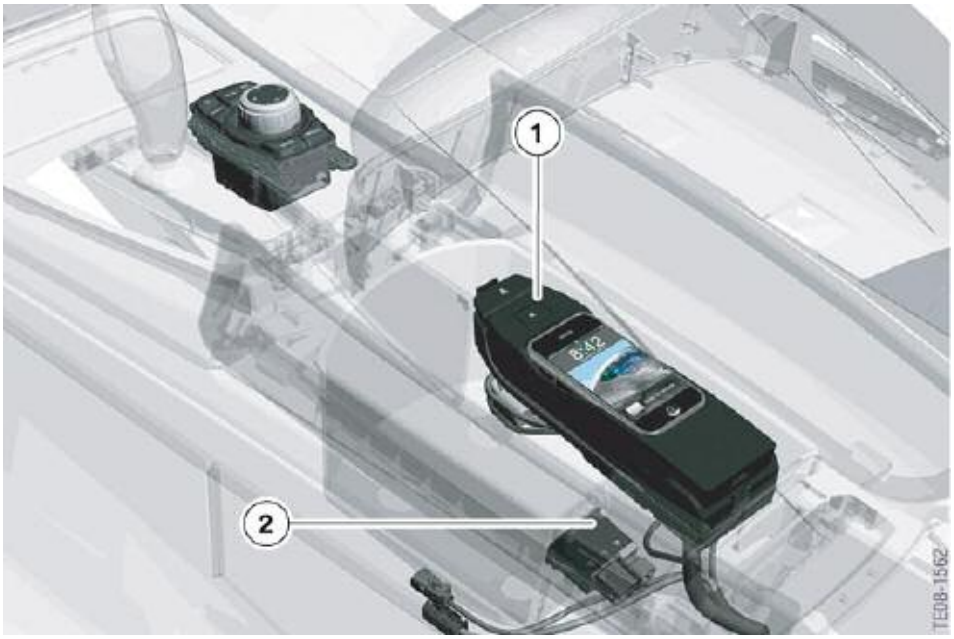
- Critical Calling:
  This service allows up to four operator assisted calls per year just by pressing the SOS button. This is useful when the customer is with out a working mobile phone and need the assistance of a relative or colleague.
- Concierge:
  This service accessed through the “Concierge” option in the iDrive. It can be used to request day-today information about the locality, for example locations of restaurants, hotels (including reservation service), addresses, etc.
- Directions:
  To receive the shortest route or directions to the nearest gas station, ATM or a point of interest. Select “Concierge” from the iDrive menu or press the SOS button to speak to a response specialist
- Traffic Information:
  To receive up to date traffic reports along a traveled route, select “Concierge” from the iDrive menu or press the SOS button to speak to a response specialist.
- Weather Information:
  Select “Concierge” from the iDrive menu or press the SOS button to speak to a response specialist to receive the latest weather forecast, locally or at your destination.
- BMW Search:
  Available only with the Navigation option, BMW Search allows online access to the Google Maps database from the iDrive. The desired business information (address and phone number) can then be sent to the navigation system or to the phone system.

Smartphone Integration

The “Smartphone Integration” optional extra enables the customer to play back audio files saved on a mobile phone. The option adds a USB port to the telephone base plate snap in cradle. The mobile phone can be connected to the car with a compatible snap-in cradle adapter, with all telephone functions remaining fully available.

Simultaneous use of the mobile phone in the snap-in adapter and the USB port in the center console is possible. However, the audio files on the mobile phone cannot be accessed while a device is connected to the USB port.

Smartphone Integrated audio player function



Index	Explanation	Index	Explanation
1	Base plate with snap-in adapter and mobile phone	2	USB audio interface

The audio files can be selected in the 'CD/Multimedia' menu, where they are in the "External devices" submenu.

Smartphone Integration is offered only in combination with "USB audio interface" option and is currently only available with the iPhone.

Note: For detailed information about these systems, see the F01/F02 “Audio Systems” training material.

