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DSP-SERIES AMPLIFIER

MANUAL

GZDSP 4.80AMP

Feature list

- 4-channel amplifier with integrated 8-channel signal processor (DSP)
- High efficient 2 Ohm stable class D amplifier
- 6-channel line input (RCA)
- 6-channel high-level input (with auto-on function)
- AUX input (3.5 mm socket)
- TOSLINK input (sampling rate up to 24-bit/96kHz)
- Plug for optional interface (wireless music streaming)
- 4-channel line output (RCA)
- 8-channel signal processor (DSP) - Cirrus Logic single core 32-bit/192 kHz
- Realtime setup of DSP functions (via PC)
- Simple handling, one-page graphical user interface (Windows compatible)
- Channel separated parametric equalizer (6x 31 band / 2x 11band)
- Channel separated time alignment (0-15 ms / 0-510 cm)
- Adjustable crossover (HPF / LPF / BPF - 20 Hz to 20 kHz)
- Selectable crossover slope (6 to 48 dB/Oct)
- Selectable phase shift for each channel (0° or 180°)
- Memory for 10 user presets (selectable with optional remote control)
- Two optional remote-control units available (GZDSP Remote or GZDSP Touch-Remote) to adjust main and subwoofer level, select the presets and input mode
- LED power and status indicator (protection circuit)
- Power on delay
- High temperature / short circuit / overload protection circuit)

Package contents

- 1 x GZDSP 4.80AMP amplifier
 - 1 x USB cable (A- to Mini-B connector) 5 m
 - 1 x 4-channel line output harness
 - 1 x 6-channel high-level input harness
 - 1 x CD-ROM incl. PC software and driver package (for Windows)
 - 1 x Owner´s manual (German and English)
 - 1 x Fastening Kit
- Optionally available:
- Remote-control unit **GZDSP Remote** with LED display incl. connection wire
 - Remote-control unit **GZDSP Touch-Remote** with color LCD display incl. connection wire
 - Interface **GZDSP BT-Box** for wireless music streaming (incl. connecting cable)

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Recommended wiring

	GZDSP 4.80AMP
Speaker wires	min 1.5 mm ² / 15 AWG
Power supply wires	min 20.0 mm ² / 4 AWG
High-level input wires	min 1.00 mm ² / 18 AW
Remote Leitung	min 0.50 mm ² / 20 AW

Mounting instructions

- As a precaution, it is recommended to disconnect the vehicles battery before mounting (also note the vehicles manuell)
- The power supply wire (+12 V) has to be protected within max. 20 cm / 8" by a main fuse holder with matching fuse value (Main fuse value has to be equal to the sum of values of the fuses of each connected device)
- If necessary, replace a defective fuse with the identical value only
- Never drill a hole to the vehicles gas tank or brake lines, to wirings or any other important vehicle part!
- Never pass wires over sharp edges or vehicle parts
- Keep the wiring away from the antenna and electronic devices contributing to radio reception
- Lay the power supply wiring always separated from speaker wiring
- The amplifier contains a temperature protection circuit that turns the device off in case of overheating. After a cooling time, it will turn on again automatically. To avoid heat buildup, sufficient air supply for cooling must be provided. Never cover the surface of the heatsink entirely.
- The amplifier should not be mounted on a heavily vibrating part or surface (e.g. subwoofer enclosure)
- If a pre-amplified output (RCA) is available (at the head unit), it is recommended to use it for input wiring

Required parts and tools for the installation

- screwdriver
- electric drill - 3 mm / 0.12" carbide drill bit
- recommende power wiring

WARNING!

High powered audio systems in a vehicle can generate "Live Concert" levels of sound pressure. Continued exposure to excessively high-volume sound levels may cause hearing loss or damage. Also, operation of a motor vehicle while listening to audio equipment at high volume levels may impair your ability to hear external sounds such as horns, warning signals or emergency vehicles! This may lead to potential traffic hazards. In the interest of safety, consumer electronics recommends listening at lower volume levels while driving.

Selecting a mounting position

Select a suitable location that is convenient for mounting, is accessible for wiring and has an ample room for air circulation and cooling. The unit must not be covered or mounted close to heat emitting objects. Because of the high operation temperature (up to 80°C), it is important to ensure sufficient distance to any heat-sensitive object. Especially the distance between GZDSP 4.80AMP and any plastic part or electronic component should be at least 3 cm (1.18").

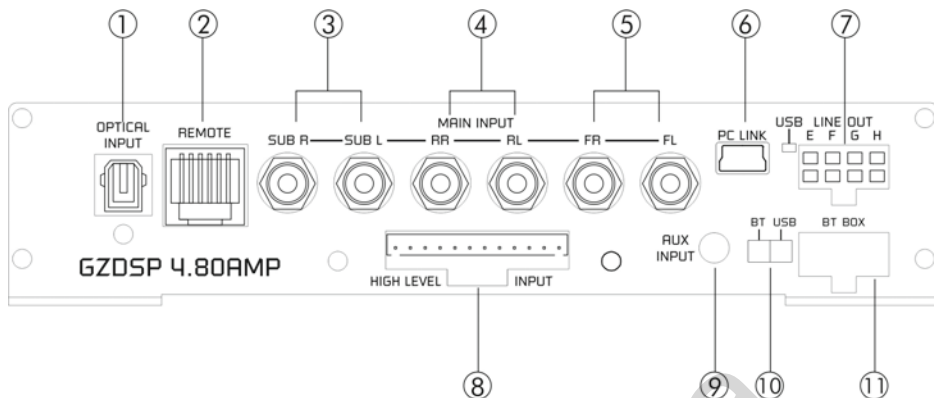
Mounting the Unit

You may use the unit as a template to mark the mounting holes, then remove it and drill the marked holes. Finally mount the unit with the mounting screws.

