

Multi-audio system controller (M-ASK)

E60



Introduction

The multi-audio system controller M-ASK is fitted with the BMW Business Radio with CD drive as standard in the E60. The menus are displayed on the 6.5 inch Central Information Display CID in colour. In conjunction with option 663 "BMW Professional Radio" or option 606 "Business Radio Navigation system" the following additional functions have been added to the M-ASK

- Selection of the strongest FM station
- Traffic message channel TMC
- Playback of MP3 files
- Navigation with DVD (only with option 606)

Several electronic control units and the drive are integrated in one casing. [system overview ...]

New innovations of the M-ASK:

The M-ASK is built on a modular design: the functional ranges are combined in "virtual" control units in the M-ASK. "Virtual" means that although the individual control units are combined in the M-ASK, they operate as "separate" control units (e.g. when programming). The following "virtual" control units are differentiated as follows:

- **Multi-audio system controller (M-ASK)**

The M-ASK has the following functions:

- Aerial tuner for radio reception with the One Tuner Radio (standard equipment)
- Aerial tuner for radio reception with the Two Tuner Radio and for playback of MP3 files (with option 663)

- Navigation (with option 606).
 - Audio function for generating acoustic signals, for setting tones, for fading the audio source in and out and distribution to the loudspeakers
- **M-ASK user interface (M-ASK-BO)**
The M-ASK-BO control unit controls the graphical user interface of the M-ASK.
 - **M-ASK Gateway (M-ASK-GW)**
The M-ASK-GW control unit has the following functions:
 - Interfaces between the MOST bus and K-CAN
 - Control and monitoring of the MOST bus
 - **M-ASK navigation system (M-ASK-NAV)**
The control unit M-ASK-NAV controls the navigation system (with option 606).
 - **M-ASK voice recognition system (M-ASK-S)**
The M-ASK-S controls the output of different voice packages for foreign languages.

Brief description of components

The M-ASK obtains signals from the following components:

- **Controller**
The controller delivers the signals for selecting the menus and submenus. The submenus are selected by turning and/or pushing the controller.
- **Telephone**
The telephone delivers the signal for the radio mute circuit and the low-frequency output signal to transmit the call from the loudspeakers. The two signals are transmitted via the MOST bus.
- **CD changer**
The CD changer (option 672 "6 disc CD changer in the glove box") delivers the low-frequency output signals for actuation of the output stages.
- **Aerials**
The aerials in the rear window deliver the signals for radio reception and for remote control operation.
[more ...]
- **Telephone and GPS aerial**
The telephone and GPS aerial is built into the roof-mounted aerial. The GPS aerial receives signals from GPS satellites. The signals to the GPS receiver and the navigation system are transmitted via the aerial cable to other connections.
- **Dynamic stability control (DSC)**
The DSC control unit calculates the data for distance, speed and direction, e.g. for the navigation system.
- **DVD for navigation**
Data for route planning, navigation and Points of Interest (POIs) is found on the DVD. POIs are places of significance for tourists such as hotels, petrol stations, restaurants, theatres, etc.
- **Wheel-speed sensors**
The wheel-speed sensors deliver the signals for the DSC control unit for calculating distance and speed and direction recognition (forwards and backwards).
- **Steering column switch cluster (SZL)**
The SZL delivers the signal for the navigation steering angle. In the SZL there are buttons for volume and station selection as well as buttons which can be freely assigned, e.g. for navigation instructions.

The M-ASK consists of the following components:

- **1 DIN radio casing**

The M-ASK is fitted in a 1 DIN radio casing. [more ...]

- **Drive**

Depending on the design, the M-ASK is equipped with the following drives:

- CD drive for playback of audio CDs.
- CD-ROM drive for playback of audio CDs or MP3 files.
- DVD drive for loading data for navigation and for playback of audio CDs or MP3 files.

- **Aerial tuner**

Depending on the design, the M-ASK is equipped with the following tuners:

- One tuner radio for reception of VHF, MW and LW radio frequencies.
- Two Tuner Radio for reception of the strongest FM station. The Traffic message channel TMC receives information, which is used by the navigation system to avoid traffic jams (with option 606).

[more ...]

- **M-ASK motherboard M-ASK-H**

The M-ASK motherboard is connected to the processor board. There are memories and processors on both boards which function as individual control units. Flash coding can be used to program the control units.

[more ...]

- **Aerial diversity**

The aerial diversity contains the aerial amplifier and switches over the aerials to FM. [more ...]

- **Electric fan**

An electric fan for cooling the audio output stages and the processors can be found on the back of the 1 DIN radio casing.

