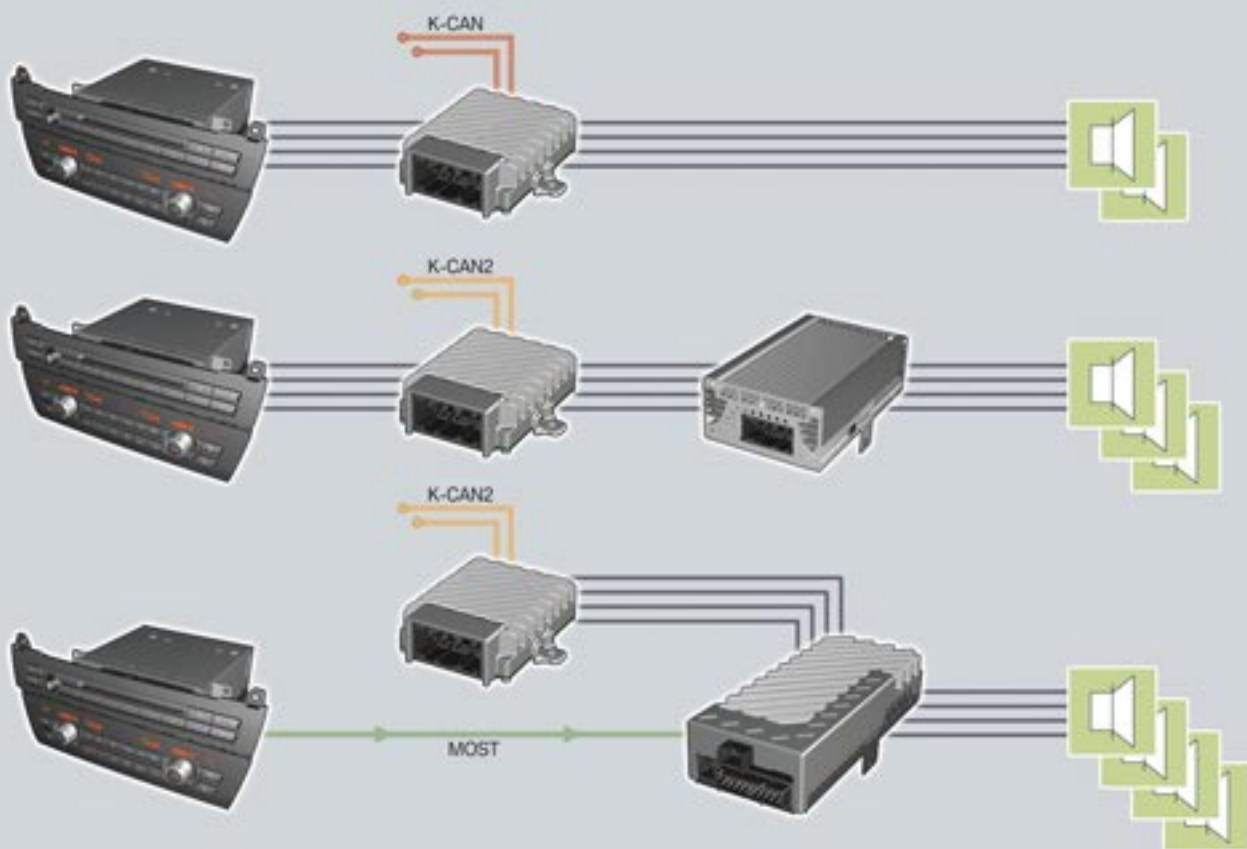


Reference Manual



ACTIVE SOUND DESIGN



Technical Training

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Active Sound Design

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Active Sound Design (ASD)

Models: E89 Z4 sDrive28i & F10 M5

**Production: Late 2011 for E89 and
start of production for
F10 M5**

OBJECTIVES

After completion of this module you will be able to:

- Understand the function and operation of the ASD system.

Introduction

BMW installed for the first time an “engine sound system” in the E85 Z4 3.0si. The intake noise of the engine was enhanced by means of a resonator and pipe routing without active intervention at the passenger compartment.