System Components

Components and Installation Locations

The following control units act as the interface between the mobile phone and the vehicle:

- ULF-SBX-High Interface box (Only for USB/Audio Interface)
- Telematics Control Unit (TCU)

The preconditions under which TCU or TCU and interface box together are installed are listed below:

Optional extra	Telephone control units installed
Option 639 "BMW Assist"	TCU
Option 639 "BMW Assist" + option 6FL "USB audio interface"	TCU ULF-SBX-H
Option 639 "BMW Assist" + option 6NF "Smartphone Integration"+ option 6FL "USB audio interface"	TCU, ULF-SBX-H base plate/cradle adapter

Note: Although both the ULF-SBX-H and the TCU may be fitted in a vehicle at the same time, the TCU always provides the telephone functions. The ULF-SBX High is only installed to provide the "USB audio interface".

ULF-SBX-H Interface Box

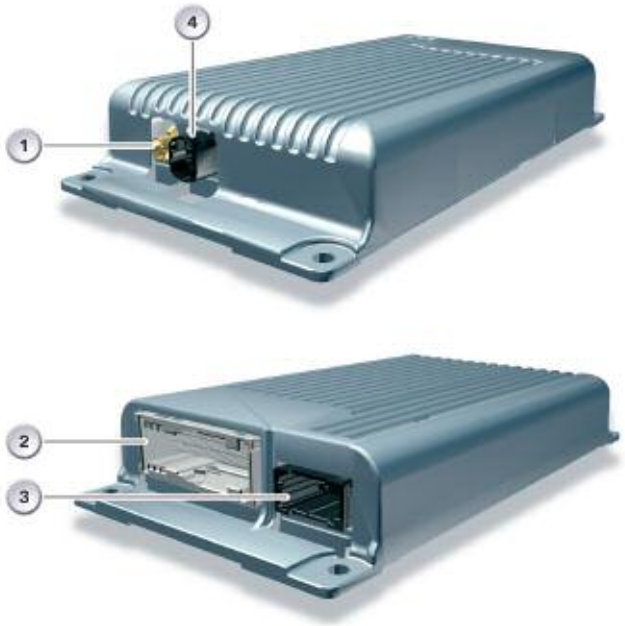
The ULF-SBX High interface box has been used in BMW vehicles since the introduction of E93.

The (SBX High) interface box is capable of performing the following tasks:

- USB connection for USB/audio interface
- Bluetooth interface with hands-free mode and phone book
- Basic voice input and activation system through the telephone

Interface box and interface box 'High' support various techniques for downloading phone book entries from Bluetooth-enabled mobile phones. One of these techniques is Phonebook Access Profile (PBAP). The number of compatible mobile phones increases with the support of several downloading techniques. In addition, it is possible to download all the phone numbers attached to a name entry.

Although both the ULF-SBX-H and the TCU may be fitted in a vehicle at the same time, the TCU always provides the telephone functions. In this case the telephone functions are not available in the ULF-SBX High and the module is only installed to provide the "USB audio interface" option.

