ESX D68SP Digital Full HD Audio 8-Channel Signal Processor Owner's Manual

DIRECTION
D68SP Digital Full HD Audio 8-Channel Signal Processor
Owner's Manual

Contents

GENERAL INFORMATION

SCOPE OF DELIVERY

1 x D68SP Processor
1 x USB Cable, Length 1,5 m
1 x Wire Harness with 12-pin Connector
1 x Owner's Manual (German/English)

INTENDED USE

This product is designed for the operation of a vehicle with an on-board voltage of +12 V with negative ground. The device functions as a digital audio processor that is used to modify audio signals within a sound system in a vehicle.

RECOMMENDED ACCESSORIES

RC-DQ
Remote Controller with Display for Volume, Mode, Bass Level, incl. Extensioin Cable (5 m)

BT-D
Upgrade Kit with Bluetooth ® Receiver for App Control and Audio Streaming, incl. Antenna. Must be installed in the device housing.

DISPOSAL
If you need to dispose of the device, be aware that no electronic devices should be deposed in household waste. Dispose of the device in an appropriate recycling facility according to the local waste regulations. Consult if necessary your local authority or dealer.

DECLARATION OF CONFORMITY
Audio Design GmbH hereby declares that the ESX D68SP device complies with Directive 2014/53/EU.
The full declaration of conformity can be viewed at **www.esxaudio.de/ce**.
Distributor:
Audio Design GmbH
Am Breilingsweg 3, DE-76709 Kronau (Germany)

TECHNICAL SPECIFICATIONS

D68SP	**Digital Full HD Audio 8-Channel Signal Processor**
DSP Chip	Analog Devices™ 32 Bit, 294 Mhz, 48 Channels 1.2 Billion MAC Operations per Second 96 kHz Sampling Rate / Full HD Audi o

DSP Control	ESX DSP Toolkit PC Software for Miaosofto Windows.”‘ 10 or newer App for i0S”‘/Androidn’ Mobile Devices 8 Presets for Sound Setups
DSP Audio Features	Crossovers HP/LP/BP @ 6-48 dB Slope Time Delay 0 – 20 ms / 0.01 ms Steps Master Gain 0 – 60 dB Channel Gain -20 – +6dB Phase Shift Normal/Invert Input Mixer, Subwoofer Control 8 x 31-Band Output Equalizer (PEQ/HSLF/LSLF) +/- 12 dB. 0.5 dB Steps Standard Mode: 8 x 15-Band Input Equalizer (PEQ/HSLF/LSLF) +/- 12 dB. 0.5 dB Steps Expert Mode: 4 x 30-Band Input Equalizer (PEQ/HSLF/LSLF) +/- 12 dB, 0.5 dB Steps
Signal Converters	AKMe Velvet SoundTM ND 32 Bit D/A 32 Bit
Frequency Response	10 – 44.000 Hz
Signal-to-Noise Ratio (A-weighted)	Analog Input 106 dB Digital Input 111 dB
THD	Analog Input < 0.0015% Digital Input < 0,0009%
Operation Voltage	7.5 – 17 V
Inputs	6 x RCA Balanced Audio Input 6 x High-Level Speaker Input (via Molex Plug) 1 x Optical stereo. S/PDIF 192 kHz, 24 bit 1 x USB Type B for PC Software 1 x RJ45 for Remote Extension 1 x Power Socket incl. REM OUT and MODE switch input
Input Sensitivity	Low Level 1 – 6 V High Level 15 – 45 V (without internal Jumper 2 – 15 V)
Input Impedance	Low Level 10 kOhms High Level 10 Ohms
Outputs	8xRCAQ6VRMS
Auto Turn-On	DC / VOX / OFF
Spedal Features	Error Protection System EPS PRO Preset Auto Switch Priority Input Mode Detection
Dimensions (L x H x W)	105 x40 x 185mm
Recommended Fuse Rating	3A, not included

SAFETY INSTRUCTIONS

THE PURCHASED DEVICE IS ONLY SUITABLE FOR AN OPERATION WITH A 12V ON-BOARD ELECTRICAL SYSTEM OF A VEHICLE. Otherwise fire hazard, risk of injury and electric shock consists.

PLEASE DO NOT MAKE ANY OPERATION OF THE SOUND SYSTEM, WHICH DISTRACT YOU FROM A SAFE DRIVING. Do not make any procedures, which demand longer attention. Perform these operations not until you have stopped the vehicle in a safe place. Otherwise, the risk of accident consists.

ADJUST THE SOUND VOLUME TO AN APPROPRIATE LEVEL, THAT YOU ARE STILL ABLE TO HEAR EXTERIOR NOISES WHILE DRIVING. High-performance sound systems in vehicles may generate the acoustic pressure of a live concert. The permanent listening to extremely loud music may cause the loss of your hearing abilities. The hearing of extremely loud music while driving may derogate your cognition of warning signals in the traffic. In the interests of common safety, we suggest driving with a lower sound volume. Otherwise, the risk of accident consists.

DO NOT COVER COOLING VENTS AND HEAT SINKS. Otherwise, this may cause heat accumulation in the device and fire hazards consists.

DO NOT OPEN THE DEVICE. Otherwise, fire hazards, risk of injury, and electric shock consist. Also, this may cause a loss of the warranty.

REPLACE FUSES ONLY WITH FUSES WITH THE SAME RATING. Otherwise, fire hazards and risk of electric shock consist.

DO NOT USE THE DEVICE ANY LONGER, IF A MALFUNCTION OCCURS, WHICH REMAINS NOT REMEDIED. Refer in this case to the chapter TROUBLESHOOTING. Otherwise risk of injury and the damage of the device consists. Commit the device to an authorized retailer.

