



SIEO
SIX IN EIGHT OUT
8-CHANNEL
DSP PROCESSOR

OWNER'S MANUAL

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Due to the ongoing development of this device, it is possible that the information in this manual is incomplete or is not matching to the delivery status.

SCOPE OF DELIVERY

1X SIEO Processor

Remote Controller with LED Display, incl. Connection Cable (optional extra)

1 x Cable Set Power Supply

1 x CD-ROM with M-CONTROL Software /refer to www.b2audio.com/sieo for latest version

1 x Owner's Manual (English)



NOTE

This symbol shows you important notes on the following pages. Follow these notes necessarily, otherwise damages of the device and on the vehicle as well as serious injuries may be caused.

PLEASE KEEP THIS MANUAL FOR LATER PURPOSES!

NOTES

TROUBLE SHOOTING

Malfunction: "ERROR" message in connection between DSP device and your computer.

Reason:

1. The DSP processor is turned off.
Note: The RUN LED and the WIFI LED must light up blue.

Remedy:

Remedy the cause

Malfunction: "The COM port could not open..." message in connection between DSP device and your computer.

Reason:

1. In the connection window after the software start the wrong COM port has been selected or defined.

Remedy:

Select the correct port.
Check if necessary the port in the Device Manager of Windows under „Ports (COM & LPT)
„USB-Serial CH340“.

Malfunction: *The stored settings can not be called up on the remote control via mode button*

Reason:

1. The settings must be saved numerological (POS1, POS2, POS3, ...)

Remedy:

Save the settings always numerological
(Refer to page 24).

Please refer also in case of malfunction to the user manuals of the other devices of the sound system such as amplifier or head units.

SAFETY INSTRUCTIONS

PLEASE NOTE THE FOLLOWING ADVICES BEFORE THE FIRST OPERATION!

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 DISTRACT YOU FROM A SAFE DRIVING. Do not make any procedures, which demand a longer attention. Perform these operations until you have stopped the vehicle on a safe place. Otherwise the risk of accident consists.

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

DO NOT COVER COOLING VENTS AND HEATSINKS. Otherwise this may cause heat accumulation in the device and fire hazard consists.

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

REPLACE FUSES ONLY WITH FUSE WITH THE SAME RATING. Otherwise fire hazard and risk of electric shock consists.

DO NOT USE THE DEVICE ANY LONGER, IF A MALFUNCTION, WHICH REMAINS UNREMEDIED. Refer in this case to the chapter TROUBLE SHOOTING. Otherwise risk of injury and the damage of 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 demands technical aptitude and experience. For your own safeness, commit the interconnexion 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 a 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 damages 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 chasis, ensure by any means, not to damage, block or tangent the fuel pipe, the gas tank, other wires or electrical cables.

ENSURE CORRECT CONNECTION OF ALL TERMINALS. Faulty connections may could cause fire hazard and lead to damages of the device.

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 a areal separated installation in the left and right cable channel of the vehicle. Therewith a 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 CATCH UP IN CLOSE-BY OBJECTS. Install all the wires and cables like 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 catch 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 a appropriate distribution block. Otherwise fire hazard and risk of electric shock consists.

DO NOT USE BOLTS AND SCREW NUTS OF THE BRAKE SYSTEM AS 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 or the driving safety will be derogated.

ENSURE NOT TO BEND OR SQUEEZE CABLES AND WIRES BY SHARP OBJECTS. Do not install cables and wires not close-by movable objects like the seat rail or may be bended 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.

INSTALLATION INSTRUCTIONS



NOTE

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

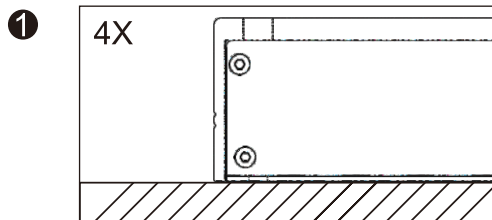
MECHANICAL INSTALLATION

Avoid any damages on the components of the vehicle like air bags, cables, board computer, seat belts, gastank or the like.

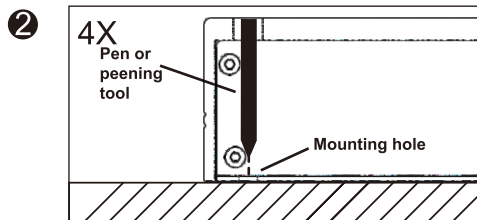
Ensure that the chosen location provides a sufficient air circulation for the processor. Do not mount the device into small or sealed spaces without air circulation near by heat dispersing parts or electrical parts of the vehicle.

