



QUANTUM QL810SP Digital Full HD Audio 10-Channel Signal Processor Owner's Manual

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Quantum

QUANTUM QL810SP Digital Full HD Audio 10-Channel Signal Processor



GENERAL INFORMATION

SCOPE OF DELIVERY

- 1 x QL810SP Processor
- 1 x Detachable Power Connector
- 1 x USB Cable, Length 5 m
- 1 x Wire Harness with 16-pin Connector
- 1 x Bluetooth® Antenna
- 1 x Owner's Manual (German/English)

RECOMMENDED ACCESSORIES

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



INTENDED USE

This product is designed for the operation in 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.

DISPOSAL

If you need to dispose the device, be aware that no electronic devices should be deposited in the household waste. Dispose 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 QL810SP 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)

RADIO EQUIPMENT TYPE

Function	Band information	Frequency range	Maximum radiated power
Bluetooth	Version 5.0	2.400 MHz – 2.484 MHz	30,0 dBm

TECHNICAL SPECIFICATIONS

QL810SP	Digital Full HD Audio 10-Channel Signal Processor
DSP Dual Chip	Analog Devices™ 2 x 32 Bit, 294 MHz, 48 Channels 2 x 1.2 Billion MAC Operations per Second 96 kHz Sampling Rate / Full HD Audio
DSP Control	ESX DSP Toolkit PC Software for Microsoft® Windows™ 10 or newer App for iOS™/Android™ 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 ~ +6 dB Phase Shift Normal/Invert Input Mixer, Subwoofer Control 10 x 31-Band Output Equalizer (PEQ/HSLF/LSLF) +/- 12 dB, 0.5 dB Steps Standard Mode: 10 x 31-Band Input Equalizer (PEQ/HSLF/LSLF) +/- 12 dB, 0.5 dB Steps Expert Mode: 6 x 31-Band Input Equalizer (PEQ/HSLF/LSLF) +/- 12 dB, 0.5 dB Steps 4 x 31-Band Staging EQ, +/-12 dB, Balance and Level Mode
Signal Converters	AKM® Velvet Sound™ A/D 32 Bit D/A 32 Bit
Frequency Response	5 ~ 45.000 Hz
Signal-to-Noise Ratio (A-weighted)	Analog Input 111 dB Digital Input 117 dB

THD	Analog Input <0.001% Digital Input <0.0004%
Operation Voltage	7.5 – 17 V
Inputs	8 x RCA Balanced Audio Input 8 x High Level Speaker Input (via Molex Plug) 1 x Optical stereo, S/PDIF 192 kHz, 24 bit 1 x Coaxial stereo, S/PDIF 192 kHz, 24 bit 1 x Bluetooth® stereo 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	10 x RCA @ 6 V RMS
Auto Turn-On	DC / VOX / OFF
Special Features	Error Protection System EPS PRO Preset Auto Switch Priority Input Mode Detection
Bluetooth® Receiver	Integrated for App Control and Audio Streaming, incl. Antenna. Bluetooth-Version 5.0, Profiles: A2DP/AVRCP, Codecs: aptX, aptX LL, aptX HD, AAC, SBC
Dimensions (L x H x W)	120 x 42 x 226 mm
Recommended Fuse Rating	3 A, not included

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SAFETY INSTRUCTIONS

THE PURCHASED DEVICE IS ONLY SUITABLE FOR AN OPERATION WITH A 12V ONBOARD ELECTRICAL SYSTEM OF A VEHICLE. Otherwise, fire hazards, risk of injury, and electric shock consist.

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, SO 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 to the device consists. Commit the device to an authorized retailer.

INTERCONNECTION 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 to 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 channels of the vehicle. Therewith an 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 BE 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, may be 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 therefore 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 A GROUND POINT. 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 hazard consists of the driving safety will be derogated.

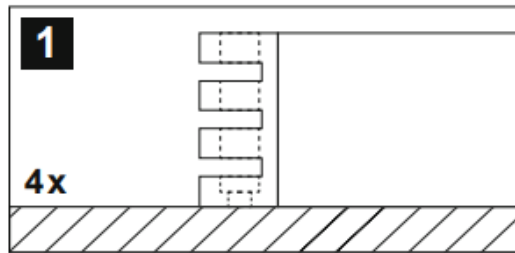
ENSURE NOT TO BEND OR SQUEEZE CABLES AND WIRES WITH SHARP OBJECTS. Do not install cables and wires not close-by movable objects like the seat rail that may be bent or harmed by sharp and barbed edges. If you lead a wire or cable through the hole in a metal sheet, protect the insulation with a rubber 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.