I**NTERCONNECTION AND INSTALLATION SHOULD BE ACCOMPLISHED BY SKILLED STAFF ONLY.** The interconnection and installation of this device demand technical aptitude and experience. For your own safety, commit the interconnection and installation to your car audio retailer, where you have purchased the device.

DISCONNECT THE GROUND CONNECTION FROM THE VEHICLE'S BATTERY BEFORE INSTALLATION. Before you start with the installation of the sound system, disconnect by any means the ground supply wire from the battery, to avoid any risk of electric shock and short circuits.

CHOOSE AN APPROPRIATE LOCATION FOR THE INSTALLATION OF THE DEVICE. Look for an appropriate location for the device, which ensures sufficient air circulation. The best places are spare wheel cavities and open spaces in the trunk area. Less suitable are storage spaces behind the side coverings or under the car seats.

DO NOT INSTALL THE DEVICE AT LOCATIONS, WHERE IT WILL BE EXPOSED TO HIGH HUMIDITY AND DUST. Install the device at a location, where it will be protected from high humidity and dust. If humidity and dust attain inside the device, malfunctions may be caused.

MOUNT THE DEVICE AND OTHER COMPONENTS OF THE SOUND SYSTEM SUFFICIENTLY. Otherwise, the device and components may get loose and act as dangerous objects, which could cause serious harm and damage in the passenger room.

ENSURE CORRECT CONNECTION OF ALL TERMINALS. Faulty connections may cause fire hazards and lead to damage to the device.

MOUNT THE DEVICE AND OTHER COMPONENTS OF THE SOUND SYSTEM SUFFICIENTLY. Otherwise, the device and components may get loose and act as dangerous objects, which could cause serious harm and damage in the passenger room.

ENSURE NOT TO DAMAGE COMPONENTS, WIRES, AND CABLES OF THE VEHICLE WHEN YOU DRILL THE MOUNTING HOLES. If you drill the mounting holes for the installation into the vehicle's chassis, ensure by any means, not to damage, block, or tangent the fuel pipe, the gas tank, other wires, or electrical cables.

DO NOT INSTALL AUDIO CABLES AND POWER SUPPLY WIRES TOGETHER. Ensure while installation not to lead the audio cables between the head unit and the processor together with the power supply wires on the same side of the vehicle. The best is an areal separated installation in the left and right cable channel of the vehicle. Therewith overlap of interferences on the audio signal will be avoided. This stands also for the equipped bass-remote wire, which should be installed not together with the power supply wires, but rather with the audio signal cables.

ENSURE THAT CABLES MAY NOT CAUGHT UP IN CLOSE-BY OBJECTS. Install all the wires and cables as described on the following pages, therewith these may not hinder the driver. Cables and wires which are installed close-by the steering wheel, gear lever, or the brake pedal, maybe caught up and cause highly dangerous situations.

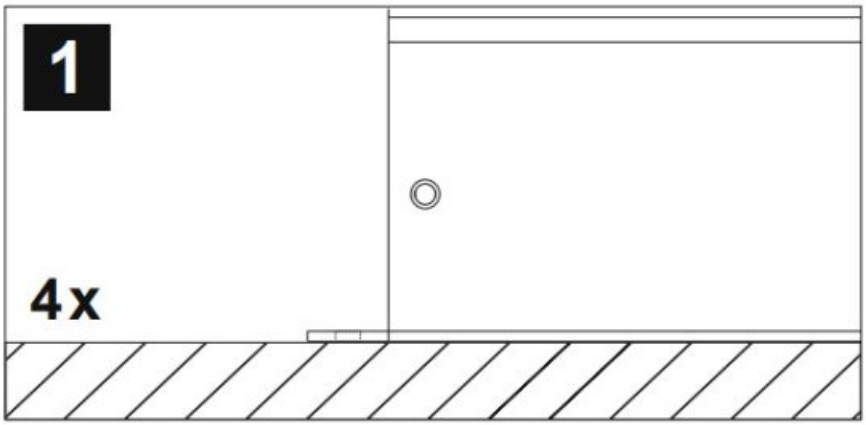
DO NOT SPLICE ELECTRICAL WIRES. The electrical wires should not be bared, to provide power supply to other devices. Otherwise, the load capacity of the wire may get overloaded. Use therefor an appropriate distribution block. Otherwise, fire hazards and risk of electric shock consist.

DO NOT USE BOLTS AND SCREW NUTS OF THE BRAKE SYSTEM AS GROUND POINTS. Never use for the

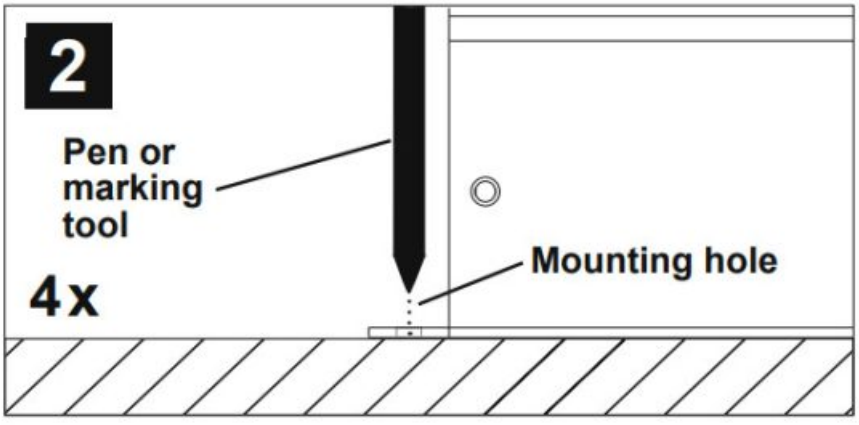
installation or the ground point bolts and screw-nuts of the brake system, steering system, or other security-relevant components. Otherwise, fire hazards consist of the driving safety will be derogated.
ENSURE NOT TO BEND OR SQUEEZE CABLES AND WIRES WITH SHARP OBJECTS. Do not install cables and wires not close-by movable objects like the seat rail or maybe bent or harmed by sharp and barbed edges. If you lead a wire or cable through the hole in a metal sheet, protect the insulation with a rubber grommet.
KEEP AWAY SMALL PARTS AND JACKS FROM CHILDREN. If objects like these will be swallowed, the risk of serious injuries consists. Consult promptly a medical doctor, if a child swallowed a small object.