Do not mount the processor on top of a subwoofer box or any other vibrating parts, whereby parts could loosen inside.

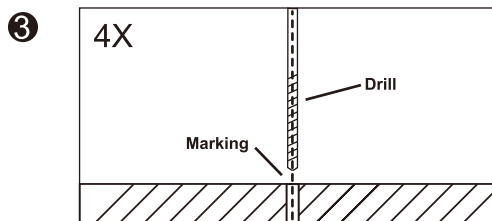
The wires and cables of power supply and the audio signal must be as short as possible to avoid any losses and interferences.



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

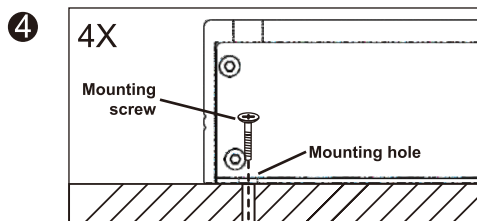


Keep the processor at the chosen mounting location in the vehicle. Then mark the four drill holes with an appropriate pen or peening tool through the designated mounting holes at the processor.



Lay the processor 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 (depends on the material of the surface) you can also use self-tapping screws.



Then uphold the processor to the chosen position and fix the screws through the mounting holes into the drilled screwholes.

Ensure that the mounted processor is tightly fixed and can not come loose while driving.

TROUBLE SHOOTING

Malfunction: no function

Reason:

1. The power supply connection of the device is not correct
2. The cables have no mechanical or electrical contact
3. The remote turn-on connection from the head unit to the processor is not correct
4. Defective Fuses. In case of replacing the fuses, ensure the correct fuse rating

Remedy:

- Recheck
- Recheck
- Recheck
- Replace Fuses

Malfunction: no signal on loudspeakers, but power LED lights up

Reason:

1. The connections of the speakers or the RCA audio cables are not correct
2. The speaker cables or the RCA audio cables are defective
3. The loudspeakers are defective
4. HP controller in LP/BP operation is adjusted to high
5. No signal from the head unit
6. A wrong input source under INPUT SOURCE is selected, which is not connected (e.g. AUX IN)
7. For example on one or more channels, "Mute" is activated in the DSP software.
8. The volume level on the remote controller is adjusted too low

Remedy:

- Recheck
- Replace cables
- Replace speakers
- Turn down controller
- Check head unit settings
- Check selection
- Check settings
- Turn up the volume level on the remote

Malfunction: one or more channels or controllers are without function / faulty stereo stage

Reason:

1. The balance or fader controller of the head unit is not in the center-position
2. The connections of the speakers are not correct
3. The loudspeakers are defective
4. HP controller in operation is adjusted to high
5. For example on one or more channels "Delay" or "Phase" is incorrectly set in the DSP software.

Remedy:

- Turn to center-position
- Recheck
- Replace speakers
- Turn down controller
- Check settings

Malfunction: distortions on the loudspeakers

Reason:

1. The loudspeakers are overloaded
2. Amplifier is clipping

Remedy:

- Turn down the level
- Turn down the level on the head unit
- Switch off loudness on the head unit
- Reset bass EQ on the head unit

Malfunction: no bass or stereo sound

Reason:

1. Interchange of loudspeaker cable polarity
2. The RCA audio cables are loose or defective
3. For example on one or more channels "Delay" or "Phase" is incorrectly set in the DSP software.

Remedy:

- Reconnect
- Reconnect or replace the cables
- Check settings

Malfunction: hiss or white noise on the loudspeakers

Reason:

1. The level controllers in the DSP software are turned up too loud.
2. The treble controller on the head unit is turned up
3. The speaker cables or the RCA audio cables are defective
4. The hissing is caused by the head unit

Remedy:

- Turn down the level
- Turn down the level on the head unit
- Replacing the cables
- Check the head unit

Malfunction: no subwoofer sound

Reason:

1. The volume of the subwoofer output (channel G / H and SUB OUT) is set too low on the remote control.
2. DSP Software is set incorrectly.

Remedy:

- Press the remote controller and hold. Turn up the volume. (Refer to page 21).
- Check all settings.