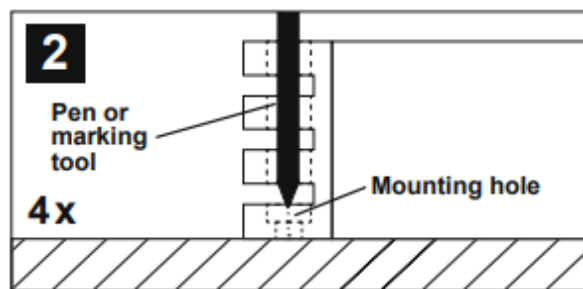
MECHANICAL INSTALLATION

Avoid any damage to the components of the vehicle like airbags, cables, board computers, seat belts, gas tanks,s

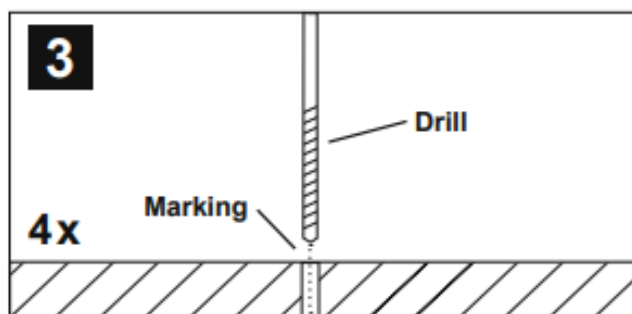
or the like. Ensure that the chosen location provides sufficient air circulation for the device. Do not mount the device into small or sealed spaces without air circulation near heat dispersing parts or electrical parts of the vehicle. Do not mount the device on top of a subwoofer box or any other vibrating 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.



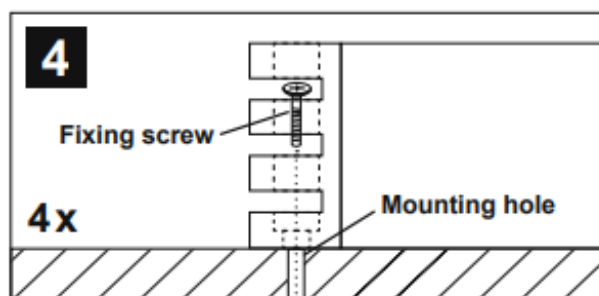
First, you need to find a suitable installation location for the device. Ensure that enough space for the installation of the cables remains and that they will not be bent and have sufficient pull relief.



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.



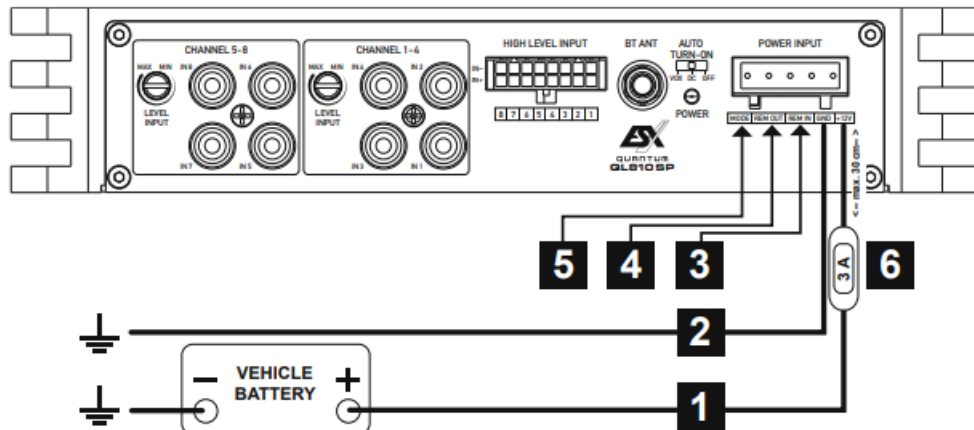
Lay the device aside and then drill the holes for the mounting screws at the marked locations. Please ensure not to damage any components of the vehicle while you drilling the holes. Alternatively (depending on the material of the surface) you can also use self-tapping screws



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.