MECHANICAL INSTALLATION

Avoid any damages on the components of the vehicle like airbags, cables, board computers, seat belts, gas tanks, or the like.
Ensure that the chosen location provides sufficient air circulation for the device. Do not mount the device into small or sealed spaces without air circulation nearby heat dispersing parts or electrical parts of the vehicle.
Do not mount the device on top of a subwoofer box or any other vibrating parts, whereby parts could loosen inside.
The wires and cables of the power supply and the audio signal must be as short as possible to avoid any losses and interferences.

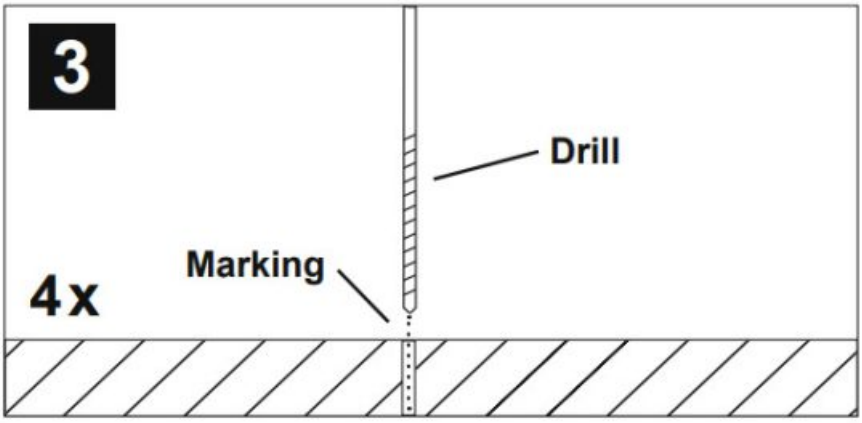


At first, you need to find a suitable installation location for the device. Ensure that enough space for the installation of the cables remains and that they will not be bent and have sufficient pull relief.

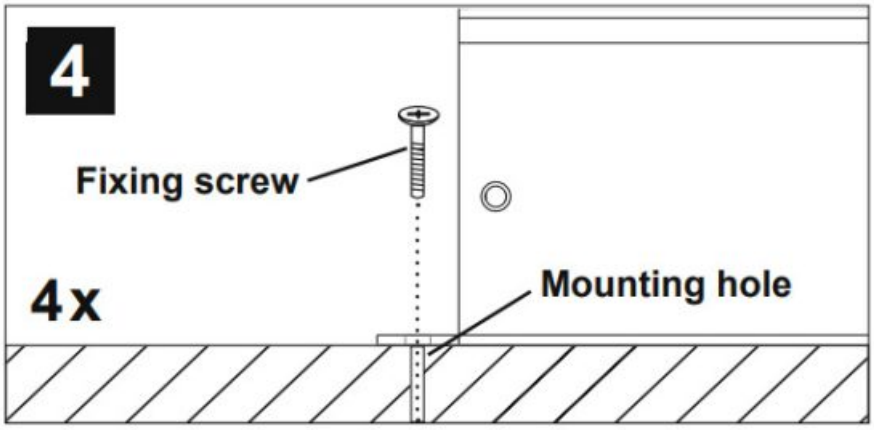


Keep the device at the chosen mounting location in the vehicle. Then mark the four drill holes with an appropriate

pen or marking tool through the designated mounting holes at the device.



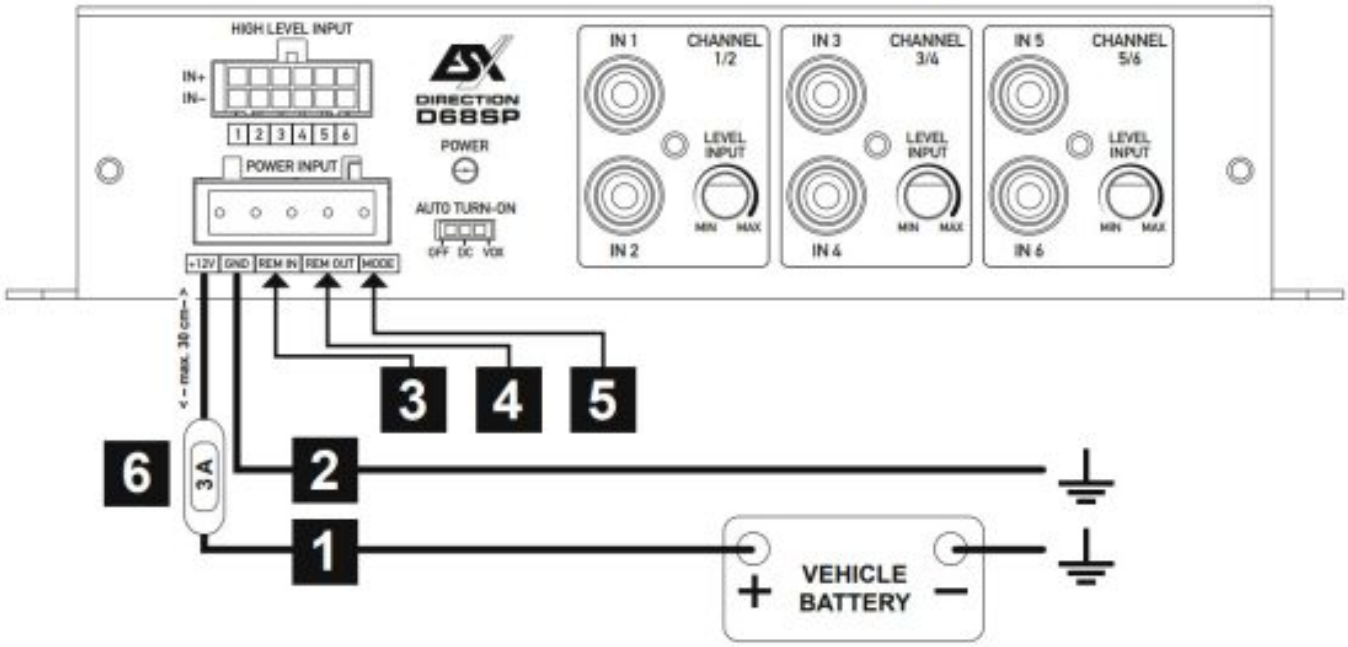
Lay the device aside and then drill the holes for the mounting screws at the marked locations.
Please ensure not to damage any components of the vehicle while you drilling the holes. Alternatively (depending on the material of the surface) you can also use self-tapping crews.