Caution

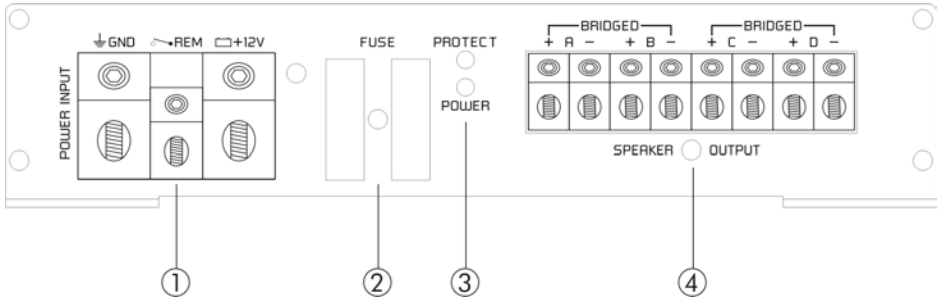
Choose a mounting position where all electric wires are protected from being damaged by sharp edges, heat or other conditions. +12 Volt DC electrical connections must be fused on the battery side. Make sure your head-unit and all other devices will remain turned off while connecting parts of the system. If it is necessary to replace the fuse(s), make sure to use only an equivalent one. Using inferior fuses may cause serious damage to your unit, wiring or even your cars electric. Any kind of damage traced back on disregard of these notes will not be covered by the warranty!

Audio connections (input)



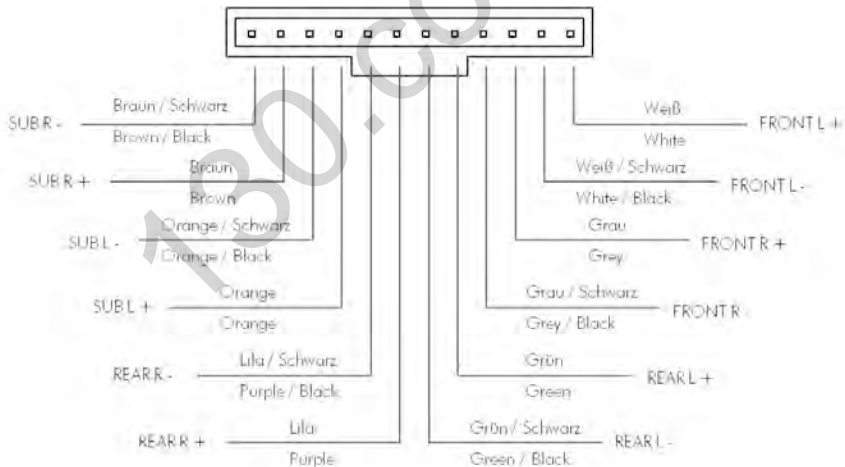
1	OPTICAL INPUT socket (TOSLINK)	To connect a digital audio source using the optical signal (SPDIF / stereo PCM) Attention: If the digital audio source has no level control, we strongly recommend using one of the available remote-control units. Otherwise the audio reproduction will be applied at max level!
2	REMOTE CONTROL socket	To connect one of the optionally available remote-control units GZDSP Remote or GZDSP Touch-Remote
3	Line Input SUB	Connect the subwoofer line out of the head-unit (if available)
4	Line Input REAR	Connect the rear line output of the head-unit (if available)
5	Line Input FRONT	Connect the front line output of the head-unit (if available)
6	PC CONNECT (MINI USB socket) and status indicator	To adjust the audio setting the unit must be connected to a PC using the included USB cable (compatible Windows PC with installed DSP software from the CD). The PC can be disconnected when the adjustment is done. The USB cable should not be extended to ensure an accurate communication between the DSP unit and the PC. The indicator next to the MINI USB socket will turn blue as soon as the connection has been established.
7	LINE OUT	To connect the included 4-channel RCA line out harness delivering the audio signal of channel E/F and G/H for further amplifiers. The signal can be set using the PC software.
8	HIGH LEVEL INPUT	The High-Level Input must be used if there's no pre-amplified output at the head-unit, nor offering a SP/DIF signal. In this case the head-unit speaker output wires must be connected to the high-level input harness. By using the high-level input, the DSP unit will turn on automatically recognizing the DC level. It's not necessary to connect the Remote-In wire to the power terminal. Caution: The high-level input and the line input(s) cannot be used simultaneously. This may lead to malfunction and cause serious damage to the DSP unit.
9	AUX INPUT	The 3.5 mm socket can be connected to an additional source unit. AUX can be selected as audio source using the PC software or one of the available remote-control units.
10	PC Link switch	To establish a wired connection to the PC, the switch must be in „USB“ position. The “BT” position is without function.
11	BT BOX socket	To connect the wireless audio interface GZDSP BT-Box or the remote-control unit GZDSP Touch-Remote – both are available optionally.