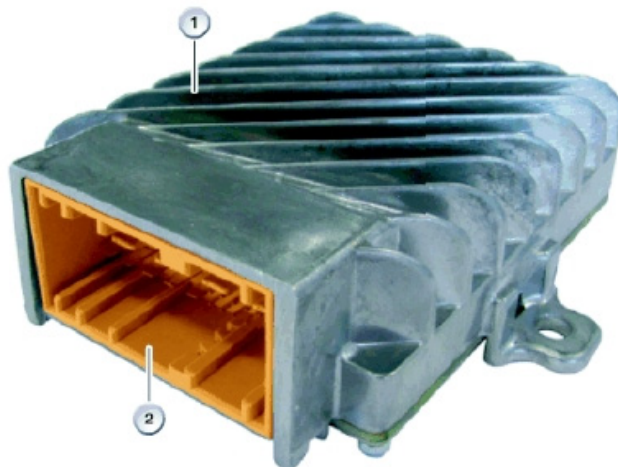
As the name Active Sound Design (ASD) suggests, the Active Sound Design is an active system. The engine sound is evaluated by means of a control unit. The engine sound is evaluated according to the programmed sound specification and various parameters such as the accelerator pedal angle (driver's desired load), engine speed and torque for example. It is then output via the vehicle's own audio system in the passenger compartment.

The ASD system complements the sound of the interior space of the passenger compartment through electronically generated engine sounds. Due to the increasingly better vehicle noise absorption and increased vehicle performance, BMW is initially launching the system in some models. Additionally other noise generated applications are still possible, such as sound generation in the vehicle exterior area for electric vehicles.

Active Sound Design will be incorporated for the first time in late 2011 in the E89 Z4 sDrive28i. This system will also be installed in the F10 M5.

There are currently **two different sound characteristic maps**. If the engine dynamic setting of "Efficient" or "Comfort" is selected, the generated engine sound output is somewhat more low-key in order to satisfy the comfort priority. On the other hand, when the driver selects an engine dynamic setting of “Sport” or “Sport +”, the engine sound is slightly more powerful, highlighting the dynamic handling characteristics of the vehicle.

ASD Control Unit



Index	Explanation	Index	Explanation
1	ASD Control Unit	2	42-Pin Connection

System Overview

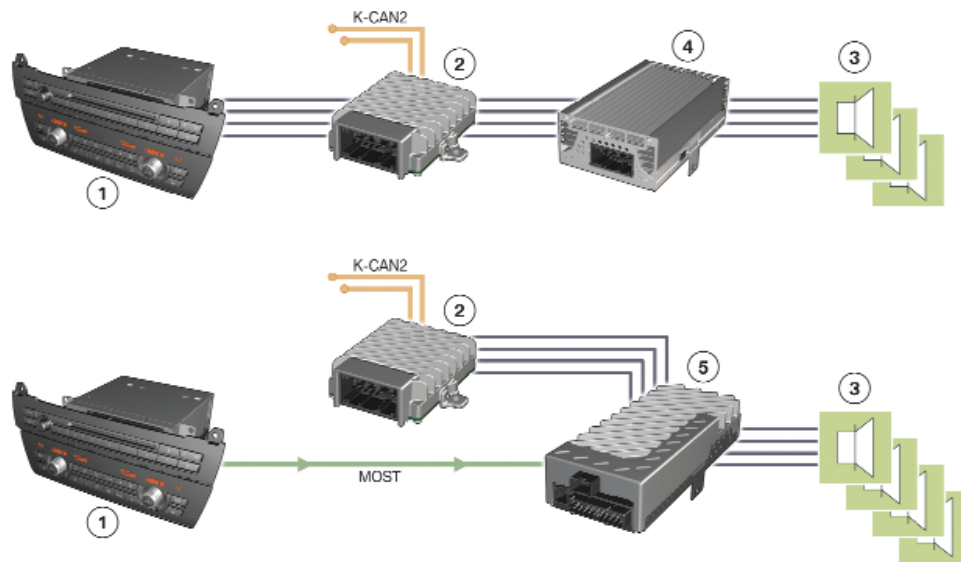
The engine sound from the Active Sound Design is output or its audio signals are super-imposed over the existing audio, regardless if the audio system is ON or OFF, such as: RADIO, CD, MP3, navigation or telephone.