Then uphold the device to the chosen position and fix the screws through the mounting holes into the drilled screw holes.
Ensure that the mounted device is tightly fixed and can not come loose while driving.

CAUTION
Before you start with the installation, disconnect necessarily the GROUND connection wire from the battery to avoid any risk of electric shocks and short circuits.

ELECTRICAL INTERCONNECTION



1. **+12V**

   Connect the +12V terminal with the +12V pole of the vehicle's battery. Use a suitable cable with a sufficient cross-section (recommended Ø 1.5mm²).

2. **GND**

   Connect the GND terminal with a suitable contact ground point on the vehicle's chassis. The ground wire must be as short as possible and must be connected to a blank metallic point at the vehicle's chassis. Ensure that this ground point has a stable and safe electrical connection to the negative "–" pole of the battery. Use a suitable cable with a sufficient cross-section (recommended Ø 1.5 mm²).

3. **REM IN**

   Connect a turn-on signal or the turn-on remote signal of your head unit (REM) with the REM IN terminal. Use therefor a suitable cable with a sufficient cross-section (recommended Ø 0,5 mm²). Hereby the device turns on or off with your head unit. If you use the AUTO TURN-ON function (refer to page 22, section 9), the REM IN terminal does not need to be connected.

4. **REM OUT**

   The REM OUT terminal can be connected with the REM terminal of another device to provide a turnon signal (REM OUT function).

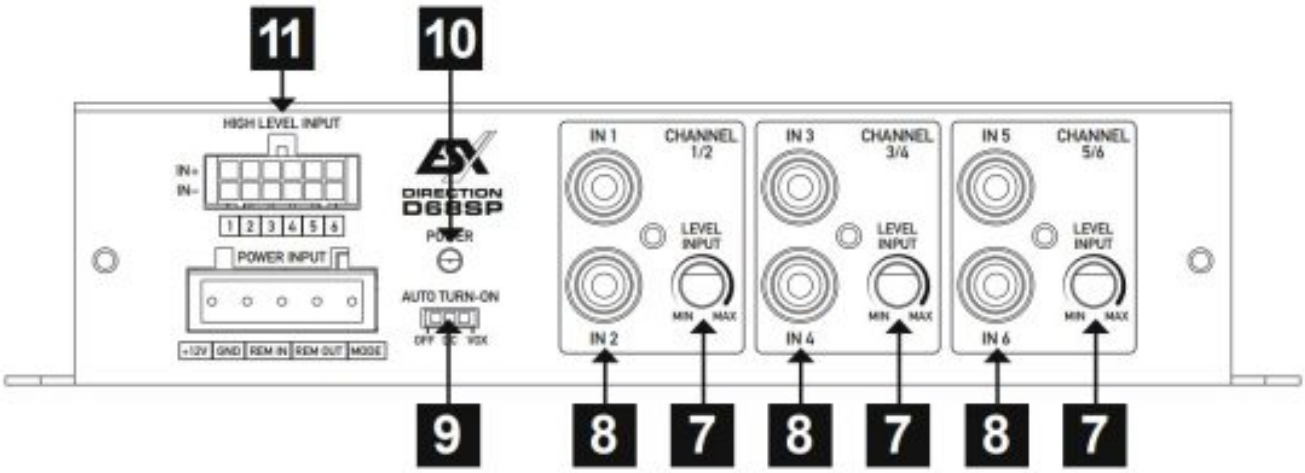
5. **MODE**

   The MODE terminal is suited to switch between two presets of the DSP (Preset Auto Switch function). As soon as a ground signal (GND) is supplied at MODE, the device switches automatically from Preset DEFAULT to Preset MODE or back again. This is useful if you operate the device in a convertible/cabriolet and connect the MODE terminal with the ground signal (GND) of the electric roof. The device is now switching between Preset DEFAULT (closed roof setup) and Preset ODE (open roof setup).

6. **FUSE**

   The device has no internal device fuse. Secure the device with a standard 3 A cable fuse. This is not included in the scope of delivery and should not be installed more than 30 cm away from the device in the +12 V power supply cable.

FUNCTIONAL DESCRIPTION



7. **LEVEL INPUT**

   These controllers determine the input sensitivity (adaptation to the output signal of the head unit) for each channel pair.

8. **IN (RCA INPUTS)**

   Connect the RCA inputs IN with the preamp outputs of the head unit accordingly by using appropriate audio signal cables.