Power input & speaker output connections



1	POWER INPUT	+12V Positive terminal (battery) GND Ground terminal REM Remote input (in RCA mode) or Remote output (in high-level mode) Never connect the remote output wire of a source unit in high-level mode to the remote terminal In high-level mode, the switched voltage at the terminal can be used to turn on additional amplifiers. The current of the remote terminal is limited to 130 mA . In case of using several units with a common current exceeding the limitation, an additional relay is required.
2	FUSE	Defective fuses must be replaced by fuses with identical values
3	Status indicator	POWER green/ok (regular operation mode) PROTECT red/error (protection mode)
4	SPEAKER OUTPUT	Channel A/B/C/D speaker terminal

High-level input harness



ATTENTION!

Please note that the GZDSP 4.80AMP cannot be used in vehicles with a factory active system installed. That might lead to serious defects of the amplifier as well as of the vehicle's electronic system. In case of uncertainty contact your car audio dealer or the car's manufacturer.

Installing the PC software

To install and use the PC software, a Windows™ XP (SP3) operating system (or later) with a USB port is required. The installation will need about 25 MB free memory space. We recommend using a laptop for easier handling. Insert the enclosed CD-ROM into the CD drive of your PC. If there is no CD drive available, the software can be downloaded from the following link: www.ground-zero-audio.com

Run the **setup.exe** file. The installation wizard will install the software for the DSP as usual. We recommend creating a desktop icon. The drivers will be installed automatically during the DSP software installation. The PC requires a restart after the installation of the software

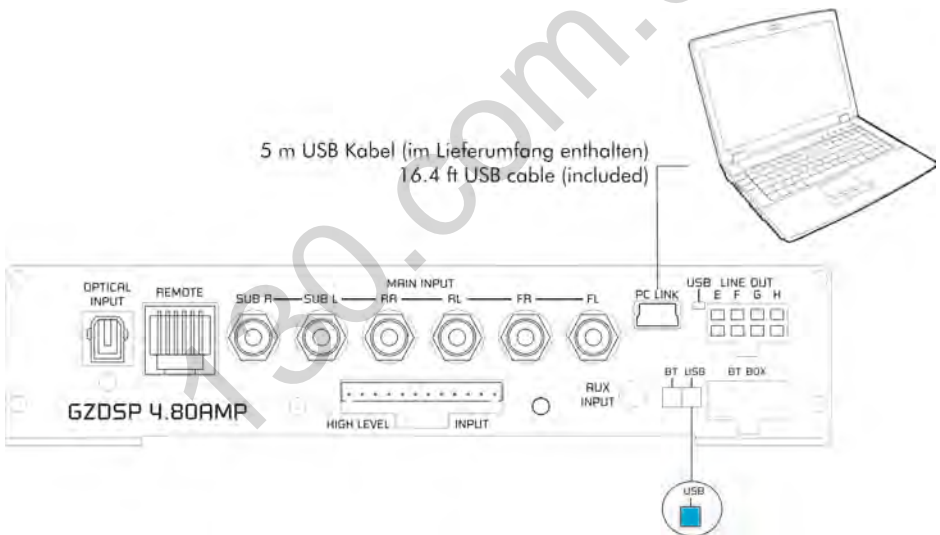
Important note for 64-bit operating systems:

It might be necessary to install the 64-bit driver manually. The driver can be found on the CD-ROM or: www.ground-zero-audio.com

Software update:

It's strongly recommended running always the latest DSP software. The actual version can be downloaded here: www.ground-zero-audio.com

Connecting the DSP to the PC

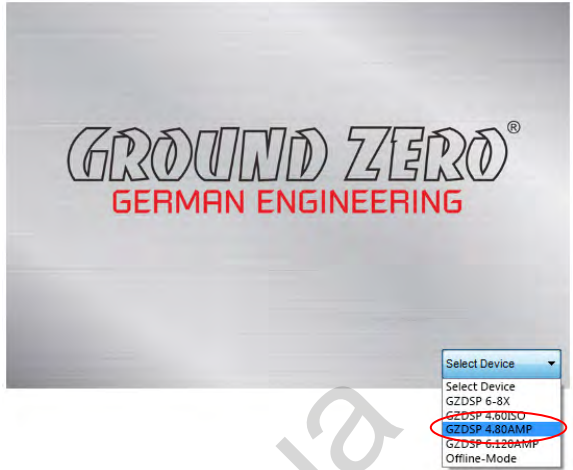


Note about the USB connection:

The included USB cable should not be extended to avoid any kind of malfunction of the communication between the DSP unit and the PC. The LED next to the USB port on the unit will light up blue as soon as the GZDSP 4.80AMP has established a connection to the PC.

In order to configure the DSP, the GZDSP 4.80AMP must be connected to a PC with the DSP software installed using the included USB wire. The head unit and the DSP unit must be turned on before opening the software. The DSP software starts by double-click the desktop icon. The start screen appears and GZDSP 4.80AMP should be selected as device (Select Device).