GENERAL NOTES

SPECIFICATIONS

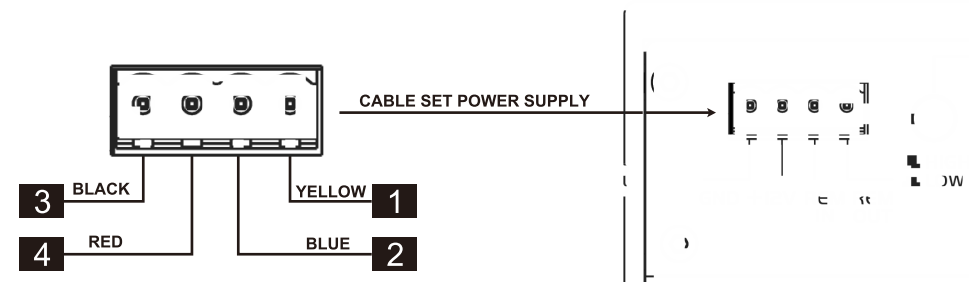
MODELL	SIEO
Frequency Range -3dB	5 Hz - 20 kHz
Signal-to-Noise Ratio	> 110 dB
Channel Separation	> 60 dB
THD&N	0,05%
Input Sensitivity	5 - 0,3 V
Input Impedance	> 47 kOhms
DSP Processor	Cirrus Logic Single Core 32 bit, 8 channel, 192 kHz
Signal Output	8 x RCA
Signal Input	6 x RCA
Optional Inputs	TOSLINK (optical 12 ~ 96 kHz, stereo) AUX (3,5 mm jack, stereo)
S0 ND DSP-Software	for Microsoft Windows® XP SP3, Vista, 7, 8, 8.1, 10 10 Presets, Gain -40 ~ +12dB 6 x 31-Band Equalizer, 2 x 11-Band Equalizer, -18 ~ 12 dB, Q 0,5 ~ 9 Setting range 20 ~ 20.000 Hz (Outputs A-F), 20 ~ 200 Hz (Outputs G-H) 6 ~ 48 db/Oct. HP/BP/LP Time Delay 0~15 ms/0~510 cm Phase Shift 0°/180°
Remote Controller with LED-Display	for Master Volume, Subwoofer Volume, Input Selection, Mode Selection
Dimensions	
Width x Height x Length	160 x 44 x 208 mm
<i>Technical specifications are subject to change! Errors are reserved!</i>	

WARRANTY

The warranty complies with legal regulations. Failures or damages caused by overload, improper use or by using the product for competitions are not covered by the warranty. Please return the defective product only with a valid proof of purchase and a detailed malfunction description to your retail store, where you have purchased this product.

INSTALLATION INSTRUCTIONS

ELECTRICAL INTERCONNECTION



BEFORE CONNECTING

For the professional installation of a sound system, car audio retail stores offers appropriate wire kits. Ensure a sufficient profile section (at least 0,75 mm²), the suitable fuse rating (the processor must be protected with an external fuse with 2 A) and the conductivity of the cables when you purchase your wiring kit. Clean and remove rust-streaked and oxidized areas on the contact points of the battery and the ground connection. Make sure that all screws are fixed tight after the installation, because loose connections cause malfunctions, insufficient power supply or interferences.

1 REM OUT

The processor connected turn-on signal (**REM IN**) can be forwarded to other devices such as amplifiers. Connect the **REM OUT** cable of the processor with the remote port (REM) of the amplifier. Use therefore a suitable cable with a sufficient cross section (0,5mm²). Hereby the processor and the amplifier turns on or off with your head unit.

2 REM IN

Connect the turn-on signal (e.g. automatic antenna) or the turn-on remote signal of your head unit with the **REM-IN** cable of the processor. Use therefore a suitable cable with a sufficient cross section (0,5mm²). Hereby the processor turns on or off with your head unit.