9. **AUTO TURN-ON**

   If your head unit does not have a turn-on signal (REM), you can use the automatic turn-on function of the device. This works in two ways, which can be set at the AUTO TURN-ON switch:

   VOX: Select this method when using the IN RCA jacks. The device then detects a voltage increase in the incoming audio signal when switching on the head unit via the attached RCA cable and then switches on the device.

   DC: This method only works if you use the device's HIGH-LEVEL INPUT. The device then detects a voltage rise to 6 volts when the head unit is turned on by a so-called "DC offset" and then turns on the device.

   OFF: Select position OFF, if you have connected a turn-on signal at the REM IN terminal.

   Note: As soon as the head unit is switched off again, the device switches itself off.

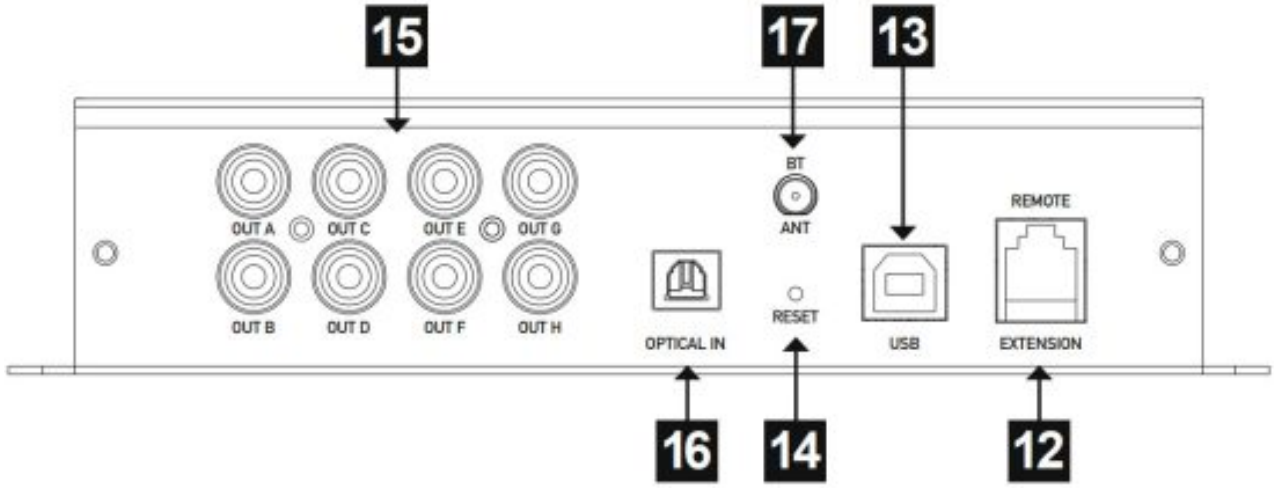
10. **POWER**

    If the LED lights up in green, the device is ready for operation.

11. **HIGH-LEVEL INPUT (15 ~ 45 V)**

    If your head unit does not have RCA preamp outputs, you can use the HIGH-LEVEL INPUT. Connect the loudspeaker cables of the head unit to the included wire harness accordingly.

    To change the input sensitivity to 2 ~ 15 V, please see the note on page 24.



12. **REMOTE EXTENSION**

This port is for the extension cable of the optionally available remote controller ESX RC-DQ.

13. **USB**

    This USB input is suited for the connection with a PC/laptop computer to manage the functions of the ESX DSP TOOLKIT software to set up the DSP functions. The connection is USB 1.1/2.0/3.0 compatible. For downloading the software please visit **www.esxaudio.de/dsp**.

14. **RESET**

    In case of a malfunction or a software crash, press this button with a suitable object such as a pen or a needle to reset the device.

15. **OUT (RCA OUTPUTS)**

    The RCA outputs OUT provide the DSP modified output signals for other devices.

    PRIORITY INPUT MODE

    The device detects the arrival of a digital input signal (e.g. via OPTICAL IN or BT-D). This input signal is then given priority over the analog input signals as long as the signal source is active.

16. **OPTICAL IN**

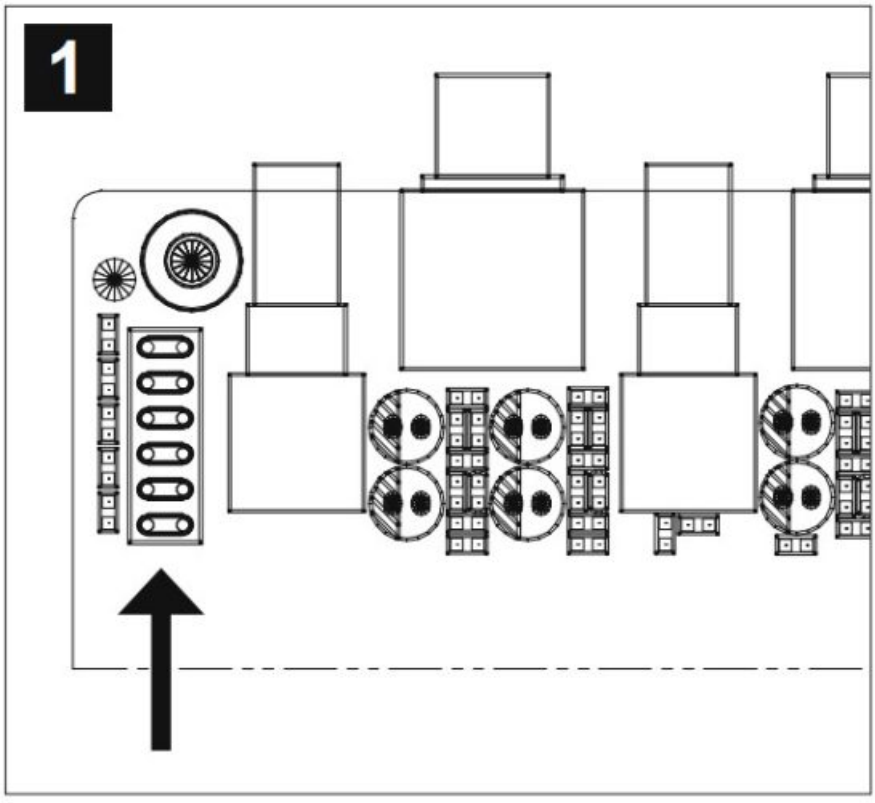
    This input accepts PCM stereo signals up to a sampling rate of 192 kHz / 24 bit. Multi-channel signals coming from audio/video sources (such as the audio tracks of DVD movies) can not be reproduced. Connect a fiber optic cable with a TOSLINK connector.