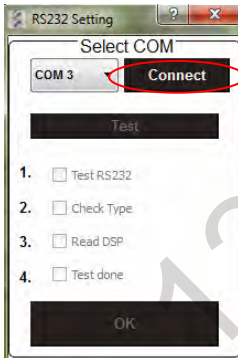
The latest software version can be downloaded from this page: www.ground-zero-audio.com



Demo Mode (Offline Mode):

It's possible to use the software in offline mode without having the GZDSP 4.80AMP connected to the PC to become familiar with most of the features and to create sample setups.

USB port selection



After having the DSP unit selected at the **Select Device** menu, the **RS232 Setting** window will appear.

Usually the correct COM port will be selected automatically. The port number may vary depending on the computer's environment. It can be selected manually using the dropdown menu.

Note:

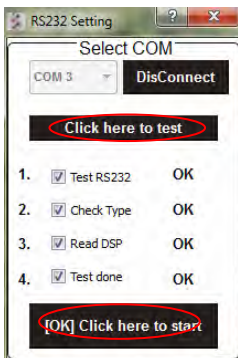
The COM port will be assigned automatically by the Windows operating system. Please note that this should be one of the ports COM1 to COM9. In case of any problem, please follow the instructions on the next page.

A click on the **Connect** button will start the automatic connection process of the GZDSP 4.80AMP to the PC.

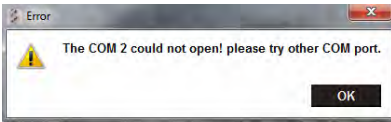
Next click on **Click here to test** connects the unit to the PC.

A number of automatic tests will be initiated now and each of them marked as **OK** after successful examination.

Finally, a click on **[OK] Click here to start** will open the user interface of the DSP software.



Wrong COM-Port error message

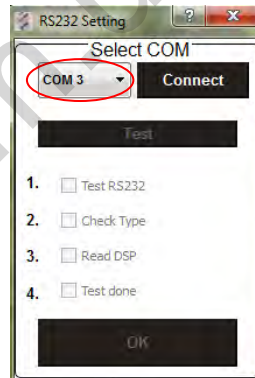


If this message will appear, the operating system assigned the wrong COM port or it was not possible to assign one of the COM1 to COM9 ports due to environmental issues of the PC. The COM port assignment may be checked with the operating system's device manager.



In this case the correct COM port is number 3

Close the pop-up window by clicking **OK**. Now it is possible to select the correct COM port at the Select COM window.

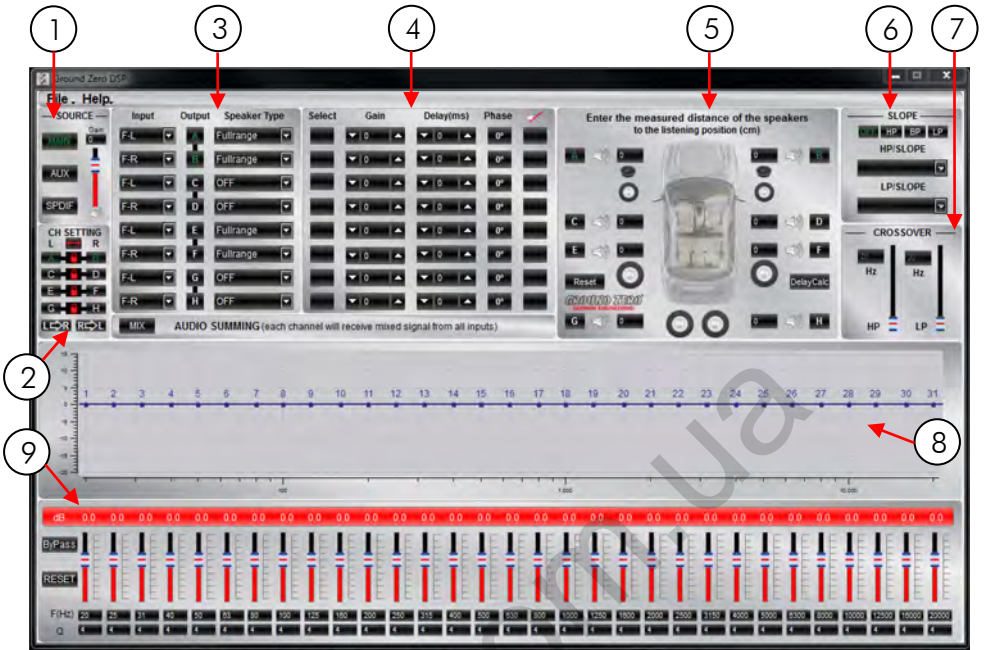


Important note:

If the assigned COM port will be COM10 or even higher one of the unused COM ports 1 to 9 has to be deleted in order to change the previously automatically assigned COM port for the **USB-SERIAL CH340** device.

Subsequently, the COM port can be selected in the **properties** of the **USB-SERIAL CH340** device (right click on the device at the device manager).