3 GND

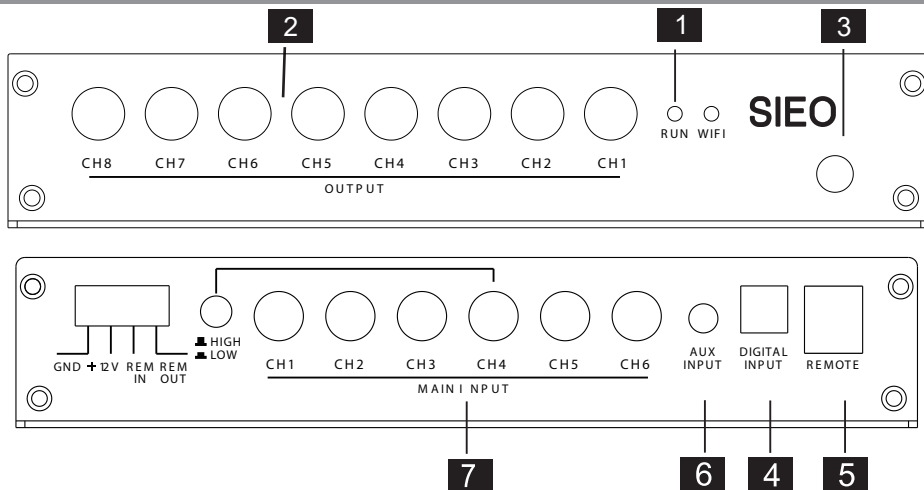
Connect this GND wire with a suitable contact ground point on the vehicle's chassis. The ground wire must be as short as possible and must be connected to a blank metallic point at the vehicle's chassis. Ensure that this ground point has a stable and safe electric connection to the negative "-"pole of the battery. Check this ground wire from the battery to the ground point if possible and enforce it, if required. Use a ground wire with a sufficient cross section (at least 0,75mm²) and the same size like the plus (+12V) power supply wire.

4 +12V

Connect the +12V-cable with the +12V pole of the vehicle's battery. Use a suitable cable with a sufficient cross section (at least 0,75mm²) and install an external in-line fuse (2 A). For safety reasons the distance between the fuseblock and the battery should be shorter than 30 cm. Do not set in the fuse into the fuseblock until the installation is accomplished.

FUNCTIONAL INSTRUCTIONS

PROCESSOR FEATURES AND OPERATIONAL CONTROLS



- 1** If the **RUN LED** lights up, the amplifier is ready for operation.
- 2** The eight **LINE OUT** RCA jacks provide audio signals for amplifiers, which can be modified and configured with the DSP software.
- 3** **WIFI** use with computer control software installed. Connected to DSP, the connection can be controlled **DSP**. Re-set the scene.
- 4** The **OPTICAL** input is suited for a Toslink cable connection with an external audio source that provides a SPDIF signal (stereo PCM).
- 5** The **REMOTE** port is for the enclosed remote controller. Please refer to the information on the next page.
- 6** The **AUX IN** 3,5 mm jack can be connected with external audio sources like MP3 player, smartphones, navigation systems.
- 7** The **LINE IN** RCA jacks must be connected with the RCA output jacks of the head unit (2 x Stereo Output Front/Rear). A.B.C.D input button on the panel can be converted to high input. The **HIGH LEVEL INPUT** can be used, if your head unit is not equipped with RCA pre-amplifier outputs. You can connect them instead of the loudspeaker on the top with the highlevel input cable set accordingly .refer to the assignment on the next page.

FUNCTIONAL INSTRUCTIONS

INTERCONNECTION EXAMPLES

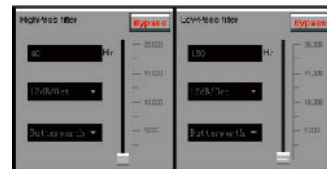
With the sound DSP, a lot of different system configurations are possible. The 2 most common applications are described here in brief:

Channels	Example 1	Example 2
	Front 3-Way Active System Rear Subwoofer	Front 2-Way Active System Rear Full with Range Speakers Subwoofer
	Input Mode 4	Input Mode 6
	Output Mode 3	Output Mode 1
A	Tweeter (FL) HP 3000-6000Hz	Tweeter (FL) HP 3000-6000Hz
B	Tweeter (FR) HP 3000-6000Hz	Tweeter (FR) HP 3000-6000Hz
C	Midbass (FL) BP: HP 60-150 Hz LP 3000-6000 Hz	Midbass (FL) BP: HP 60-150 Hz LP 3000-6000 Hz
D	Midbass (FR) BP: HP 60-150 Hz LP 3000-6000 Hz	Midbass (FR) BP: HP 60-150 Hz LP 3000-6000 Hz
E	Kickbass (FL) BP: HP 60 Hz LP 150 Hz	Speaker (RL) HP 60-150 Hz
F	Kickbass (FR) BP: HP 60 Hz LP 150 Hz	Speaker (RR) HP 60-150 Hz
G	Subwoofer (RL/RR)	Subwoofer
H	BP: HP 10-30 Hz LP 50 - 100 Hz	BP: HP 10-30 Hz LP 50 - 100 Hz

FUNCTIONAL INSTRUCTIONS

5. High-pass filter&Low-pass filter

- Here you can select the required filter type (HLF, LPF, BPF, Bypass) and set under **FREQUENCY** the desired cut-off frequency. The sliders only work when the particular filter type is activated. when a filter type is selected, it will be displayed graphically.