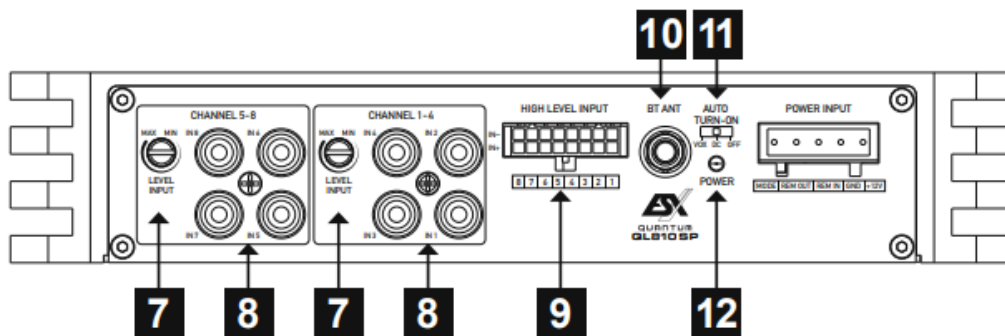
CAUTION: Before you start with the installation, disconnect necessarily the GROUND connection wire from the battery to avoid any risk of electric shocks and short circuits.

ELECTRICAL INTERCONNECTION

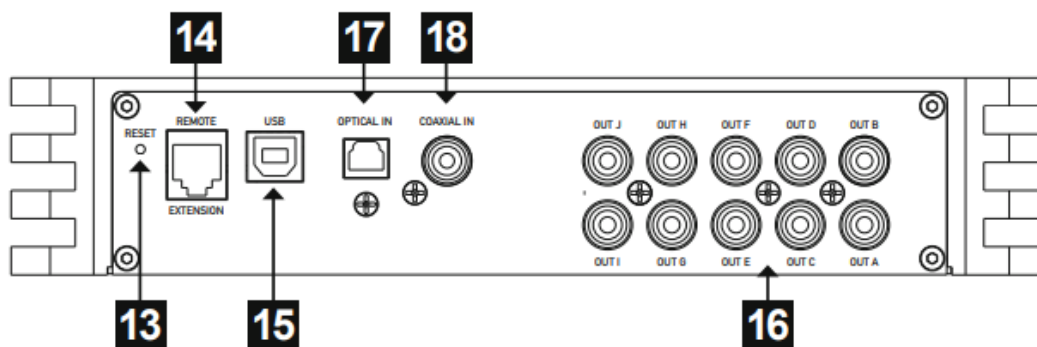


1. **+12V** Connect the +12V terminal with the +12V pole of the vehicle's battery. Use a suitable cable with a sufficient cross-section (recommended \varnothing 1.5 mm²).
2. **GND** Connect the GND terminal with a suitable contact ground point on the vehicle's chassis. The ground wire must be as short 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 \varnothing 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 therefore a suitable cable with a sufficient cross section (recommended \varnothing 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 24, section 11), 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 MODE (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



- **LEVEL INPUT** These controllers determine the input sensitivity (adaptation to the output signal of the head unit) for each channel section (CH1-4 and CH5-8).
- **IN (RCA INPUTS)** Connect the RCA inputs IN with the preamp outputs of the head unit accordingly by using appropriate audio signal cables.
- **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 26.
- **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.
- **POWER** If the LED lights up in green, the device is ready for operation.
- **BT ANT** This port is for the Bluetooth® 13 antenna. Screw the antenna tight and deflect it upwards.