Depending on the driving style, driving dynamics or engine dynamic program selection from Comfort to Sport, the tone and the level of engine sound output can be designed to match the selected program.

The Active Sound Design control unit (ASD) in the F10 M5 is connected to the K-CAN2 whereas in the E89 is connected to the K-CAN data bus. This connection enables the evaluation parameters and transfers the audio signals to the corresponding control unit, the AMPH (HiFi amplifier) or the AMPT (Top HiFi amplifier).

The Active Sound Design control unit is located in the luggage compartment on the left.

Overview of ASD Systems in F10 M5



Index	Explanation
1	Headunit/CIC
2	Active Sound Design (ASD)
3	Speaker
4	HiFi amplifier (AMPH)
5	Top HiFi audio amplifier (AMPT)

Note: The diagram shows an F10 M5 ASD system schematic where the ASD is connected to the K-CAN 2. The ASD in the E89 Z4 is connected to the K-CAN.

NOTES

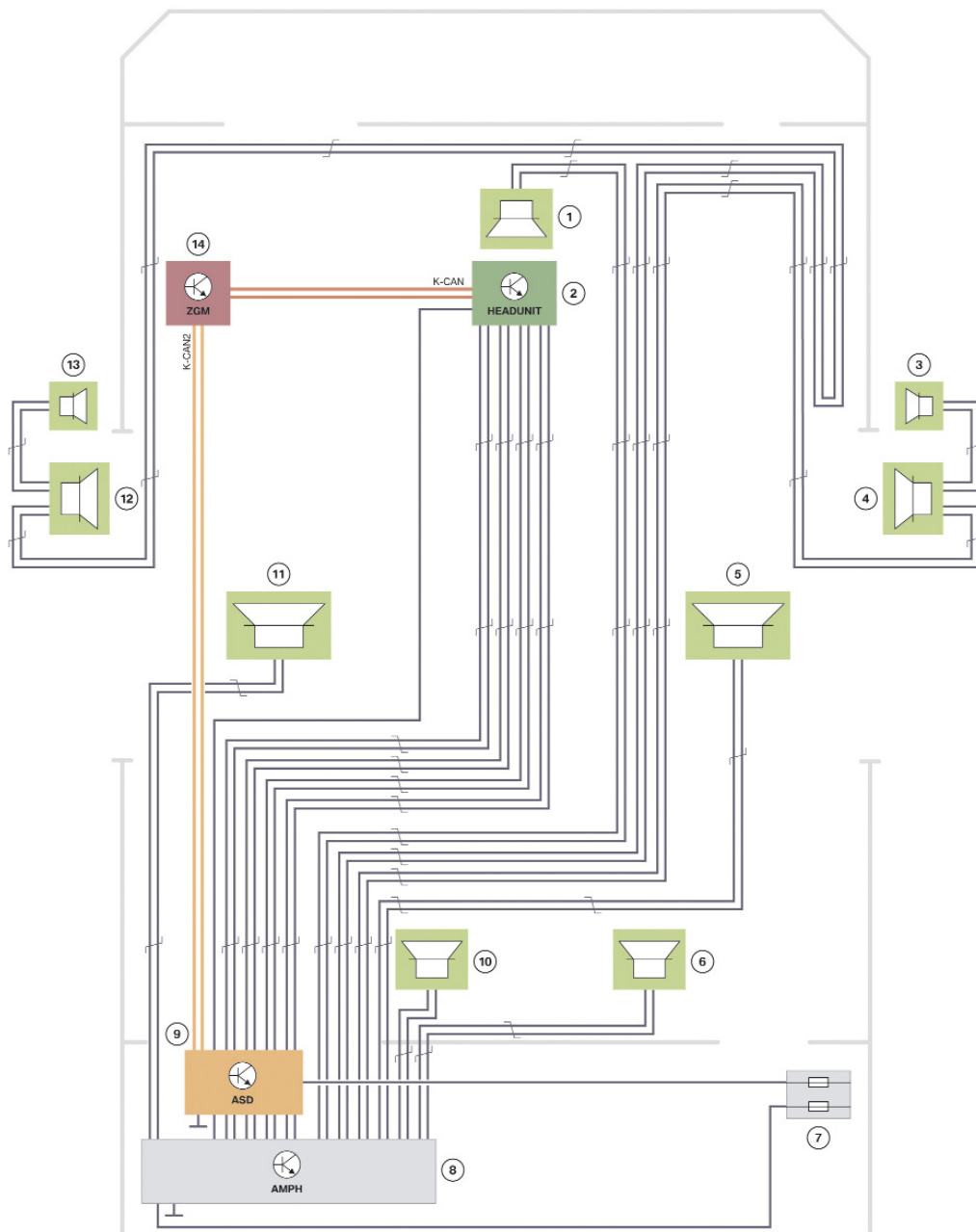
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Active Sound Design Variants