The M-ASK outputs the following signals:

- **Instrument cluster**

The instrument cluster contains an LC display with variable indicator lamps to display Check Control messages. Detailed texts are displayed as check control messages in the status bar in the Central Information Display CID via the M-ASK. The instrument cluster discharges the functions of priority control for the check-control messages.

- **Central Information Display (CID)**

The following menus can be called up on the CID:

- On-board info (with option 606 is displayed as menu navigation)
- Entertainment
- Communication
- Climate
- Settings

- **Audio operation**

The following signals can be output via the loudspeakers:

- Audio signals
- Parking-aid (Park Distance Control PDC)
- Audible notes (jingles) e.g. gongs during the Check Control messages

System functions

The M-ASK includes the following functions:

- Aerial tuner
 - One Tuner Radio
 - Two Tuner Radio (only with option 663 or option 606)

- Multi-audio system controller (M-ASK)
 - System master
 - Power master
 - Network master
 - Audio master
 - Connection master

- M-ASK user interface (M-ASK-BO)
- M-ASK Gateway (M-ASK-GW)
- M-ASK navigation system (M-ASK-NAV)
 - Loading Almanac data
 - Navigation with DVD

Aerial tuner

- One Tuner Radio

The One Tuner Radio is fitted as standard in the M-ASK. The tuner receives the radio frequencies FM (VHF) and AM (MW and LW). The radio waves from the radio station are received by the aerials in the rear window. The received high-frequency signal is led by the aerial diversity (on the rear window) via a coaxial line to the aerial input on the One Tuner Radio.

- Two Tuner Radio

The Two Tuner Radio is available as option 663 or option 606 in the M-ASK. While tuner 1 receives the required radio station, tuner 2 works in the background. Tuner 2 searches the station frequencies for additional signals. If a radio station on another frequency sends a stronger signal, tuner 2 automatically switches to this alternative frequency.

Tuner 2 receives additional information from the Traffic Message Channel (TMC). The TMC information is used by the navigation system (option 606) to avoid traffic jams.

- Radio Data System (RDS)

Both aerial tuners receive information from the Radio Data System (RDS) which is emitted with the signal from the FM station. If an AM station is set, RDS traffic information announcements can still be received from an FM station. If a traffic information announcement is received, the AM station is hidden and the message is outputted over the loudspeakers. All the radio stations and traffic information stations which can be received are contained in a list of RDS stations.

Multi-audio system controller

- System master

The system master connects the individual control units in the M-ASK.

- Power master

The Power master initialises the network and switches the MOST bus on and off (wake-up, sleep mode).

- Network master

The network master controls and monitors the MOST bus. Each time the network is started, the exact system configuration is recorded and compared with a stored target configuration. If systems do not work

correctly, these are reset and separated from the MOST bus. Any operating fault of the network or any deviation from the target configuration is stored in a fault memory for the MOST bus.

- Audio master

The Audio master collects all the audio signals in the vehicle, processes the audio signals and outputs them over the loudspeakers. The Audio master also produces additional audible signals for warnings and Park Distance Control (PDC). By mixing or fading in and out, a "softer" audible change is obtained between the signal sources.

- Connection master

The Connection master distributes the signals of the audio sources and the audible signals to the loudspeakers. The signals are transmitted to the loudspeakers in the following way:

- Front left and right (audible signals, telephone, gong, messages from the navigation system, traffic information announcements)
- Front left and right, rear left and right (signals for Park Distance Control PDC parking-aid)
- All loudspeakers (all sources in the "Entertainment" menu)

M-ASK user interface

The M-ASK control unit user interface processes signals from the controller (selection from the menus and submenus).

In addition the M-ASK user interface controls the displays on the Central Information Display CID. The data in the graphics processor is immediately transmitted to the CID as Low Voltage Differential Signalling LVDS digital signals.

M-ASK gateway

The M-ASK Gateway control unit forms the interfaces for data exchange between the MOST bus and the K-CAN. The two bus systems transfer data formats at different data transfer rates and in different formats. The data for each bus is configured in the M-ASK Gateway to communicate with all systems.

M-ASK navigation system

- Navigation with DVD

In conjunction with option 606, the navigation system is integrated in the M-ASK. The navigation system has the following new features:

- Data for navigation on DVD
- Reading and storing the data for navigation in the RAM (Random Access Memory)
- Complete representation of Europe
- Manual alteration of the route calculated by the navigation system by route criteria (fastest route, motorway) and by the Via function.
- Dynamic route planning by using TMC information (avoiding traffic jams)
- List with stored routes (already driven or newly programmed routes)
- Exact calculation of the arrival time. By integration of the various types of streets (motorway, A roads, B roads) and the average speed of the vehicle, the arrival time can be calculated exactly.
- Better route guidance. When changing from one motorway or A road onto another, the road number is announced.