17. **BT ANT (only with optional BT-D Upgrade)**

    This port is for the Bluetooth ® antenna. Screw the antenna tight and deflect it upwards.

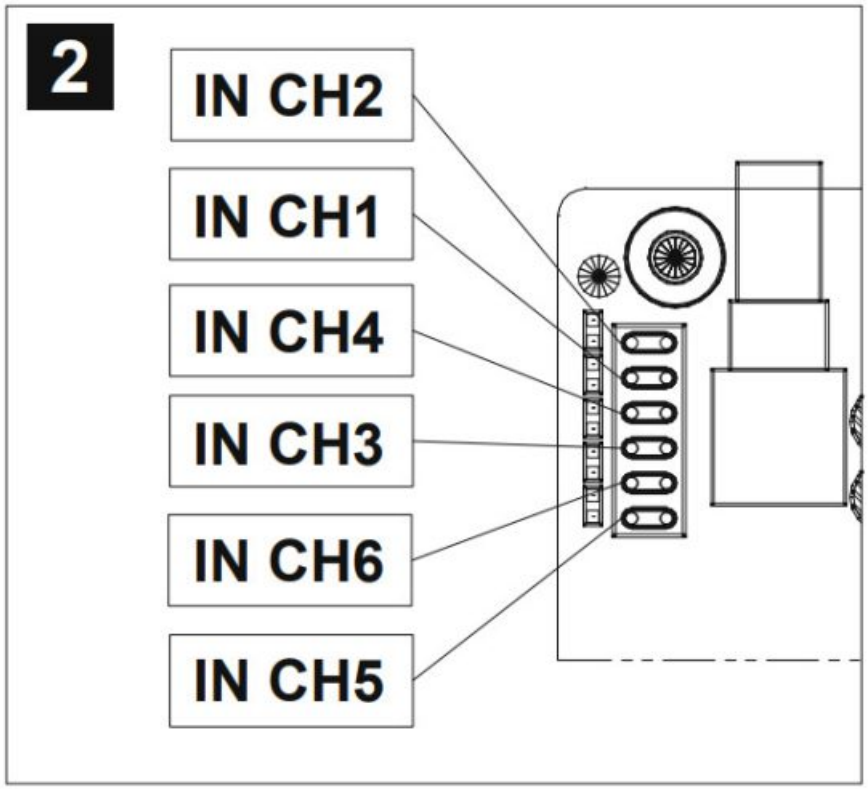
HIGH-LEVEL INPUT SENSITIVITY

The input sensitivity of the High-Level Input is set to 15 ~ 45 V ex-factory. If necessary, the input sensitivity for each input channel can be changed to 2 ~ 15 V. To do this, you have to remove the respective jumper inside the housing on the circuit board. Proceed as follows:



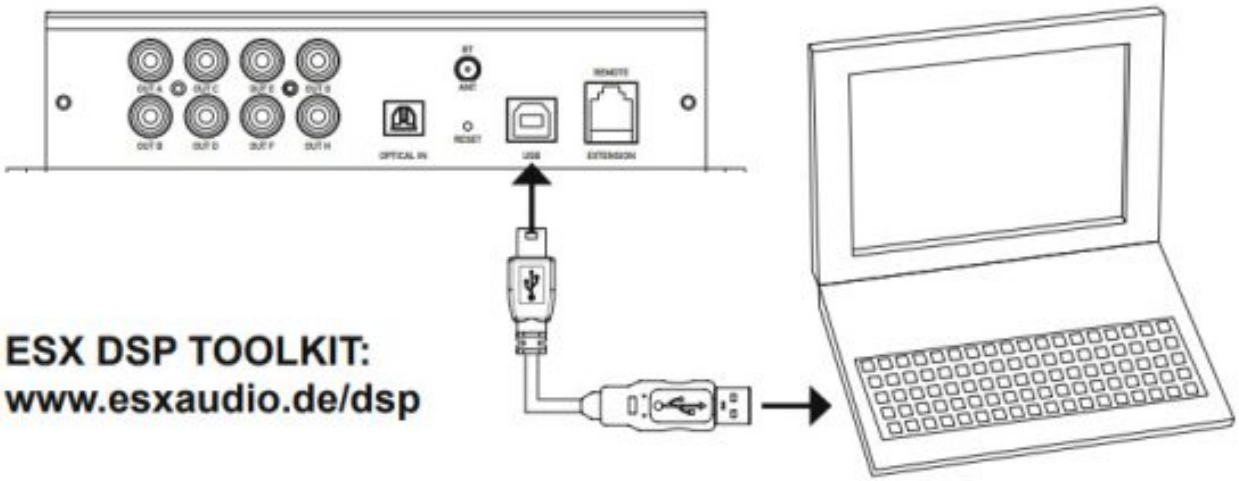
First, disconnect the device from the power supply. Then remove the housing cover and locate the six jumpers on

the circuit board. These are located to the left of the audio inputs.



Then carefully remove the jumper on the desired input channel to set it to an input sensitivity of 2 ~ 15 V. Use suitable pliers for this.