Software user interface



1 SOURCE

Input selection



- MAIN** - RCA line or high-level input
- AUX** - 3.5 mm input socket
- SPDIF** - Optical input (TOSLINK socket)

Main volume control

Gain - Main volume (-40dB to +12dB)


Caution:

The controls must be used carefully to avoid damaging the speakers.

② CH SETTING

Channel selection




Clicking the -Icon will link the relevant pair of channels allowing function adjustments simultaneously (Crossover / Slope / Equalizer) for both channels.




Simultaneous adjustment of channel A and B



Independent adjustment of channel A and B

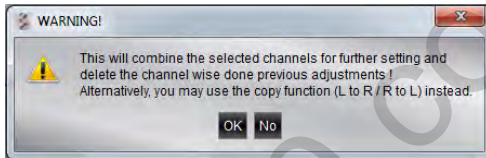
Clicking  will copy the current adjustment of the left channel to the right channel.



Clicking  will copy the current adjustment of the right channel to the left channel.

Clicking the -Icon will invert the left and right inputs.

Warning

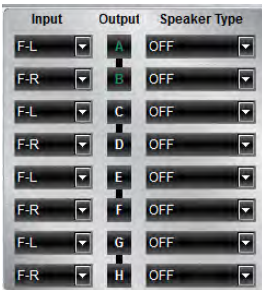
Trying to synchronize (link) two channels, which have already been adjusted separately, will cause a pop-up warning.



Confirming this with OK will reset all channel wise done previous adjustments. This cannot be revoke. Therefore, either a separate adjustment is recommended or alternatively the copy-functions  or  can be used.

3 CHANNEL MATRIX

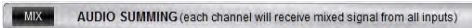
Configuration of in- and outputs



Input – Assignment of the corresponding input channel to the respective output A – H.

The following input options are available:

- Channel A/B: F-L (Front-L) and F-R (Front-R)
- Channel C/D/E/F: F-L (Front-L) and F-R (Front-R)
or R-L (Rear-L) and R-R (Rear-R)
- Channel G/H: F-L (Front-L) and F-R (Front-R)
or R-L (Rear-L) and R-R (Rear-R)
or F-L+R (sum of Front-L and Front-R)
or R-L+R (sum of Rear-L and Rear-R)
or F+R-L (sum of Front-L and Rear-L)
or F+R-R (sum of Front-R and Rear-R)
- SUB-L and SUB-R
- SUB-L+R (sum of SUB-L and SUB-R)



Input-MIX – Input summing of filtered signals

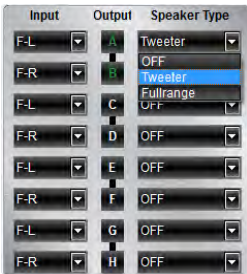
This setup should be chosen if the head unit has filtered (HPF/LPF/BPF) speaker output channels. All 6 high level input channels will be summed to a full-range audio signal.

Outputs A+C+E+G receive a summed audio signal from the input channels FL+RL
Outputs B+D+F+H receive a summed audio signal from the input channels FR+RR

We recommend connecting the input channels as follows
Front left and Front right: Highpass filtered audio signal
Rear left and Rear right: Bandpass filtered audio signal

Output:

Clicking the corresponding channel will allow adjustments of crossover, slope and equalizer functions. Same as CH Setting (2) function.



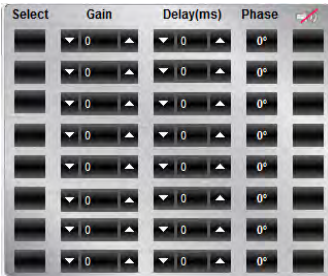
The mentioned information to channel A, B, C and D refer to the speaker output of the GZDSP 4.80AMP. The signal of channel E, F, G and H will be available at the RCA line output (via line out harness).

Speaker Type: Pre-selection of the connected speakers.
3 different options can be chosen.

- OFF – Channel deactivated
- Fullrange – All filters deactivated! (individually selectable)
- Tweeter (A/B) – Highpass filter preset 3000 Hz (12 dB/oct)
- Midrange (C/D) – Bandpass filter preset 250 / 3000 Hz (12 dB/oct)
- Kickwoofer (E/F) – Bandpass filter preset 80 / 250 Hz (12 dB/oct)
- Subwoofer (G/H) – Bandpass filter preset 20 / 80 Hz (12 dB/oct)

4 GAIN & DELAY

Channel configuration (level adjustments and time alignment)



Select:

Marking the channel as **Selected** allows grouping the respective channels together for combined adjustments of **Gain** and **Delay**.

Gain:

To adjust the output level of the respective channel

Delay(ms):

To adjust the time alignment of the respective channel. Will be displayed in milliseconds.

