

## Satellite Digital Audio Radio Service

E60, E61, E63, E64, E90, E91



### Introduction

In the USA, BMW supports the digital radio reception system SDARS (Satellite Digital Audio Radio Service). The following providers offer SDARS:

- "Sirius Satellite Radio Inc."
- "XM Satellite Radio Inc."

BMW uses the SDARS system of "Sirius Satellite Radio Inc.". [System overview ...]

The installation of special equipment creates the prerequisites in the car for using SDARS. These items of special equipment include the hardware and software for digital radio reception.

- Option 655 "BMW satellite tuner" together with
- Option 645 "Radio Control US"

### New features:

- Digital radio reception from satellites and stationary antennae for terrestrial reception. [more ...]
- Radio text: Information concerning radio programs are displayed.

### Benefits:

- Low degree of interference from outside sources (no noise) because signals are transmitted digitally.
- Reception of the national radio station is possible over the whole of mainland USA.
- Sound quality is nearly as good as from Compact Disk or MiniDisk.
- Radio program not interrupted for commercials.

- At present, some 100 radio programs can be received digitally.
- Approximately 20 current affairs and "talk" radio programs can be received digitally.
- Dividing the stations into groups allows a particular musical style or information station to be found quickly.
  - The selection "Preset" creates and stores a list of favourite stations.
- Additional information is available with radio text: Station name, artist, song title.

## Brief description of components

The components involved can be split into the following functional areas:

- Master control unit and antennas
- Central display and control
- Audio

### Master control unit and antennas

- **Satellite tuner: Tuner for Satellite Digital Audio Radio Service**

The satellite tuner converts the digital signals from the SDARS antennas into optical signals (light signals). The satellite tuner transmits these optical signals onto the MOST bus (Media-Oriented System Transport).

[more ...]

- **SDARS antennas**

High-frequency signals (digital signals) from satellites and stationary antennas for terrestrial reception are picked up by 2 SDARS antennas on the vehicle. Separate antenna cables route the signals to the satellite tuner.

SDARS antennas:

- 1 SDARS antenna for terrestrial reception from stationary antennas
- 1 SDARS antenna for satellite reception

[more ...]

### Central display and operation

- **RAD2: BMW "Professional" radio**

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The BMW "Professional" radio is an item of special equipment.

The radio serves as the gateway (= data interface) between the MOST bus and the K-CAN. SDARS is controlled on the radio.

SDARS is only available in conjunction with the following equipment:

- BMW "Professional" radio (RAD2)
- Car Communication Computer (CCC)

- **M-ASK: Multi-audio system controller**

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M-ASK is an item of special equipment.

M-ASK is the interface for operating the satellite tuner. The radio stations and other SDARS information are displayed on the Central Information Display (CID).

- **CCC: Car Communication Computer**

The CCC is installed in connection with one of the following options:

- Navigation system "Professional"
- "Voice recognition system"
- "TV function" (not US version)

On the CCC, several control units and the CD-ROM/MD/DVD drives are integrated into a single housing. The CCC is used to control all information and communication systems, including SDARS.

- **CID: Central Information Display**  
The menus for the M-ASK and CCC are displayed on the CID.
- **CON: Controller**  
The menus on the CID are selected with the controller.

## Audio

- **AMP: TOP-HiFi amplifier (optional)**  
Option 677 "HiFi system Professional LOGIC7" guarantees the best possible interior sound. The TOP-HiFi amplifier is connected to the MOST-bus.
- **Loudspeakers**  
Tweeters, mid-range loudspeakers and woofers are arranged to give the best possible interior sound.

## System functions

The following SDARS system functions are described:

- Digital radio reception
- Optimised radio reception
- Wide selection of radio programs, grouped according to musical style

### Digital radio reception

The "Sirius Satellite Radio Inc." radio station records the radio programs in digital form. Parabolic antennae transmit the signals to the 3 Sirius satellites.

The digital signals are transmitted back to Earth as follows:

- 2 satellites transmit to all parts of the Earth. The signals are received by the car's SDARS antenna for satellite reception.
- 1 satellite transmits the digital signals to stationary antennae for terrestrial reception. The antennas transmit digital signals in all directions. The vehicle's SDARS antenna for terrestrial reception receives these digital signals.

Different reception paths for digital signals ensure that reception is good even if there is no direct visual contact between the vehicle and the Sirius satellites.

If there is not direct visual contact, the signal will be received via the stationary antennae for terrestrial reception.

Satellite reception can be prevented by topographical and constructional features (e.g. valleys, skyscrapers, tunnels).

Very good reception across the entire region covered is achieved through the following measures:

- Satellites positioned in a high elliptical orbit
- Use of additional stationary antennae for terrestrial reception

### Optimised radio reception

The quality of the signal is further improved by a special process for evaluating the signal.

### - Wide selection of radio programs, grouped according to musical style

- A wide selection of musical styles can be grouped together in the following categories:
  - "Rock"
  - "Hip-Hop"
  - "Country"
  - "Dance"
  - "Jazz/Standards"
  - "Popular"
  - "Rhythm and Blues"

- "Variety"
- "Classical"
- "News"
- "Sports"
- "Entertainment"

## Operation

*Note: "Sirius Satellite Radio Inc." may only be used with a valid contractual agreement.*

- A contract must be signed with the company before the "Sirius Satellite Radio Inc." service can be used.
- "Sirius Satellite Radio Inc." may block the service through the satellite contact: e.g. if payment obligations are not met.

*Note: SDARS must be enabled.*

After enabling, perform initial operation of SDARS as described in the operating instructions. How to use the satellite tuner is described in detail in the operating instructions.

Depending on the vehicle's equipment, the SDARS will be operated as follows:

- on the BMW "Professional" radio (RAD2)
- on the M-ASK or CCC: with the Central Information Display (CID) and Controller (CON)
- with the multifunction steering wheel (buttons for station-search: upwards/downwards)
- with voice input (only if Car Communication Computer (CCC) is fitted)
- with buttons in the centre console (selection of radio station: upwards/downwards)

## Notes for service staff

Service staff should note the following points:

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

E90, E91 - Almost all Car & Key Memory functions are programmed inside the vehicle itself. (See "Personal Profile" in the Owner's Handbook: Individual settings for a maximum of 3 remote control units via the display in the instrument cluster or via the Central Information Display)

Subject to change.