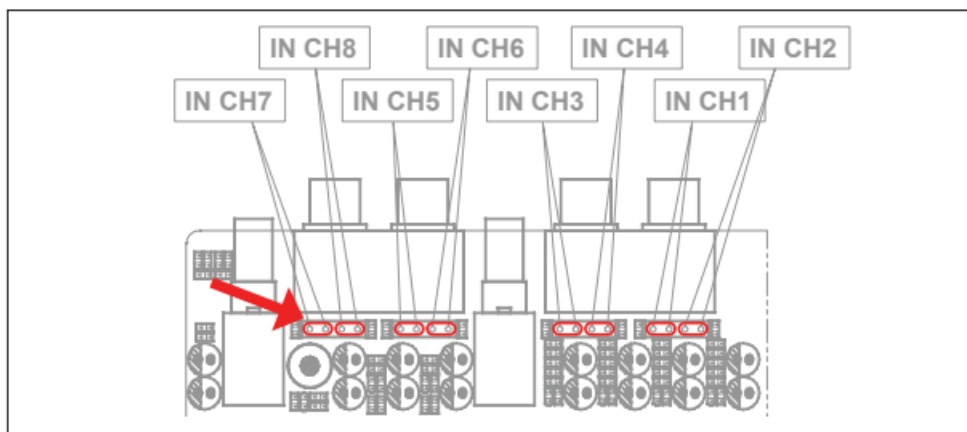
- **REMOTE EXTENSION** This port is for the extension cable of the optionally available remote controller ESX RC-DQ.
- **USB** This USB input is suited for the connection with a PC/laptop computer to manage the functions of the ESX DSP TOOLKIT software to set-up the DSP functions. The connection is USB 1.1/2.0/3.0 compatible. For downloading the software please visit www.esxaudio.de/dsp.
- **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.

- **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, COAXIAL IN or Bluetooth®). This the input signal is then given priority over the analog input signals as long as the signal source is active
- **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 movie) can not be reproduced. Connect a fiber optic cable with a TOSLINK connector.
- **COAXIAL 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 movie) can not be reproduced. Connect a suitable coaxial cable.

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:



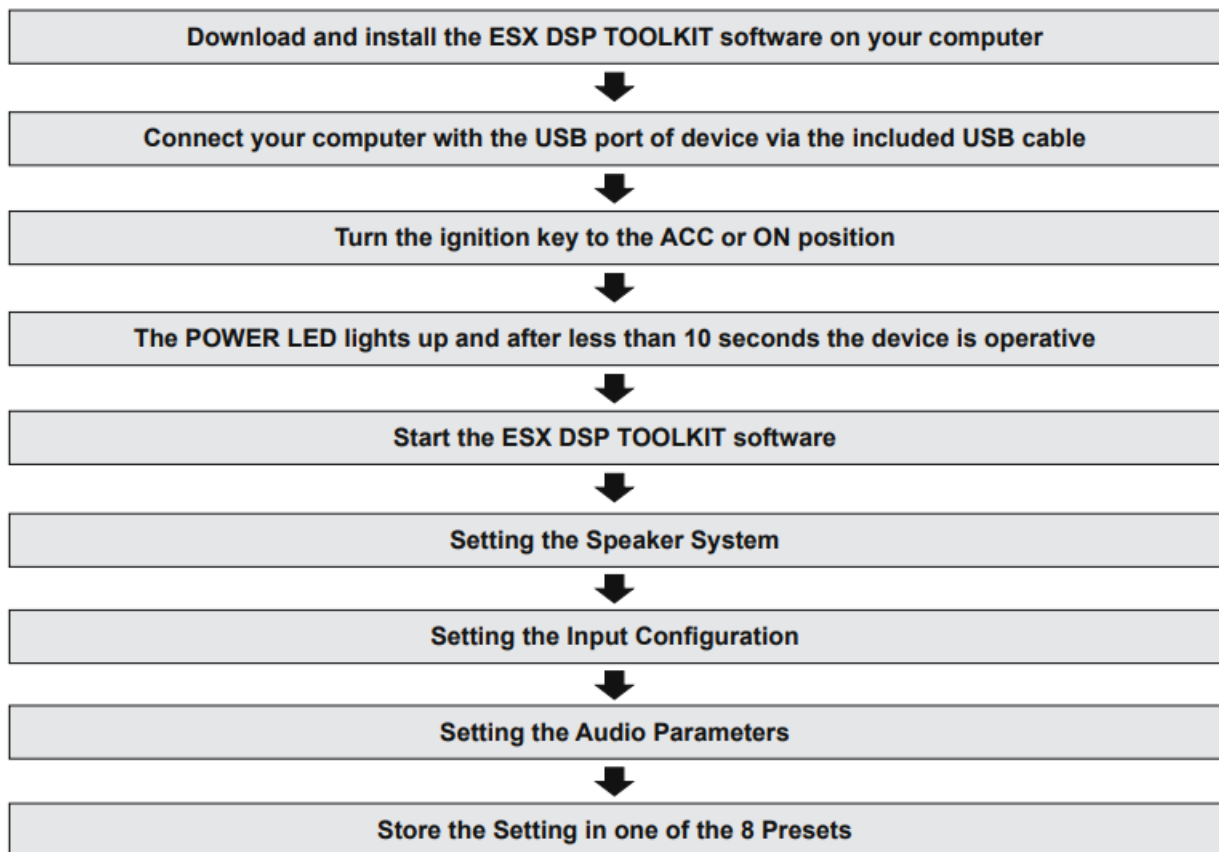
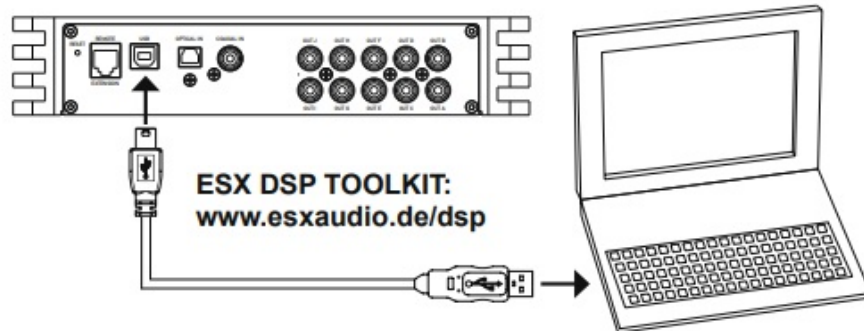
First disconnect the device from the power supply. Then remove the housing cover and locate the six jumpers on the circuit board. These are located below the audio inputs. Then carefully remove the jumper on the desired input channel to set it to an input sensitivity of „2 ~ 15 V“. Use suitable pliers for this. **You can determine the correct jumper position for your application with the following procedure:**