Warning:

It is recommended to fill in the measured distances of the speakers to the listening position first **(5)** and realize detailed fine-tuning later at the **Delay(ms)**

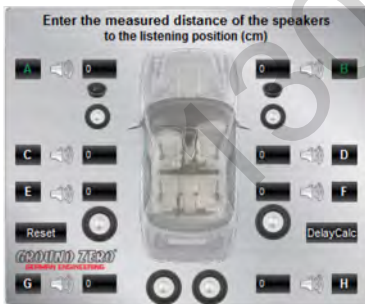
Phase – 0 / 180° Phase inversion of the respective channel



– Mute of the respective channel

5 SPEAKER DISTANCE

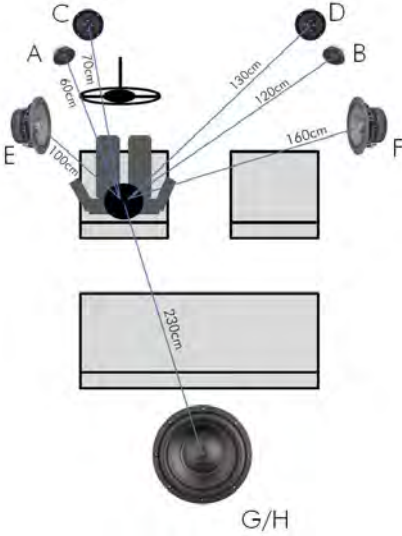
Speaker distance entry



Before realizing the detailed tuning of each speaker's time alignment (**Gain & Delay**), the measured distances of all connected speakers should be added to this graphic.

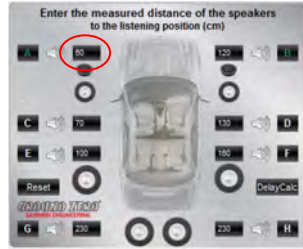
The exact distance between listening position (head) and the cone center of each speaker must be measured.

The explanation of a correct implementation on the following page can be used as an application example.



Application example (time alignment)

All measured distances (cm) must be added to the according fields of the graphic



DelayCalc

Clicking the button will cause the calculation of the respective time alignment in milliseconds and transfer the data to the **Delay** list

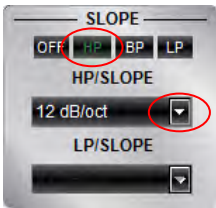
Select	Gain	Delay(ms)	Phase
▼ 0 ▲	▲ ▼	5.05	0°
▼ 0 ▲	▲ ▼	3.29	0°
▼ 0 ▲	▲ ▼	4.76	0°
▼ 0 ▲	▲ ▼	2.99	0°
▼ 0 ▲	▲ ▼	3.85	0°
▼ 0 ▲	▲ ▼	2.09	0°
▼ 0 ▲	▲ ▼	1.1	0°

Further detailed adjustments can be edited to either the time alignment list (ms) or to the speaker distance window (cm)

Reset

The Reset button will delete all settings of the time alignment function. Other DSP settings remain

6 SLOPE



Adjustment of the crossover

Important:

Before choosing the filter, a **Speaker Type** must be defined in window 3.

When the setup consists of a front system connected to channel A/B and a rear speaker system connected to channel C/D, the **Fullrange** entry should be selected. According to the speakers and listeners request a high pass filter (HP) can be activated at the **Slope** window.

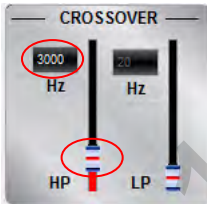
High pass (**HP**) / Bandpass (**BP**) and low pass (**LP**) can be chosen at the **Slope** window for the selected channel(s).

A slope of 6 to 48 dB/oct can be selected at the drop down menu.

Note:

The higher the selected value the steeper the slope starting at the crossover frequency.

7 CROSSOVER



Adjusting the cutoff frequency

The filters can be adjusted continuously from 20 – 20000 Hz.

The controls can only be used if a filter (Slope/6) has been selected first.

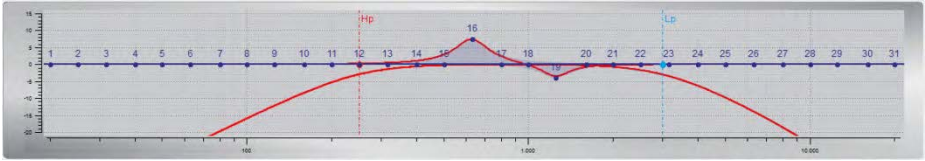
Note:

If a filter has been selected, it is possible to adjust the crossover frequency directly with the cursor at the frequency chart (8). Click and hold the red (HPF) or blue (LPF) dot with the cursor and move it to the desired point on the frequency chart.

Hint:

Instead of using the crossover control, it is possible to adjust the crossover point by typing the required value directly into the box above and confirm with >ENTER< or by using the up/down cursor buttons.

8 FREQUENCY DIAGRAM

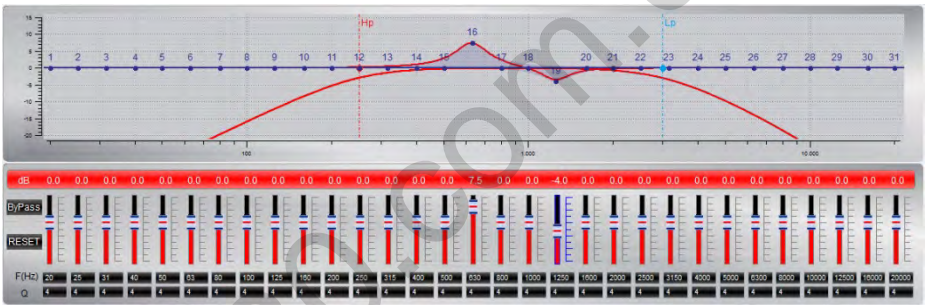


Function of the frequency diagram

The frequency chart displays the adjustments of the 31-band equalizer (9) and the setting of the crossover (7) for every output channel or a pair of output channels.