HiFi System (AMPH)

In the HiFi system the Active Sound Design is installed between the Headunit/CIC and the audio amplifier AMPH. The Active Sound Design in the F10 M5 is woken up by the K-CAN2. The ASD System mixes the audio signals coming from the headunit and the corresponding vehicle-specific and engine-specific audio signal. The ASD then forwards the modified signals to the audio amplifier and from there the combined audio signals are output on the speaker.

Active Sound Design (ASD) F10 M5 HiFi System Wiring Diagram



Active Sound Design (ASD) F10 M5 HiFi System Legend

Index	Explanation
1	Speaker, front center
2	Headunit/CIC
3	Tweeter, right front door
4	Mid-range speaker, right front door
5	Bass speaker, front right
6	Speaker, rear right
7	Power distribution box, rear
8	HiFi amplifier (AMPH)
9	Active Sound Design (ASD)
10	Speaker, rear left
11	Bass speaker, front left
12	Mid-range speaker, left front door
13	Tweeter, left front door
14	Central gateway module



The ASD is connected to terminal KL_30B and ground for voltage supply. The ASD is woken-up by the K-CAN2 (E89 K-CAN) and is immediately available.

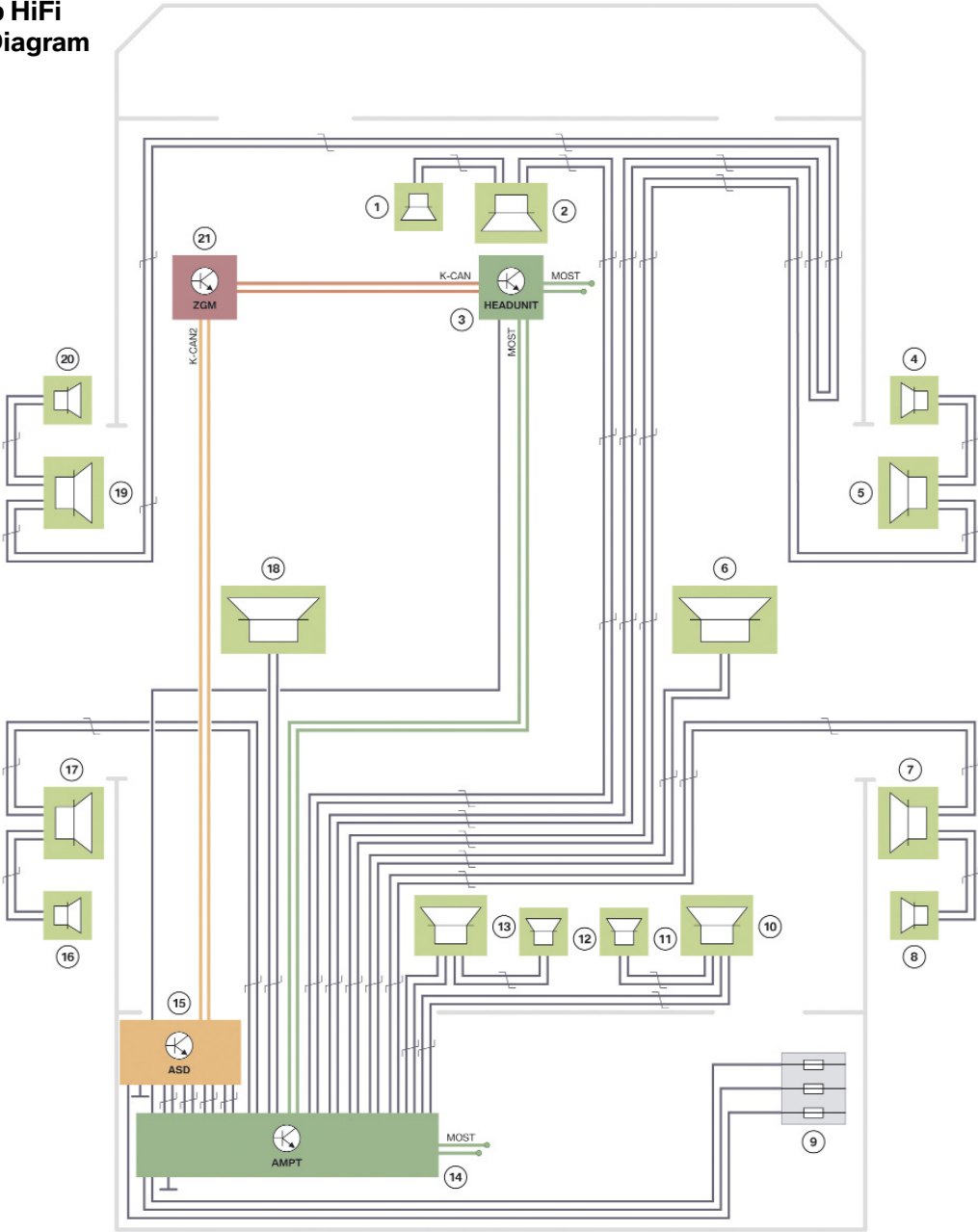
Please refer to the latest version of ISTA for the E89 Active Sound Design wiring diagrams.