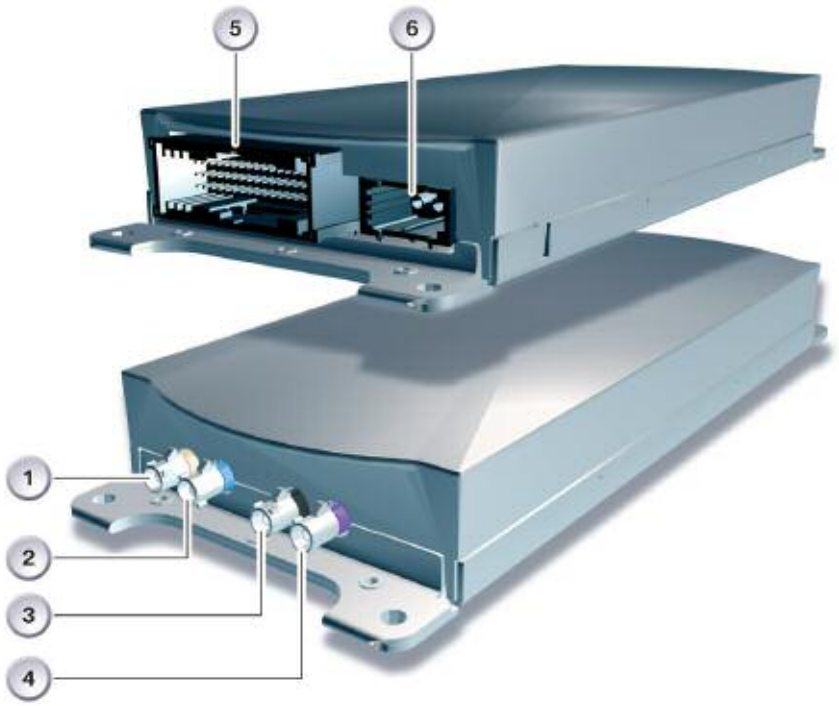


Index	Explanation	Index	Explanation
1	Bluetooth connection (Not for US)	3	MOST connection
2	54-pin connector	4	USB connection

Telematics Control Unit (TCU)

The Telematics Control Unit used on the F01/F02 evolved from the E70 TCU.

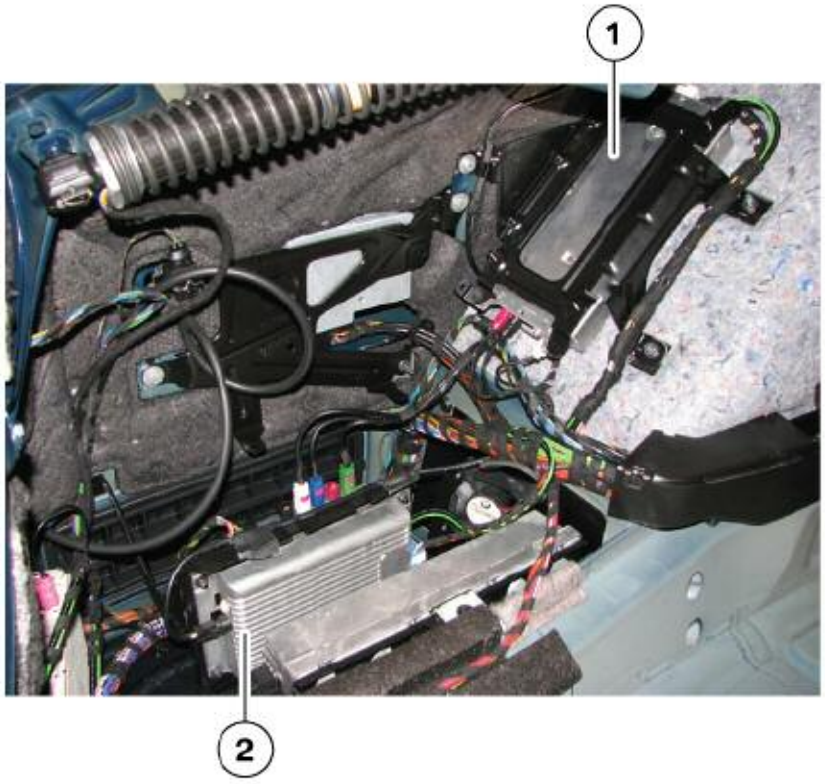
The TCU always incorporates a GPS receiver and a GPS connection. In the F01/F02, however, this connection is not used because the GPS signals are processed by the CIC.



Index	Explanation	Index	Explanation
1	Bluetooth antenna connection, transparent connector	4	Emergency antenna connection purple connector
2	GPS antenna connection blue connector	5	54-pin connector
3	Roof antenna connection black connector	6	MOST connection

Location of ULF-SBX/ULF-SBX-H and TCU

Interface box or interface box 'High' and the TCU are seated in the luggage compartment on the left.