Furthermore, the curves can be adjusted individually using the mouse (drag&drop).

9 EQUALIZER



Adjusting the parametric 31-band equalizer

The output channels A to F can be equalized by adjusting 31 frequency bands (20 - 20000 Hz) using the controls (-18 to +12dB) individually. The subwoofer output channels G/H offer 11 bands (20 - 200 Hz) to adjust the audio signal.

Each frequency can be adjusted individually in 1-Hz steps in the F(Hz) window.

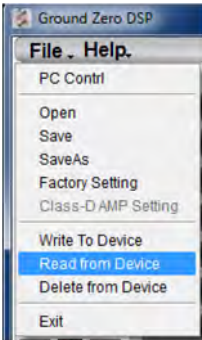
Additionally, it is possible to change the filter Q (bandwidth/slope) by typing the required value directly into the box below each band control (0,5/narrow - 9,0/wide) or by using the up/down cursor buttons.

Furthermore, the curves can be adjusted individually in window 8 using the mouse (drag&drop).

The EQ-function can be deactivated with the **ByPass** button without resetting the EQ-setup.

Using the **RESET** button will cause a full reset of the EQ-setup to factory setting. (Other adjustments are not affected).

FILE dropdown menu

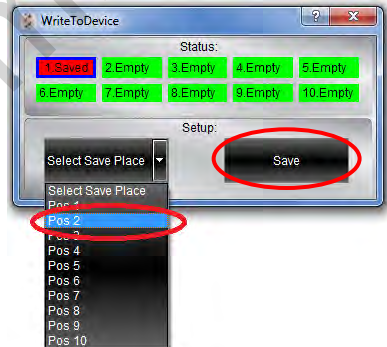
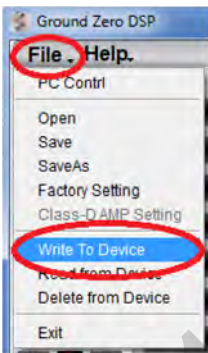


PC Contrl	Opens the „Select COM“ window (page 9)
Open	Opens a setup file that has been saved previously to the PC memory or an external drive
Save	Saves the current setup as a file to the PC with unmodified filename. If no filename has been selected yet, the dialogue will ask for the input.
Save as	Saves a setup file with a certain filename.
Factory setting	Sets the unit to default settings
Class-D AMP Setting	No function
Write to Device*	Saves the current setting to the preset memory of the GZDSP 4.80AMP unit. At the following window, the preset number can be selected.
Read from Device*	Opens one of the available presets from the memory of the GZDSP 4.80AMP. The preset can be selected from the following window. The blue frame indicates the actually selected preset number.
Exit	Closes the DSP software

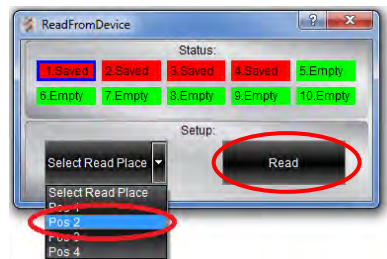
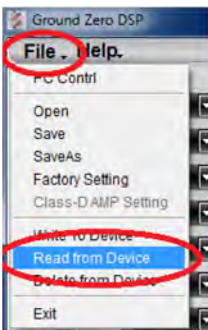
***Important:** The 10 presets can be used if the optional remote control GZDSP Remote or GZDSP Touch-Remote is connected. Without the remote-control unit, it is only possible to use and edit the last preset that has been saved.

Preset memory saving and loading

***Note:** All presets must be covered in numerical order (Pos 1 > Pos 2 > Pos 3 > ...) without skipping a position, otherwise it will not be possible to access all presets with the remote control.



Open the dropdown menu at **Select Save Place** and choose one of the preset positions. Confirm by clicking **Save**



Open the dropdown menu at **Select Read Place** and choose one of the preset positions. Confirm by clicking **Read**

Application examples

GZDSP 4.80AMP offers various system configurations. Here is a description of the two most common applications:

		Front and rear speaker system + subwoofer (e.g. active sub)	2-way front system (active) + + subwoofer (e.g. active sub)
Channel	A/B	Front system at speaker output High pass filter HP: 50 – 80 Hz	Tweeter at speaker output High pass filter HP: 2500 – 4500 Hz
	C/D	Rear system at speaker output High pass filter HP: 50 – 120 Hz	Midwoofer at speaker output Bandpass filter HP: 50 – 80 Hz LP: 2500 – 4500 Hz
	E /F	-	-
	G/H	Subwoofer Bandpass filter HP: 10 – 30 Hz LP: 50 – 80 Hz	Subwoofer Bandpass filter HP: 10 – 30 Hz LP: 50 – 80 Hz

Note: The final crossover points depend on the speaker's capacity that have been installed. The technical specifications of the speakers will supply more information about possible applications and suggested crossover points. Above, these are just noncommittal examples. Ground Zero will not be legally responsible for any kind of damage of speakers or other components caused by wrong settings.