THE FIRST SYSTEM START WITH PC / LAPTOP



Recommended specifications:
CPU: 1.6 GHz or higher
Memory: 1 GB or higher
HDD: 512 MB or more available space
Display: 1024×576 or higher
OS: Microsoft™ Windows 10 or higher

Download and install the ESX DSP TOOLKIT software on your computer

↓

Connect your computer with the USB port of device via the included USB cable

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Turn the ignition key to the ACC or ON position

↓

The POWER LED lights up and after less than 10 seconds the device is operative

↓

Start the ESX DSP TOOLKIT software

↓

Setting the Speaker System

↓

Setting the Input Configuration

↓

Setting the Audio Parameters

↓

Store the Setting in one of the 8 Presets

CAUTION

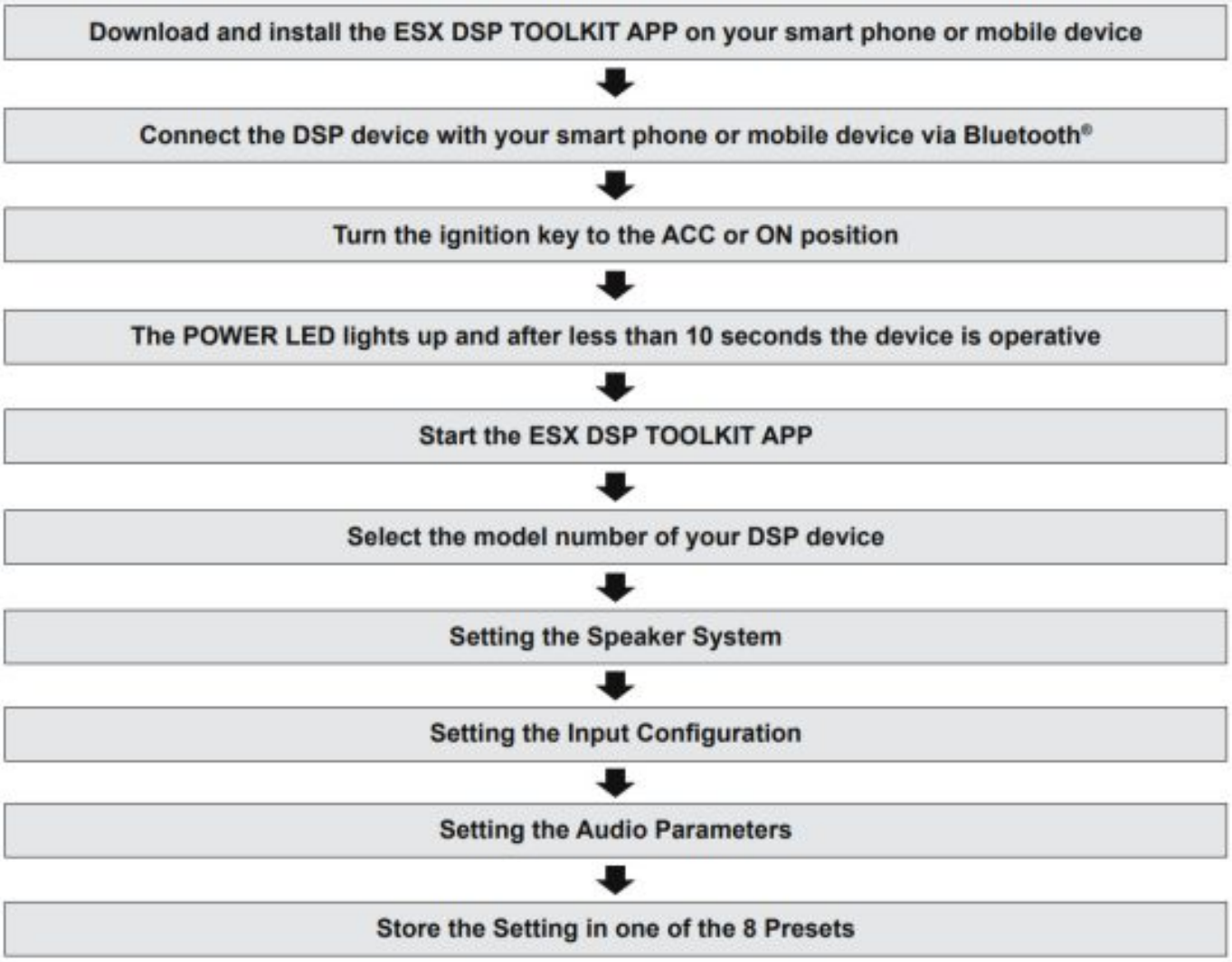
Before turning on the sound system, check again carefully the configuration of the crossovers and the speaker's setup. A wrong type of crossover or inappropriate parameters may cause permanent damages on the speakers, especially on tweeters without passive crossovers.

FIRST SYSTEM START WITH APP (only with BT-D Upgrade)

ESX DSP TOOLKIT APP:

App Store: iOS™ smartphones and mobile devices

Google Play: Android™ smartphones and mobile devices



CAUTION
Before turning on the sound system, check again carefully the configuration of the crossovers and the speaker's setup. A wrong type of crossover or inappropriate parameters may cause permanent damages on the speakers, especially on tweeters without passive crossovers.

TROUBLESHOOTING

ATTENTION: All instructions in this troubleshooting refer to the entire sound system and its individual components. The features of your device may not match the functions described in the notes. Then skip this point and move on to the next one.

NO FUNCTION / THE POWER LED IS NOT ILLUMINATED
First, check the fuse of the routed power cable on the vehicle battery
The fuse is defective
Replace the defective fuse with an equivalent one, never with a higher value.

- The fuse fails again.

  In this case, there appears to be a short circuit between the fuse and the device. To do this, check the +12V power cable along its entire length from the battery to the device for damage and whether there is a short circuit to ground, e.g. contact with the vehicle chassis or the body. If necessary, replace the defective power cable.

