

# GROUND ZERO<sup>®</sup>

## GERMAN ENGINEERING

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# DIGITAL SIGNAL PROCESSOR

## GZDSP 4-8XII

### Owner's manual

#### Feature list

- Digital signal processor (DSP) – 2x Analog Devices SigmaDSP
- 4-channel line input (RCA)
- 4-channel high-level input (with auto-on function)
- 8-channel line output (RCA)
- Realtime setup of all functions (via PC or APP\*)
- Simple handling, one-page graphical user interface (Windows<sup>®</sup> compatible)
- Parametric equalizer for each channel (8x 10 bands)
- Time alignment (0-8 ms / 0-272 cm / 0-107") for each channel
- Adjustable crossover (HPF / LPF / BPF from 20 Hz to 20 kHz)
- Selectable crossover slope (6 to 24 dB/oct)
- 3 filter characteristics (Butterworth/Bessel/Linkwitz-Riley)
- Selectable phase shift for each channel (0° or 180°)
- Memory for 6 user presets (selectable via remote control, PC or APP\*)
- Wired remote control (available separately)
- Heatsink dimensions (w x l x h): 6.65" x 4.57" x 1.06"  
\*with optionally available USB BT adapter connected

#### **App control and wireless music streaming**

To use your mobile device controlling the unit and changing the adjustments, please install the GROUND ZERO GZDSP 4-8XII control app on your device (Android / iOS) and connect the separately available music streaming interface. Check the web page for further information and to download the app's owner's manual.

## Product description

The GZDSP 4-8XII is a digital signal processor increasing the sound quality of the vehicle's audio equipment, based on two 28-bit DSP chipsets in combination with four 24-bit AD and eight separate DA converters. Due to its universal summing function combining up to 4 high-level channels and its 8x 10-band equalizing, the GZDSP 4-8XII can be integrated into most OEM sound systems.

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## Package content

- 1 x GZDSP 4-8XII
- 1 x USB cable (A to B connector)
- 1 x Power supply and high-level input harness
- 1 x CD-ROM (software & drivers) compatible with Microsoft Windows® XP SP3, Vista, 7, 8, 8.1 and 10
- 1 x Owner's manual (German/English)
- 1 x Fastening kit Separately available

Available separately

- GZDSP BTS 4-8XII wireless music streaming USB adapter (required for app control)
- GZDSP REM 4-8XII wired remote control



GROUND ZERO products are engineered in Germany

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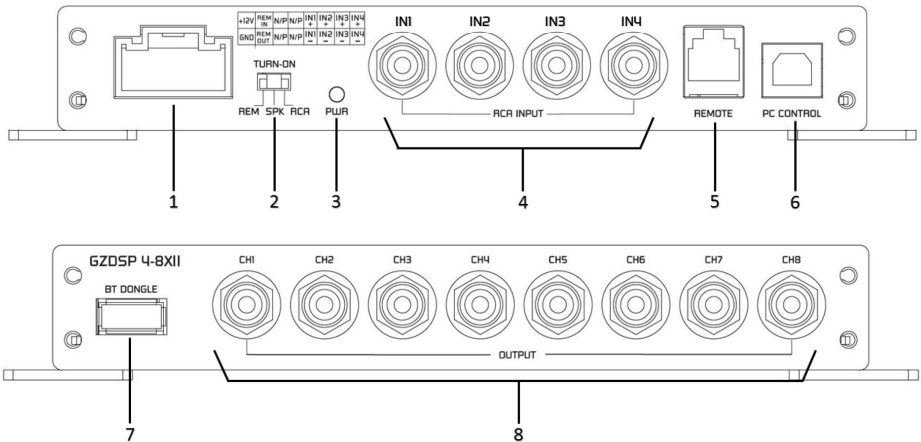
## General installation note

- As a precaution, it is recommended to disconnect the vehicles battery before mounting the amplifier. (Note: For new vehicles, disconnecting the battery might cause various errors in your vehicle's electric system that can be cleared only by authorized service partners of your vehicle's manufacturer! Please ask your service partner first before disconnecting the battery!)
- The power supply wire (+12 V) has to be protected within max. 20 cm / 8" by a main fuse holder with a fuse value matching the recommendation for your amplifier

(Note: If there is more than one amplifier connected using this power wire, the main fuse value must be equal to the sum of the recommended fuses of all connected devices. However, make sure the diameter of your power wire will be sufficient for the required current!)