Technical Specifications

Model	GZDSP 4.80AMP
Type	4-channel amplifier with integrated signal processor (DSP)
Frequency range	20 Hz – 20 KHz (-3 dB)
RMS Power @ 4 Ω CEA Standard CEA-2006-A	4 x 80 W (1% THD+N)
RMS Power @ 2 Ω CEA Standard CEA-2006-A	4 x 130 W (1% THD+N)
Processor	Cirrus Logic single core 32 bit, 8-channel, 192 kHz
Sensitivity	High level input: 2 – 15 V RMS AUX input: 0.6 – 5 V RMS
Input resisance	> 47 kΩ (low level input)
Output	4-channel speaker output 4-channel line output (RCA)
Input	6-channel high level input AUX (3.5 mm socket) Digital input: TOSLINK optical max. 24bit/96 kHz (PCM stereo)
Remote out	max. 130mA
Recommended fuse	2 x 30 A
Dimensions Heatsink only W x H x L	185 x 39 x 181 mm 7.28" x 1.54" x 7.13"
Dimensions Whole unit W x H x L	185 x 42 x 215 mm 7.28" x 1.77" x 8.46"
Software compatibility	Microsoft Windows™ XP SP3, Vista, 7, 8, 8.1, 10
Preset	10 x individually adjustable / selectable using the optionally available remote control unit GZDSP Remote or GZDSP Touch-Remote
Gain range	-40 to +12dB
Equalizer	6 x 31 bands at output A - F (20 – 20000Hz), -18 bis +12dB, Q 0.5 - 9 2 x 11 bands at output G&H (20 – 200Hz), -18 bis +12dB, Q 0.5 - 9
Time alignment	0 – 15 ms / 0 – 502 cm per channel
Crossover	6 / 12 / 18 / 24 / 30 / 36 / 42 / 48 dB/oct (BPF / LPF / HPF Butterworth) 20 – 20000 Hz
Phase shift	0° / 180° per channel
Optionally available Remote control units	GZDSP Remote or GZDSP Touch-Remote (main level, subwoofer level, source selection and preset selection)

Error diagnosis

Error	Control	Help / Solution
No function	PWR LED on?	check the fuse(s) check the remote wire (not required in high-level mode) check the auto-on switch position (in high-level mode) check the +12 Volt connection and wire check the ground connection and wire
No sound (PWR LED on)	no setup selected	select the setup using the DSP software
	signal wire no contact or broken	check the contact or replace the wire
	no audio signal from the head-unit	check the audio output signal of the head-unit
	non-operational further amplifier	check the remote wire connection (if used) check the further amplifier's power supply
	non-operational source is selected	check the source unit
	MUTE function activated (software)	check the setup using the DSP software
Single channels with no function	level at optional remote control is too low	check the setting at the remote control
	signal wire has no contact or it's broken	check the contacts or replace the wire
	no audio signal from the head-unit	check the audio output signal of the head-unit
	balance or fader control of the head-unit is not in the center position	check the setting of the head-unit
	wrong setup of input and output mode	check the setup using the DSP software
Impure sound, incorrect stereo reproduction	gain (level) is too low, or the MUTE function is activated in the DSP setup	check the setup using the DSP software
	inverted phase of one (or more) speakers	check the polarity of the speaker connection check the polarity of the high-level input check the PHASE setting check the TIME ALIGNMENT adjustment
Distorted sound quality	speaker overload	reduce the volume level check the high-pass filter and the slope of the filter
	DSP input override (distortion)	select the correct input mode pay attention to the input sensitivity of the unit
	head-unit output override (distortion)	reduce the volume level of the head-unit set the sound controls of the head-unit to center position -deactivate the LOUDNESS function of the head-unit
	amplifier override (clipping)	max output power of the GZDSP 4.80AMP exceeded. reduce the level to avoid damaging the amplifier or the speakers
Increased noise level	gain (level) is too high	reduce the gain (level) using the DSP software
	head-unit creates noise(s)	select a superior quality head-unit use the optical output (if available) let the audio store or manufacturer check the head-unit
Car specific interferences audible	diverse power supplies or ground connection	the head-unit, GZDSP 4.80AMP and each further amplifier should be wired up to a common ground, as well as a common +12 Volt terminal
	signal wire has no contact or it's broken	check the contacts or replace the wire
	defective head-unit	let the audio store or manufacturer check the head-unit
	defective amplifier	let the audio store or manufacturer check the amplifier
	this or further amplifier(s) mounted near automotive control units	choose a mounting position far away from automotive units
	OEM head-unit's analog output connected (although car supports MOST connection)	use the MOST audio signal of the OEM head-unit*

***Note:**

To use the digital MOST audio signal of the OEM head-unit as source, an optional MOST to SP/DIF signal converter is requested. Connect the SP/DIF signal directly to the digital input of the GZDSP 4.80AMP using TOSLINK connectors.

Terms of warranty

The limited warranty for this product is covered by Ground Zero's local distribution partners and their terms and conditions. For further information contact your local retailer or distributor.

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