- Note:** If you have selected a filter type, the cut-off frequency can also be changed under point 4 with the mouse. Click and hold the red dot and move the cursor to the desired location on the frequency band.
- Select the desired slope of the high-pass filter and the slope of the low-pass filter, which is selectable in 6dB steps, starting from 6dB per octave (very flat) to 48 dB per octave (very steep).

Various filter types (Butterworth, Linkwitz, Bessel) are available for achieving desired sound effects.

- Hint:** Instead of using the slider, you can also type in the cut-off frequency directly with the keyboard after a double click on the values below **FREQUENCY**. Confirm by pressing **ENTER**.

6. GEQ&PEQ

- You can change the Q value of the EQ from 0.5-9, on frequency range from 20-20KHz, as well as the gain from -18 to +12.

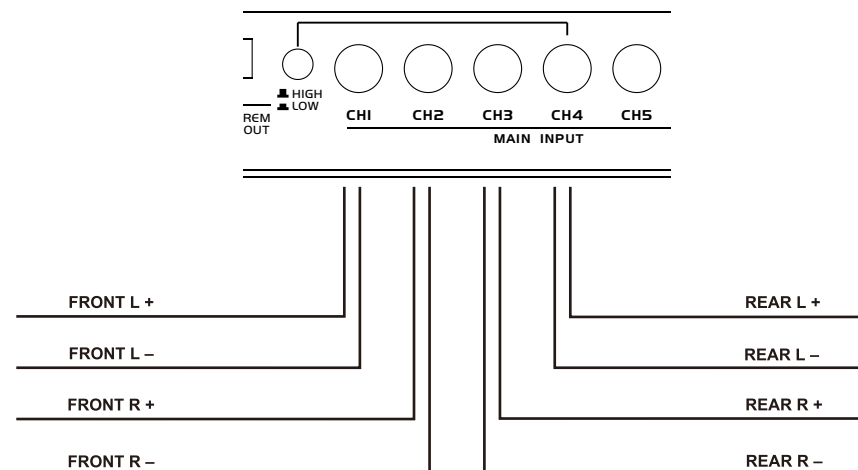
7. FREQUENCY BAND PREVIEW:

- The frequency band shows graphically the envelope of the 31-band equalizer (point 7) and the currently selected settings of the output channel or output channel pair from point 2.

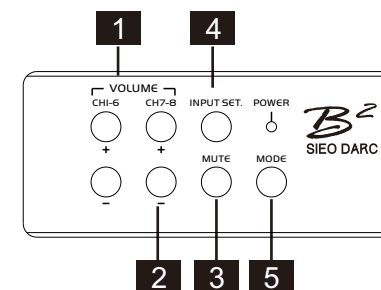
8. 31-BAND EQUALIZER:

- With the sliders below you can set the desired dB value (-18 to +12) between 20 Hz to 20000 Hz for each output channel (except subwoofer channels G & H: 11-band equalizer 20 Hz - 200 Hz). Press the **RESET** button to reset all Equalizer settings to default (All other settings are not affected by this).