- If necessary, replace a defective fuse by a fuse with identical quality and value
- Never drill a hole to the vehicle's gas tank or brake lines, to wirings or any other important vehicle parts!
- Never pass wires over sharp edges or vehicle parts to avoid any kind of damage
- Keep the wiring away from the antenna and electronic devices contributing to radio reception
- Lay the power supply wiring always separated from speaker wiring to avoid disturbance
- The amplifier contains a temperature protection circuit that turns the device off in case of overheating. After a certain cooling time, it will turn on automatically. To avoid heat build-up, sufficient air supply for cooling must be provided. Never cover the surface of the amplifier's heatsink entirely
- The DSP unit should **NEVER** be mounted onto a vibrating part or surface such as a subwoofer enclosure. This might lead to malfunction due to loosened electrical parts inside the amplifier.
- Some amplifiers offer a high-level input option, however if a pre-amplified output (RCA) is available (at the head unit), it is strongly recommended to make use of them.

## Connections



1	<b>Harness connection</b>	To connect the power and speaker input harness (check the pinout on the next page).
2	<b>TURN-ON switch</b>	This unit offers automatic turn-on. Using the feature, it's unnecessary to connect a remote wire. Set the switch to the RCA position for line input or SPK position for the high-level input. <b>Caution: The high-level input and the line input cannot be used simultaneously. This may lead to malfunction and cause serious damage to the DSP unit.</b>
3	<b>Power indication</b>	Indicating the operation status
4	<b>Line input (RCA)</b>	To connect the head-unit's pre-amplified line output audio signal (RCA)
5	<b>Remote control</b>	To connect the supplied wired remote control
6	<b>USB port</b>	To connect the supplied USB cable to a compatible Windows PC's USB port
7	<b>Port for optional BT adapter</b>	To connect the optionally available interface for wireless music streaming. The interface is required to control the unit and adjust the settings using a mobile device (app), as well.
8	<b>Line output (RCA)</b>	To connect one or more amplifiers using RCA signal cables

## Harness connector pinout

1	+12V	REM IN	N/P	N/P	IN1 +	IN2 +	IN3 +	IN4 +	8
9	GND	REM OUT	N/P	N/P	IN1 -	IN2 -	IN3 -	IN4 -	16

cable side view

1	Yellow	+ 12 V Power supply	Connect the unit to the positive pole (+) of the vehicle's battery. Use adequate wiring gauge (not less than 1.0 mm <sup>2</sup> / 17 AWG) with an additional fuse holder (2 A fuse) not further than 30 cm / 12" away from the terminal of the battery
2	Blue	Remote input	Using the line input (RCA), a remote wire can be connected to turn on the DSP unit. In this case, set the TURN-ON switch to the REM position. Setting the switch to the RCA or SPK position activates the auto-on function, in that case a remote wire is superfluous.
5	White	Channel 1 (+)	To connect the left front speaker output (+)
6	Grey	Channel 2 (+)	To connect the right front speaker output (+)
7	Green	Channel 3 (+)	To connect the left rear speaker output (+)
8	Purple	Channel 4 (+)	To connect the right rear speaker output (+)
9	Black	Ground (GND)	Connect the unit to a suitable ground terminal. The ground wire should be as short as possible and be mounted to an unvarnished metal part
10	Blue/ White	Remote output	To be used with additional system equipment like amplifiers to turn on together with the DSP unit. The current is limited to 500 mA max.
13	White/bl	Channel 1 (-)	To connect the left front speaker output (-)
14	Grey/bl	Channel 2 (-)	To connect the right front speaker output (-)
15	Green/bl	Channel 3 (-)	To connect the left rear speaker output (-)
16	Purple/bl	Channel 4 (-)	To connect the right rear speaker output (-)

## PC software installation

The PC software is compatible\* to Windows™ XP (SP3) operating systems (or later). One USB port and 25 MB free memory space is required for the installation. The files are located on the included CD-ROM. If there is no CD drive available, the software can be downloaded from the Ground Zero web page: [www.ground-zero-audio.com](http://www.ground-zero-audio.com)

\* compatible operating systems: Microsoft Windows® XP SP3 / Vista / 7 / 8 / 8.1 / 10  
 PC requirements: min. 1.5 GHz processor with 1 GB main memory (RAM) and graphic cards with a resolution of 1024x600 pixels or more

Run the **setup.exe** file. The installation wizard will guide through the installation process.  
**Note:** We strictly recommend using the latest DSP software available from the web page.

## USB connection

**USB connection:** We don't recommend using any passive extension cable together with the included USB wire, as the proper function can't be ensured.

**DSP setting:** The unit must be connected to a PC with the DSP software installed using the included USB wire. To adjust any setting the unit must be in operation mode. Click the program icon on the desktop or select the program from the software list to start. The starting window appears.

**Windows® user account control (UAC):** In case the PC operating system is set to restricted security clearance regarding software with unknown source or without digital signature a window will appear each time at the program is starting. Please confirm with >Yes< (language depends on your local setting) to run the program

## USB port

In order to use the software, a communication to the PC must be established. Therefore, an unused USB port is required. During the connection of the USB cable the system will assign automatically a USB port.