- Turn the input control „LEVEL INPUT“ of the respective channel pair group on the device to „MIN“. Then set the volume level of the outputs to around „75%“ in the DSP software or DSP app. If you then hear distortions from the loudspeakers, the factory setting „15 ~ 45 V“ is suitable in this case. Then turn the „LEVEL INPUT“ controller back a bit until the distortions are no longer audible.
- If no distortion can be heard from the loudspeakers, you can remove the jumpers of the respective channel pair group in order to achieve a higher power reserve with the „2 ~ 15 V“ setting. Then gradually increase the input sensitivity of the respective channel pair group using the „LEVEL INPUT“ controller until slight distortions can be heard. Then turn the controller back a bit until they are no longer audible. **Note:** Depending on the structure of the sound system, the signal outputs can be operated with different output voltages. Use a multimeter to check the resistance of the connected speakers. If the resistance is over 5 ohms, the associated high-level input should be operated with a higher voltage, i.e. „15 ~ 45 V“. If the resistance is around 4 ohms or less, the associated high-level input should be operated with a lower voltage, i.e. „2 ~ 15 V“.

FIRST SYSTEM START WITH PC / LAPTOP

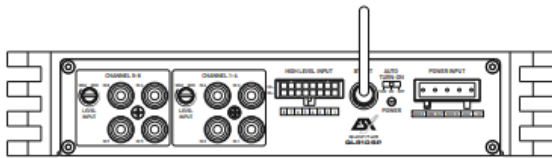
Recommended specifications:

- 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



CAUTION: Before turning on the sound system, check again carefully the configuration of the crossovers and the speakers 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