The fuse is apparently okay

Use a standard 12-volt voltmeter to check the voltage between the +12V connection and the ground connection on the device.

- There is no voltage.

  Use the voltmeter to check the fuse, which is located close to the vehicle battery, to see whether there is the voltage between the output and ground.

  If there is no voltage there, either the fuse holder or the fuse is defective, although it appears to be okay. If necessary, replace the fuse holder or fuse.
- There is voltage.

If you operate the device with a pre-device signal (RCA), you must have laid a remote turn-on wire from the head unit to the REM terminal of the device. The AUTO TURN-ON switch must be in the OFF position. However, you can test the AUTO TURN-ON switch to VOX to see if the device then turns on. If so, there is a problem with the control line.

- A remote turn-on wire is connected to the REM terminal at the device.

  Use the voltmeter to check whether there is a voltage between the REM terminal of the device and the ground.

  The head unit must be switched on.

  There is no voltage.
- Check the remote turn-on wire from the device to the head unit for a short circuit or damage. If necessary, replace the control line.

  There is voltage.
- The device is probably malfunctioning or defective. Contact your retailer.

If you operate the device with the loudspeaker signals (high-level mode), the AUTO TURN-ON switch must be switched to DC.

- The AUTO TURN-ON switch is in the DC position, but the device remains off.

  Check the speaker cables from the head unit to the device for short circuits or damage. If necessary, replace the speaker cables or insulate the damaged area.

THE POWER LED IS ON, BUT NO SOUND COMES FROM THE SPEAKERS
Check the following steps:
Low-level mode: Are the RCA cables on the head unit and on the device correctly connected? •The RCA cables are correctly connected.
Then an RCA cable could be defective. Check the function of the RCA cables on another audio device. If necessary, replace the defective RCA cables.
High-level mode: Are the loudspeaker cables on the head unit and the high-level inputs of the device or on the high-level cable plug correctly connected? •The speaker cables are connected correctly.
A speaker cable could be defective. If necessary, replace the speaker cable or insulate the damaged area.
Are the speaker cables correctly connected between the speakers or the subwoofer at the speaker outp uts of the device? •The speaker cables are connected correctly.
A speaker cable could be defective. If necessary, replace the speaker cable or insulate the damaged area.
Is the high pass filter or subsonic filter set higher than the low pass filter on the device? Then slowly turn down the controller for the high pass filter or subsonic filter until the sound can be heard.
Is the input mode switch on the device set correctly? Check the setting and change the switch position if necessary.
Are the crossover switches on the device set correctly? Check the settings and change the respective switch position if necessary.
Are the speakers or the subwoofer working? Hold a standard 9-volt block battery to the terminals of each loudspeaker or the subwoofer. •A faint cracking sound can be heard.
The speaker or subwoofer is fine. •There is nothing to he heard,
The loudspeaker or subwoofer could be defective. If necessary, replace the defective speaker or subwoofer.
Are the settings on the head unit set correctly? •Check the fader and balance settings •Check whether the mute function is activated •Check whether a high pass or low pass filter is activated •Check whether playback has been paused •Check the source settings •Check whether any existing subwoofer output is activated

DISTORTION OR HISSING NOISE CAN BE HEARD FROM THE SPEAKERS
Check the following steps:
Is an Input level controller on the device set too high? Slowly turn the controller back until you hear a clean audio signal.
Is the Bass Boost controller on the device set too high? Slowly turn the controller back until you hear a clean audio signal.
Is the loudness function on the head unit set too high? Deactivate loudness or turn the loudness setting back until you can hear a clean audio signal.
Are the EC and sound settings on the head unit set too high? Turn down the settings for Treble, Middle, and Bass, or deactivate the equalizer until you can hear a clean audio signal.

ENGINE SPEED-DEPENDENT NOISE CAN BE HEARD FROM THE SPEAKERS
Check the following steps:
Have the RCA cables been laid separately from the power cable in the vehicle? If necessary. lay the cables again and make sure that the audio cables are laid separately from the power cable on the left and right in the vehicle.
Is the device's ground connection correctly connected? Make sure that the ground connection of the device is not connected directly to the negative pole of the vehicle battery. Select a suitable ground point on the vehicle body for connection. If necessary, use contact spray to imp rove the conductivity of the connections.
Is the conductivity of the ground cable from the vehicle battery to the body okay? Make sure that the ground connection of the vehicle battery has a stable and conductive connection to the body . If necessary, use contact spray to improve the conductivity of the connections.

AN ACTWE OPERATED TWEETER IS DISTORTED OR CRACKED
CAUTION: Tweeters will be damaged if the frequencies are too low. Please note the manufacturer's Information on which frequency setting Is recommended. To be on the safe side, pause the playback of the head unit first. C heck the following steps:
Is the crossover mode switch of the relevant channel pair on the device set correctly? Set the crossover mode switch to the high pass position (HP or HPF).
Is the high pass filter of the relevant channel pair set too low on the device? First, turn the high pass controller fully clockwise. Now start playback on the head unit. Then tum the high pass controller slowly counter-clockwise until you can hear a clean sound from the tweeters and produce a balanced sound together with the woofers/mid-range speakers. Make sure that the woofers/ mid-range speakers are set correctly with the respective high pass and low pass controllers.

DIRECTION

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Documents / Resources

	ESX D68SP Digital Full HD Audio 8-Channel Signal Processor [pdf] Owner's Manual D68SP, Digital Full HD Audio 8-Channel Signal Processor, D68SP Digital Full HD Audio 8-Channel Signal Processor, 8-Channel Signal Processor, Signal Processor, Processor

References

- ESX - Car Audio Systems
- esxaudio.de/ce
- esxaudio.de/dsp