Graphical user interface (GUI)

This screenshot shows the 'Expert' mode of the GROUND ZERO GUI. At the top, there are 'Memory' and 'Options' buttons, an 'Input source' dropdown set to 'Hi\_Level', and a 'Not connected devices' status with a 'Not connect' button. The main area is divided into filter and EQ sections. The filter section includes a 'High-pass filter' (Type: Butter\_W, Freq: 20\_Hz, Slope: 18dB/Step) and a 'Low-pass filter' (Type: Butter\_W, Freq: 20000\_Hz, Slope: 18dB/Step). Below the filters is an EQ section with 10 bands, each with a frequency, gain, and Q factor. A 'Work' button is at the bottom left of the EQ section. A 'Main volume' knob is on the far left. The bottom of the screen features eight channel strips (CH1-CH8), each with level, delay, mute, phase, and link controls. Red callout numbers 1 through 9 point to various UI elements.

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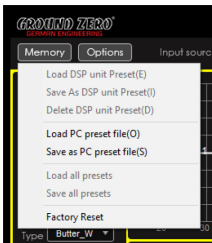
This screenshot shows the 'Expert' mode of the GROUND ZERO GUI with a 4x8 matrix of input channels. The top bar is identical to the previous screenshot. The main area is dominated by a grid of 32 input channels (IN1-IN4 across 8 channels). Each channel has a status indicator (yellow or grey square) and a 'Link' button. A 'Main volume' knob is on the left. The bottom of the screen features the same eight channel strips (CH1-CH8) with their respective controls. Red callout numbers 1 through 10 point to various UI elements.

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## Graphical user interface (GUI)

1	<b>Main level adjustment</b>	Setting the main level (input sensitivity) in between the range of -60 up to +6 dB (the adjustment is equal to the remote control setting between 0 and 66) The MUTE button deactivates the output
2	<b>Memory / Options dropdown menu</b>	Tap the button to open the dropdown menu. Further information about the dropdown menu is to be found at the section below
3	<b>Expert mode</b>	Switch to the channel matrix. Further information about the dropdown menu is to be found at section 10
4	<b>Channel settings</b>	<b>Channel:</b> Select the required channel tapping the according button <b>Level:</b> Use the up/down buttons to adjust the output level of the channel <b>Mute:</b> Tap the button to deactivate the selected channel <b>Input:</b> The button is indicating the selected input channel. Tap repeatedly to select a channel <b>Delay:</b> The button indicates the selected unit of the time delay. Tap repeatedly to select a unit. Use the up/down buttons to adjust the time delay. The value can be entered to the display field directly, as well. <b>Phase:</b> Each tap inverts the phase (0°/180°) <b>Link:</b> Tap the button to link each pair of channels (e.g. 1 with 2, 3 with 4, etc.) to adjust both channels simultaneously
5	<b>High pass filter settings</b>	<b>Type:</b> Select the filter characteristic from the dropdown menu <b>Freq:</b> The required value can be entered to the display directly or selected using the scroll wheel of the PC mouse. The frequency chart shows the adjustments graphically (H=high pass) <b>Slope:</b> Select the crossover slope from the dropdown menu or deactivate the filter <b>Note:</b> The filter can be adjusted using the PC mouse at the frequency chart directly
6	<b>Low pass filter settings</b>	<b>Type:</b> Select the filter characteristic from the dropdown menu <b>Freq:</b> The required value can be entered to the display directly or selected using the scroll wheel of the PC mouse. The frequency chart shows the adjustments graphically (L=low pass) <b>Slope:</b> Select the crossover slope from the dropdown menu or deactivate the filter <b>Note:</b> The filter can be adjusted using the PC mouse at the frequency chart directly
7	<b>Equalizer settings</b>	As soon as the equalizer setting is changed from default, the following button appears <b>Bypass EQ:</b> Resets the adjustments temporarily to default setting. At bypass position: <b>Restore EQ:</b> Restores the previous setting of the equalizer <b>Reset EQ:</b> Resets the equalizer setting to default <b>Freq / Q / dB:</b> Enter the required value to the display field directly or select the value using the scroll wheel of the PC mouse. The frequency chart shows the adjustments graphically <b>Note:</b> Many settings can be changed at the frequency chart directly using the PC mouse
8	<b>PEQ or LS/HS selection</b>	Selecting one of the available modes for the first (1) and last (10) band, the default setting (PEQ) can be set to a variable shelf filter (LS/HS) instead with a slope of 6 or 12 dB/octave
9	<b>Connect / Disconnect button</b>	Tap the button to establish or separate the connection between the DSP unit and the PC via USB cable. The connection status is displayed at the top of the window
10	<b>Input signal</b>	Using the matrix, one or more input channels can be assigned for each output channel. If more than one channel is selected, the MIX-icon will be visible at the button