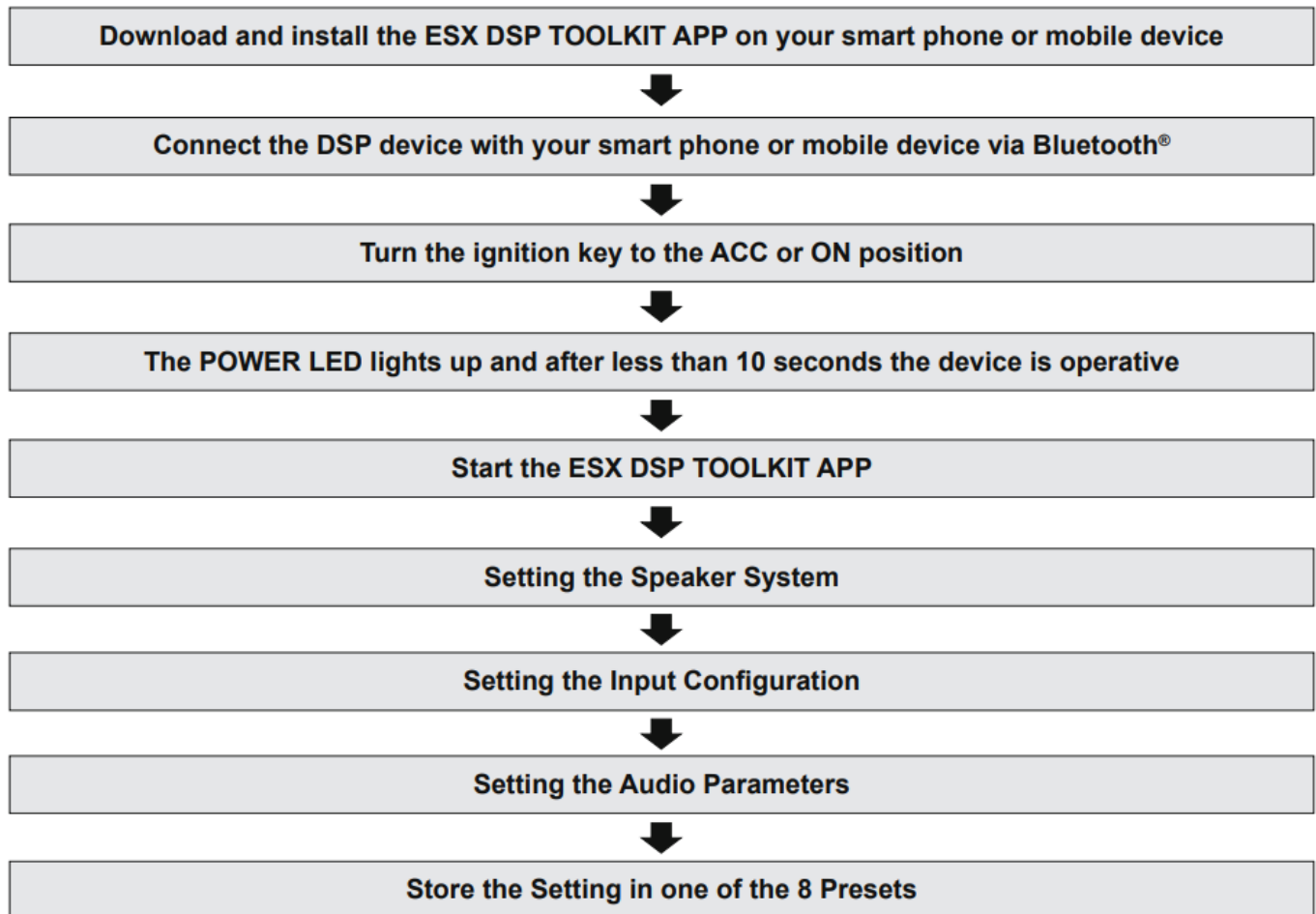


Wireless Bluetooth® Connection
Device Name: ESX QL810SP



ESX DSP TOOLKIT APP:

- **App Store:** iOS™ smart phones and mobile devices
- **Google Play:** Android™ smart phones and mobile devices



TROUBLE SHOOTING

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 cables 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 outputs 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 be 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 a 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 EQ 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 improve 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 ACTIVE 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 play- back of the head unit first. Check 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 turn 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.





Documents / Resources



[QUANTUM QL810SP Digital Full HD Audio 10-Channel Signal Processor](#) [pdf] Owner's Manual

QL810SP, Digital Full HD Audio 10-Channel Signal Processor, Audio 10-Channel Signal Processor, 10-Channel Signal Processor, QL810SP, Signal Processor

References

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-  [ESX - Car Audio Systems](#)
-  [esxaudio.de/ce](#)
-  [esxaudio.de/dsp](#)