

Audio systems: E87, E90, E91, E92

The audio systems are divided into 3 groups: .

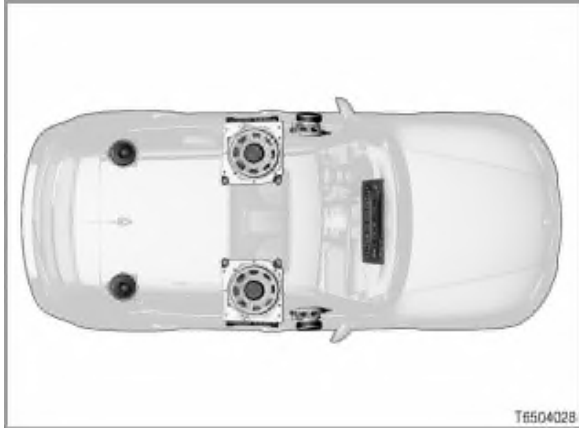
- Stereo system
- HiFi system
- Top-HiFi system

The audio systems differ in the number of loudspeakers, the acoustic pressure that can be generated and by enhanced system linearity.

The bass loudspeakers are located under the front seats.

The Top-HiFi system has an integrated 7-channel graphic equaliser and Surround Sound (Logic7).

Stereo system



4 channels
6 loudspeakers

- 2 mid-range loudspeakers, front 100 mm
- 2 mid-range loudspeakers, rear, 100 mm
- 2 bass loudspeakers, 160 mm

Bandwidth: 50 Hz to 14,000 Hz

Max. acoustic pressure 98 dB

Amplifier power: depends on radio,

radio: 4 x 15 W (4 Ω)

M-ASK: 4 x 40 W (2 Ω)

CCC: 4 x 25 W (2 Ω)

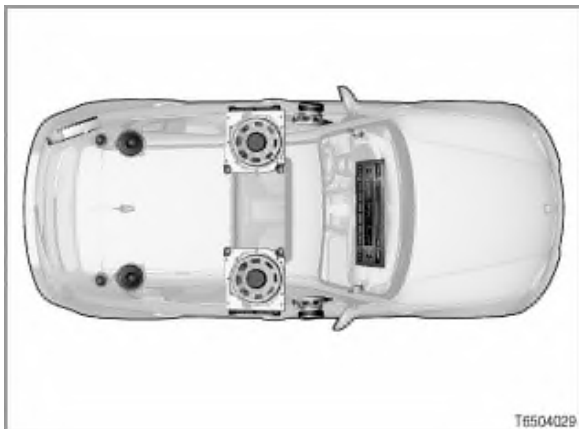
With the stereo system, the loudspeakers are actuated directly by the audio output stages in the radio or navigation system, without additional amplifiers. The stereo loudspeaker system is fitted as standard, provided a radio or navigation system is fitted.

The mid-range loudspeakers in the front doors and the bass loudspeakers are controlled on each side by a common audio output stage in the radio or navigation system. The loudspeaker wire is split in the vehicle's A-pillar. From here, the signal is fed separately to the loudspeakers. In order to protect the radio's audio output stages from overloading through the loudspeakers, which are connected in parallel, a capacitor is connected in series to the front mid-range loudspeakers.

The capacitor acts as resistance to the alternating current, and changes its value according to the frequency. The lower the frequency, the greater the resistance. This means that the total resistance (impedance) of the bass loudspeakers, capacitor and mid-range loudspeakers is in an uncritical range for the audio output stage.

The audio output stages of the "Business" (M-ASK) and "Professional" (CCC) navigation systems can control two loudspeakers connected in parallel. The capacitor for adjusting resistance is therefore not necessary.

HiFi-System (option 676)



6 channels
10 loudspeakers

- 2 treble loudspeakers, front 26 mm
- 2 mid-range loudspeakers, front 100 mm
- 2 bass loudspeakers, 217 mm
- 2 mid-range loudspeakers, rear, 100 mm
- 2 treble loudspeakers, rear 26 mm

Bandwidth: 40 Hz to 20.000 Hz

Max. acoustic pressure: 104 dB

Amplifier power:

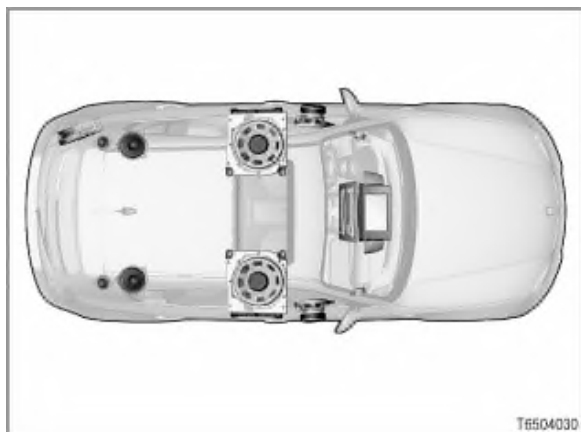
2 x 40 W (2 Ω) Bass

4 x 25 W (2 Ω)

The analogue 6-channel HiFi amplifier can be operated with every radio or navigation system offered. The HiFi amplifier is located in the rear left of the luggage compartment behind the luggage compartment trim. The audio signals are transferred to the HiFi amplifier in analogue form. The HiFi amplifier amplifies the signals and sends them to the loudspeakers. In total, 10 loudspeakers can be controlled via 6 audio channels.