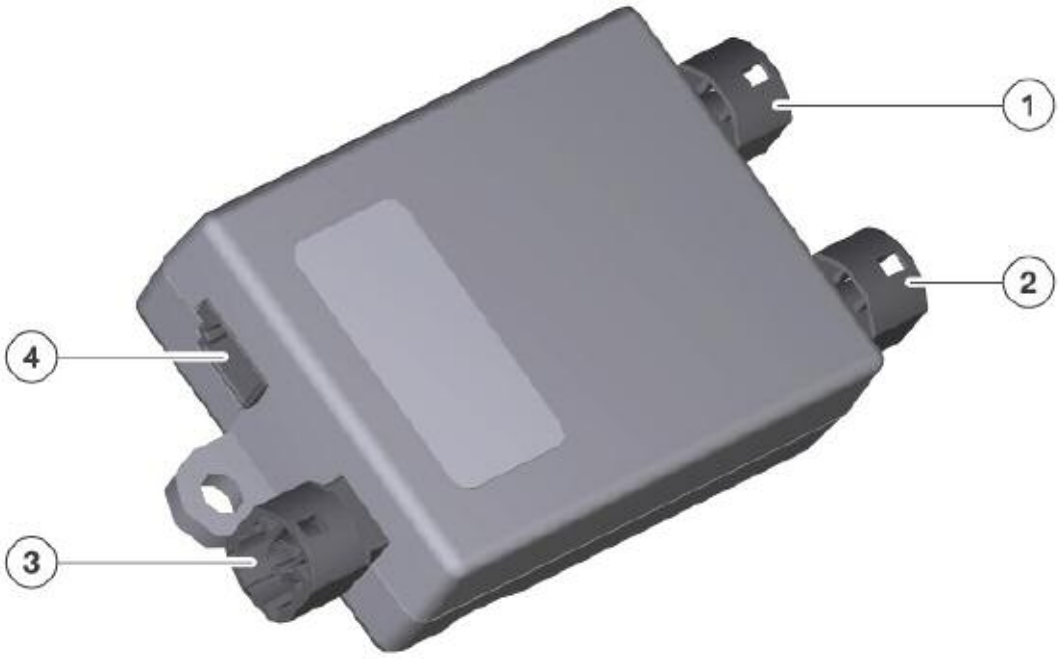


Index	Explanation
1	Telematics control unit (TCU)
2	Interface box (ULF-SBX-High)

USB Hub

The USB hub is for connecting multiple USB interfaces to the interface box 'High'. The USB hub incorporates an active USB signal amplifier and has two USB inputs and one USB output.

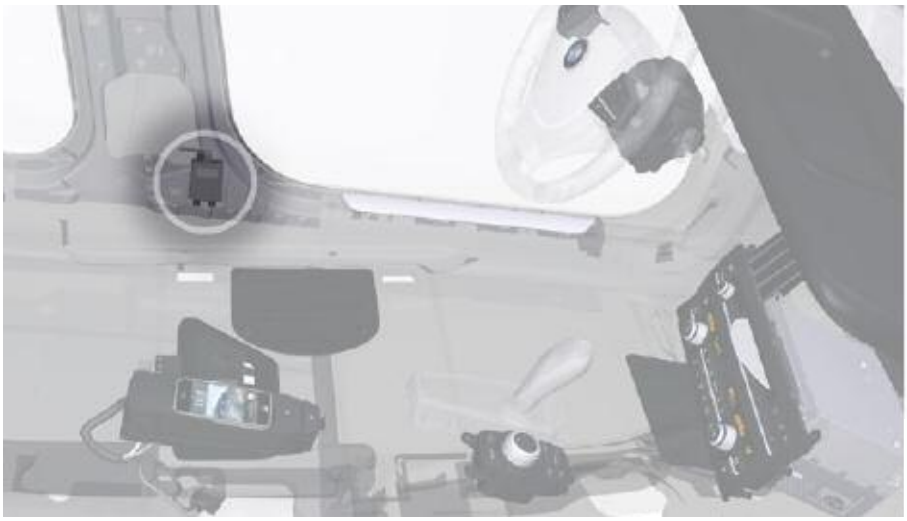
The USB hub is installed only if the car is ordered with the "Smartphone Integration".