Top HiFi System (AMPT)

The Active Sound Design can also be installed in the Top HiFi system. The Active Sound Design in the F10 M5 is woken up by the K-CAN2 and generates the vehicle-specific and engine-specific audio signals. The ASD continuously forwards the generated signals to the respective audio amplifier (AMPT).

The main difference between the Top HiFi system and the HiFi system relies in that the former, the audio signals from the Headunit/CIC and the signals from the ASD are combined in the audio amplifier and output to the speakers, as opposed to the HiFi System where the audio inputs are combined in the ASD control unit and then the modified signals are sent to the AMPH.

ASD F10 M5 Top HiFi System Wiring Diagram



Active Sound Design (ASD) F10 M5 Top HiFi System Legend

Index	Explanation
1	Tweeter, front center
2	Mid-range speaker, front center
3	Headunit/CIC
4	Tweeter, right front door
5	Mid-range speaker, right front door
6	Bass speaker, front right
7	Mid-range speaker, right rear door
8	Tweeter, right rear door
9	Power distribution box, rear
10	Mid-range speaker, left window shelf
11	Tweeter, right window shelf
12	Tweeter, left window shelf
13	Mid-range speaker, left window shelf
14	Top HiFi audio amplifier (AMPT)
15	Active Sound Design (ASD)
16	Tweeter, left rear door
17	Mid-range speaker, left rear door
18	Bass speaker, front left
19	Mid-range speaker, left front door
20	Tweeter, left front door
21	Central gateway module



The ASD is connected to terminal KL_30B and ground for voltage supply. The ASD is woken-up by the K-CAN2 (E89 K-CAN) and is immediately available.

Please refer to the latest version of ISTA for the E89 Active Sound Design wiring diagrams.

Service Procedures

Component Replacement

During the service life of the vehicle, various repairs can become necessary. In the course of repairs, components for various software versions and hardware numbers may be installed:

- The control unit for Active Sound Design (ASD) can be replaced individually.
- The control unit for Active Sound Design (ASD) must always be encoded after replacement.
- When replacing individual components, proceed according to repair instructions.
- Only Original BMW replacement parts guarantee the function of the Active Sound Design (ASD).

Diagnosis

The Active Sound Design (ASD) can be read for diagnosis and is connected to the K-CAN2 on the F10 M5 and to the K-CAN on the E89. We can assume no liability for printing errors or inaccuracies in this document and reserve the right to introduce technical modifications at any time.