## Memory dropdown menu



<b>Load DSP unit Preset</b>	Loading a setup from the DSP memory
<b>Save as DSP unit Preset</b>	Saving a setup to the DSP memory Preset can be named individually
<b>Delete DSP unit Preset</b>	Deleting a preset from the DSP memory
<b>Load PC preset file</b>	Loading a preset from the PC memory
<b>Save as PC preset file</b>	Saving a setup to the PC memory
<b>Load all presets</b>	Loading all presets (from the PC to the DSP)
<b>Save all presets</b>	Saving all presets (from the DSP to the PC)
<b>Factory Reset</b>	<b>Caution:</b> The unit will run through a number of routines. Some windows will appear and disappear. The process will last for about 15 seconds.

## Options dropdown menu



<b>Language</b>	Select the Chinese or English version of the software
<b>Update</b>	Opens a window to select the update file
<b>Help</b>	Opens the GROUND ZERO web page within the browser
<b>About</b>	Displays the software version

## Technical specifications

Model	GZDSP 4-8XII
<b>Type</b>	8-channel signal processor (DSP) with 4 input channels Sampling frequency 48 kHz / resolution 56-bit
<b>Frequency range</b>	20 Hz – 20 KHz (-3 dB)
<b>SNR / line input</b>	≥ 115 dB
<b>SNR / high level input</b>	≥ 105 dB
<b>THD / line input</b>	0.002 %
<b>THD / high level input</b>	0.010 %
<b>DSP chipset</b>	2x Analog Devices SigmaDSP
<b>Sensitivity</b>	Line input (RCA) max. 855 mV RMS High level input max. 8.0 V RMS
<b>Input impedance</b>	Line input (RCA) ≥ 20 kΩ High level input 39 Ω
<b>Output voltage / channel</b>	≥ 2.5 V
<b>Remote current</b>	max. 500 mA
<b>Remote input voltage</b>	> 10 V
<b>Switching voltage / speaker input</b>	> 1.3 V
<b>Switching voltage / line input</b>	> 10 mV
<b>Turn on delay</b>	3 seconds
<b>Recommended fuse value</b>	2 A
<b>Dimensions</b>	169 x 116 x 27 mm / 6.65 x 4.57 x 1.06" (w x l x h)
<b>Software compatibility</b>	Microsoft Windows™ XP SP3, Vista, 7, 8, 8.1, 10
<b>Preset memory</b>	6 presets (individually assignable)
<b>Gain range</b>	-60 bis +6 dB
<b>Equalizer</b>	8x parametric 10 band EQ (20 Hz – 20 kHz) with adjustable Q
<b>Time delay</b>	0 – 8 ms / 0 – 272 cm / 0 – 107"
<b>Crossover</b>	6 / 12 / 18 / 24 dB/oct. slope with selectable filter characteristic
<b>Phase correction</b>	0° / 180°
<b>Optionally available accessory</b>	GZDSP BTS 4-8XII GZDSP REM 4-8XII

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.

## Error diagnosis

Error	Control	Help / Solution
No function	PWR LED on?	-check the fusing -check the remote wire -check the +12 Volt connection and wire -check the ground connection and wire
No sound (PWR LED on)	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
	amplifier not switched on	-check the remote out of the DSP -check the amplifiers power supply
	non operational source selected	-check the setting
	activated >MUTE< function (User Interface)	-check the setting
Single channels with no function	adjusted level on optional remote control unit too low	-check the setting
	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
	balance or fader control of the head-unit not in center position	-check the setting of the head-unit
Impure sound, incorrect stereo reproduction	wrong setup of input and output mode	-check the setting
	>GAIN< level too low or >Mute< function (user interface) active	-check the setting
Distorted sound quality	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
	speaker overload	-reduce the volume level -check the highpass filter and slope
	DSP input override (distortion)	-select the correct input mode -pay attention to the input sensitivity of the DSP 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
Increased noise level	amplifier override (clipping)	-check the amplifiers input sensitivity -reduce the level
	>GAIN< level too high	-reduce the >GAIN< level
Car specific interferences audible through the audio system	head-unit creates noise	-select a superior quality head-unit -use the optical output (if available) -let the audio store or manufacturer check the head-unit
	diverse power supplies or ground connection	-the head-unit, the DSP and each amplifier should be wired up to a common ground and +12 Volt connection
	signal wire no contact or broken	-check the contact or replace the wire
	head-unit defective	-let the audio store or manufacturer check the head-unit
	amplifier defective	-let the audio store or manufacturer check the amplifier
DSP unit or amplifier mounted close to an automotive control unit	-choose another mounting position	

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