Index	Explanation	Index	Explanation
1	USB connection to AUX-in connection (blue connector)	3	USB connection to (ULF-SBX-High) interface box (black connector)
2	USB connection for base plate of the Smartphone audio link (neutral color connector)	4	Power supply for the USB hub (black connector)

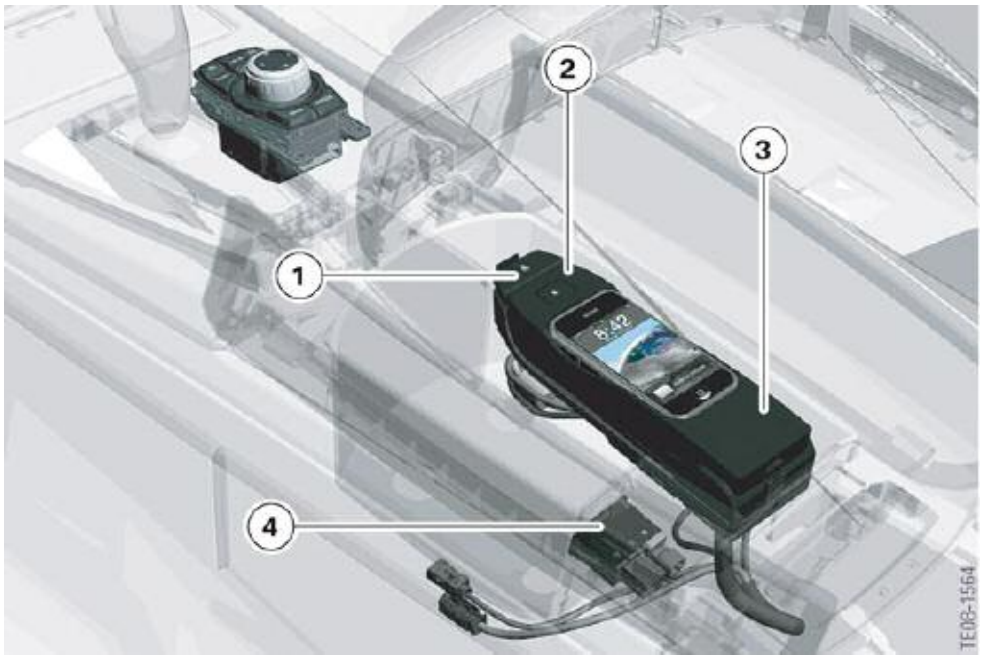
Location of USB Hub

The USB hub is installed at the left B pillar. This applies to both RHD and LHD cars.



USB Base Plate/snap-in Adapter

The base plate with snap-in adapter and USB AUX-IN connection are installed in the front center console, underneath the armrest.



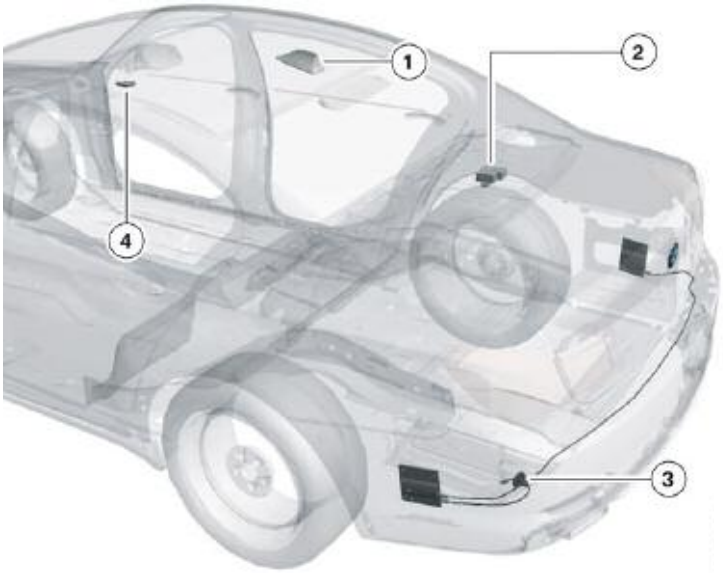
Index	Explanation	Index	Explanation
1	Button for removal of the snap-in adapter	3	Snap-in adapter
2	Button for removal of the mobile phone	4	USB connection and AUX-IN

Telephone Antenna System

In order to meet the high quality requirements that apply to the telephone system of the F01/ F02, several antennas are installed in the vehicle, with the configuration depending on equipment trim level.