- GPS satellites

GPS satellites move around the earth in 6 nearly circular orbits. There are 4 GPS satellites per orbit, therefore there is a maximum number of 24 GPS satellites. Before the navigation system can process the reference signal from the GPS satellites (minimum 4 GPS satellites), the Almanac data must first be loaded.

- Loading Almanac data

The Almanac data delivers the following data and information to the navigation system:

- UTC (Universal Time Coordinate)
- Date
- Location of the GPS satellites
- Orbits
- Operational capacity of the GPS satellites

Once the navigation system has been switched on for the first time (terminal R ON) the GPS satellite Almanac data is received and loaded. The loading time depends on the number of "visible" GPS satellites and can take up to 20 minutes during the learning phase. Otherwise the Almanac data is permanently stored in the system.

Note: After longer periods of not being used (longer than 1 week) it is possible that navigation will be inaccurate at first.

The Almanac data must be reloaded if the vehicle is transported over a distance of more than 300 km from the manufacturing point, e.g. after:

- Transportation from the Dingolfing works.
- Return transport from abroad in the case of damage.
- Placing the vehicle on a train.

During the learning phase, navigation is possible when the vehicle is stationary or during a journey. Navigation is highly inaccurate at first. After some time and longer journeys, the end of the learning phase and optimum accuracy of navigation is achieved.

When the Almanac data is loaded, the navigation system is ready for operation 10 to 15 seconds after starting each time.

Operation

The M-ASK is operated using 1 rotary push button and 2 buttons

- Rotary push button for switching on and off and for adjusting the volume.
- Search rocker switch to select the radio station and to select tracks on the audio CD and the CD-ROM (MP3 files). With option 655 "BMW Satellite radio" the stations are selected using the search rocker switch.
- Eject button for removing the CD, CD-ROM or DVD from the drive.

Operation of the M-ASK and its functions occurs almost without exception via the controller in the centre console or via the multifunctional steering wheel.

The menus are selected in the Central Information Display CID using the controller. The selector buttons for the submenus are found in the menus. After confirming (by pressing on the controller) the selected submenu is called up.

The following 5 menus can be called up:

- "Communication" menu (push controller forwards)
- "Navigation" menu (push the controller to the right)
- "Entertainment" menu (push the controller to the rear)
- "Climate" menu (push the controller to the left)
- "Settings" menu (press the controller)

"Communication" menu

With option 638 "Professional car phone", the network connection is established after the SIM card is inserted

and the PIN (Personal Identification number) is entered. If option 644 "Universal charging and hands-free device" is fitted, the PIN is entered on the mobile phone. The following functions can be selected in the "Communication" menu:

- Telephone
- BMW ASSIST

"Navigation" menu

The following functions can be selected in the "Navigation" menu:

- Navigation
- On-board info
- Address book
- Traffic information

"Entertainment" menu

The following functions can be selected in the "Entertainment" menu :

- FM
- AM
- CD

"Climate" menu

The following functions can be selected in the "Climate" menu:

- Centre vent (if the integrated automatic heating / air conditioning system is fitted in the basic design)
- Heat distribution, seat
- Auxiliary heating/ventilation (with option 536 "Auxiliary heating with remote control")

"Settings" menu

The following functions can be selected in the "Settings" menu:

- Screen OFF
- Display settings
- Entertainment settings
- Traffic information
- Vehicle settings
- Service
- Communication settings

Notes for service staff

Service staff should note the following points:

- General information: [more ...]
- Diagnosis: ---
- Encoding/programming: ---
- Car and Key Memory: [more ...]

US national version

In the US version there is the One Tuner Radio with FM and AM radio frequencies.
The SDARS aerial or the telephone and GPS aerial can be fitted in the US version. The SDARS aerial consists of the aerials for:

- Telephone 1
- Telephone 2
- Terrestrial reception
- Satellite reception
- GPS

The telephone and GPS aerial consists of the aerials for:

- Telephone 1
- Telephone 2
- GPS

Option 606 "Business radio navigation system" is not available in the US version.

Japanese national version

There is the Two Tuner Radio with FM, AM and Traffic (2 channels) radio frequencies in the Japan version. The Japan version cannot be coded.

Option 606 "Business radio navigation system" is not available in the Japan version.

Subject to alteration due to misprints, errors and technical modifications.