The treble loudspeakers and mid-range loudspeakers are connected in parallel. They are each supplied by the four amplifier output stages via a common wire. At the mid-range loudspeaker there is a diplexer (high pass) that decouples the signal for the treble loudspeaker. The diplexer takes the form of a capacitor. With a higher frequency the alternating current resistance (impedance) is lower and the capacitor is therefore more conductive. Thus, only higher frequency signals reach the tweeter loudspeakers. Low frequency signals, which could damage the treble loudspeakers, are suppressed.

Top-HiFi System (option 677) on E87



6 channels (7 channels simulated - Logic7)
10 loudspeakers

- 2 treble loudspeakers, front 26 mm
- 2 mid-range loudspeakers, front 100 mm
- 2 bass loudspeakers, 217 mm
- 2 mid-range loudspeakers, rear, 100 mm
- 2 treble loudspeakers, rear 26 mm

Bandwidth: 30 Hz to 20.000 Hz

Max. acoustic pressure: 104 dB

Amplifier power:

2 x 70 W (4 Ω) Bass

6x40 W 40 (2 Ω)

Top-HiFi System (option 677) on E90



9 channels, 13 loudspeakers

- 1 mid-range loudspeaker, middle, 100 mm
- 2 treble loudspeakers, front 26 mm
- 2 mid-range loudspeakers, front 100 mm
- 2 bass loudspeakers, 217 mm
- 2 mid-range loudspeakers, rear door, 100 mm
- 2 mid-range loudspeakers, rear shelf, 100 mm
- 2 treble loudspeakers, rear shelf, 26 mm

Bandwidth: 30 Hz to 20.000 Hz

Max. acoustic pressure: 110 dB

Amplifier power:

2 x 70 W (4 Ω) Bass

7 x 40 W (2 Ω)

Top-HiFi system (option 677) on E91



9 channels, 13 loudspeakers

- 1 mid-range loudspeaker, middle, 100 mm
- 2 treble loudspeakers, front 26 mm
- 2 mid-range loudspeakers, front 100 mm
- 2 bass loudspeakers, 217 mm
- 2 mid-range loudspeakers, rear door, 100 mm
- 2 treble loudspeakers, rear door, 26 mm
- 2 mid-range loudspeakers (electro-dynamic planar loudspeakers) at rear in headlining

Bandwidth: 30 Hz to 20.000 Hz

Max. acoustic pressure: 110 dB

Amplifier power:

2 x 70 W (4 Ω) Bass

7 x 40 W (2 Ω)

Top-HiFi system (option 677) on E92



9 channels, 13 loudspeakers

- 1 mid-range loudspeaker, middle, 100 mm
- 2 treble loudspeakers, front 26 mm
- 2 mid-range loudspeakers, front 100 mm
- 2 bass loudspeakers, 217 mm
- 2 mid-range loudspeakers, rear door, 100 mm
- 2 treble loudspeakers, rear door, 26 mm
- 2 mid-range loudspeakers, rear shelf, 100 mm

Bandwidth: 30 Hz to 20.000 Hz

Max. acoustic pressure: 110 dB

Amplifier power:

2 x 70 W (4 Ω) Bass

7 x 40 W (2 Ω)

The digital TOP-HiFi amplifier is a bus participant in the MOST network. The Top-HiFi amplifier can only be used with a MOST-compatible radio or navigation system. The audio signals are transmitted in digital form from the radio or navigation system to the Top-HiFi amplifier via the fibre optic cable (MOST bus). The Top-HiFi amplifier converts the digital signals into analogue signals and amplifies them before forwarding them to the loudspeakers.

The Top-HiFi amplifier is equipped with Logic7 (Surround Sound).

At least 7 audio channels are needed for Surround Sound. The BMW 1-Series has only 6 audio channels. Because there is no medium-range loudspeaker in the instrument panel, the Top-HiFi amplifier simulates the Surround Sound. This is done by distributing audio signals to the front door loudspeakers. Sound manipulation is carried out before the signals are converted to analogue signals in the amplifier's digital sound processor (DSP).

The Top-HiFi amplifier has the same installation location as the HiFi amplifier.