The following antennas are used for this purpose:

- Roof antenna
- Bluetooth antenna
- Emergency-call GSM antenna



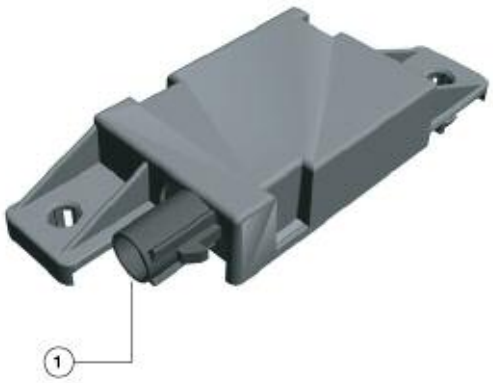
Index	Explanation	Index	Explanation
1	Roof Antenna	3	Not for US
2	Emergency-call GSM (back-up) antenna	4	Bluetooth antenna

Emergency-call GSM antenna

The emergency-call GSM antenna is needed for the ASSIST service so it is installed in combination with the Telematics Control Unit. “Preparation for mobile phone with Bluetooth interface”.

Bluetooth antenna

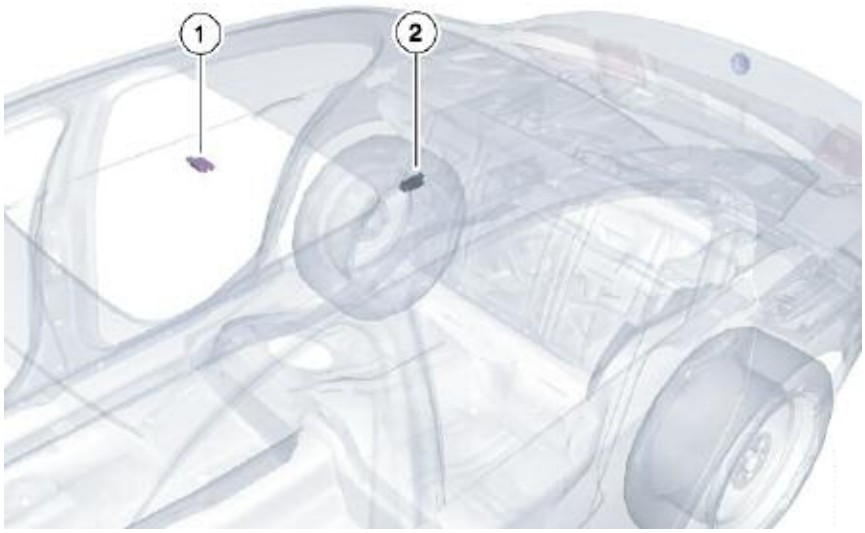
The Bluetooth antenna is a newly designed component. It is smaller than the predecessor model, which means that it can be accommodated in the roof.



Index	Explanation
1	Connection to the TCU

There are two different locations for the Bluetooth antenna. The position actually occupied depends on whether or not the car is fitted with the slide/tilt sunroof option.

Location of the Bluetooth Antenna



Index	Explanation	Index	Explanation
1	Bluetooth antenna without slide/tilt sunroof (in middle of roof)	2	Bluetooth antenna with slide/tilt sunroof (on B pillar)

Roof antenna

The roof antenna is in the middle of the roof, toward the trailing edge. Depending on the equipment installed, the car might have two GSM antennas (roof 1 and roof 2). Both are inside the housing of the roof antenna.

Overview of the GSM antennas installed and relationship to optional extras:

Optional extra	GSM 1 (roof antenna)	GSM 2 (roof antenna)	Emergency-call GSM antenna	Bumper antenna
BMW Assist	X	X	X	O