FUNCTIONAL INSTRUCTIONS



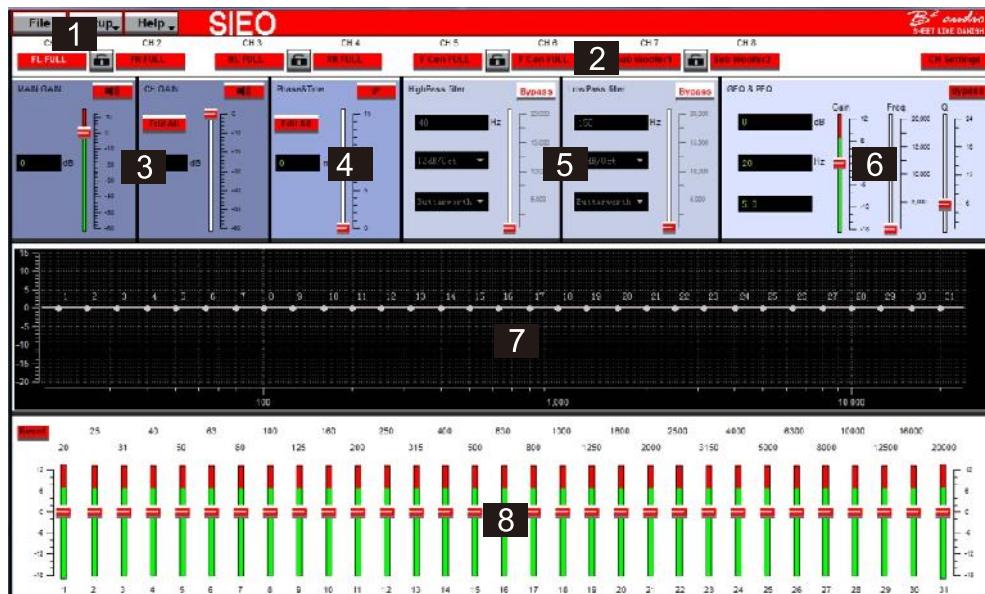
REMOTE FEATURES AND OPERATIONAL CONTROLS



- With this button the overall volume of the sound system can be controlled.
- With this button the the sound system (G / HHcan be controlled.
- With this button the overall volume of the sound system can be muted.
- With the **INPUT SET.** button you are able to switch an one the signal inputs of the audio sources ANALOG, AUX, DIGITAL. **MAIN** is the input **LINE IN** (Page 7, #7) sowie **SUB IN** (Page 6, #5).
- With the **MODE.** button you can switch the DSP into anyone of MODES.

FUNCTIONAL INSTRUCTIONS

USER INTERFACE OF THE SOFTWARE



Here you are able to adjust many settings to customize your sound system, which are immediately audible in real time via the DSP processor. Once you are done with the configuration of a setting, it can be transferred to a storage space on the DSP processor. You can store up to 10 different settings and select them with the remote control at any time during operation.

The following section describes the functions of the Sound DSP user interface.

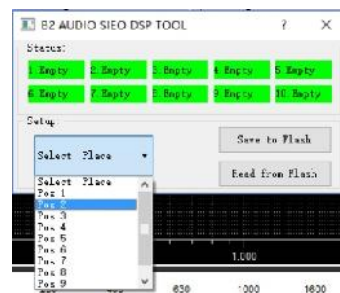
File - Dropdown menu:

- **Connect Device:** connect to the PC via the WIFI.
- **Open:** Open an existing file saved in the PC.
- **Save:** Saves a setting to a file on the PC with the current used file name. If no file name has been previously chosen the **Save File** dialog automatically asks for it.
- **SaveAs:** Save the settings in a new file.
- **Factor Setting:** Reset all settings to factory default.
- **Save/Read from Device:** Saves the setting on the DSP device. The following selection window shows in which storage space the setting can be stored. Choose under **Select Save Place** a storage space and confirm your selection with **Save to Flash**.

Note: Save the settings always **numerological (POS 1, POS 2, POS 3,...)**, to get access to them with the remote controller. No save space must be empty, otherwise, these settings are not accessible. See dialog window above.

Reads from the selected setting on the remote control from the DSP.

- **Exit:** Quit Sound DSP



△ * **Important:** The enclosed remote controller must necessarily be connected to the DSP processor.

FUNCTIONAL INSTRUCTIONS

2.SETTING:

- Here you can choose among the different input sources Digital input and AUX input.
- Select an input channel, click and drag to the setting panel on the right.
- Every output channel can be connected with any one or more input channels. As well, you can combine any 2 of the input channels and connect to one output channel for subwoofer. Right click to cancel the settings.
- The output labels are flexible for changing from each dropdown list, for easier configuration on the main interface.
- Reset all the channels by clicking RESET button.



3. EDIT ALL-GAIN:

- Here you can reduce the level of the individual **Outputs 1 – 8** from 0dB to -60dB. With **MUTE** you can mute the respective channel. If necessary, you can use **MUTE** under **MAIN** to mute all output channels.
- In addition, under **MAIN**, the total output level of the DSP processor (-60dB to + 12dB) can be adjusted. **Attention:** Use this control with caution. Too loud level could seriously damage your speakers.

4. EDIT ALL-DELAY:

- Here you can adjust the time delay and phase shift of the individual **Outputs 1 – 8**. For each output channel you can individually set the time delay of the signal under **DELAY**. Above **PHASE**, the unit of delay can be switched between ms (milliseconds) and cm (centimeters).
- Hint:** Instead of using the slider, you can also type in the value directly with the keyboard after a double click on the values above the sliders. Confirm by pressing **ENTER**.
- Below the sliders you can switch the phase to 0 or 180 individually for each channel.
- With these two functions you can match your sound system to the vehicle acoustics and adjust the acoustic stage perfectly.

