



Only for cars applications

DSP A8

MKII

8 outputs digital signal processor

• **OWNER'S MANUAL**

Please read before using this equipment.

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Warning



This symbol means important instructions. Failure to heed them can result in serious injury or death.

DO NOT OPERATE ANY FUNCTION THAT TAKES YOUR ATTENTION AWAY FROM SAFELY DRIVING YOUR VEHICLE

Any function that requires your prolonged attention should only be performed after coming to a complete stop. Always stop the vehicle in a safe location before performing these functions. Failure to do so may result in an accident.

KEEP THE VOLUME AT A LEVEL WHERE YOU CAN STILL HEAR OUTSIDE NOISE WHILE DRIVING.

Failure to do so may result in an accident.

DO NOT DISASSEMBLE OR ALTER.

Doing so may result in an accident, fire or electric shock.

USE ONLY IN CARS WITH A 12 VOLT NEGATIVE GROUND.

(Check with your dealer if you are not sure.) Failure to do so may result in fire, etc.

KEEP SMALL OBJECTS SUCH AS BATTERIS OUT OF THE REACH OF CHILDREN.

Swallowing them may result in serious injury. If swallowed, consult a physician immediately.

USE THE CORRECT AMPERERATING WHEN REPLACING FUSES.

Failure to do so may result in fire or electric shock.

DO NOT BLOCK VENTS OR RADIATOR PANELS.

Doing so may cause heat to build up inside and may result in fire.

USE THIS PRODUCT FOR MOBILE 12V APPLICATIONS.

Use for other than its designed application may result in fire, electric shock or other injury.

DO NOT PLACE HANDS, FINGERS OR FOREIGN OBJECTS IN INSERTION SLOTS OR GAPS.

Doing so may result in personal injury or damage to the product.

HALT USE IMMEDIATELY IF A PROBLEM APPEARS.

Failure to do so may cause personal injury or damage to the product.

Precautions

PRODUCT CLEANING

Use a soft dry cloth for periodic cleaning of the product. For more severe stains, please dampen the cloth with water only. Anything else has the chance of dissolving the paint or damaging the plastic.

TEMPERATURE

Be sure the temperature inside the vehicle is between +60°C (+140°F) and -10°C (+14°F) before turning your unit on.

MAINTENANCE

If you have problems, do not attempt to repair the unit yourself.

Product description

The DSP A8 MKII is a digital signal processor (DSP) that can be added to any existing automotive Hifi-system and be used for filtering, equalizing and time alignment purposes. Typically installed between the analogic source (head unit) and the amplifiers the DSP A8 MKII offers multiple possibilities to optimize the performance of your installation. Using either a PC or a Mac computer and the supplied USB-cord you can control the DSP through its software. The intuitive interface allows you to alter your settings in a real-time environment.

Beyond the state-of-the-art audio characteristics the product offers, ease of use is a guideline for all our products.

To start using your DSP A8 MKII follow the steps hereunder:

- Connect the DSP A8 MKII to you PC or Mac using the supplied USB cord
- Launch the software and apply your settings
- Click on “connect & synchronize” to synchronize the DSP A8 MKII with your settings on the screen
- After the DSP A8 MKII has been synchronized all the subsequent changes to the settings are “on the fly” and do not call for another synchronization. All parameters are automatically stored in the flash memory of the device.
- Once you are satisfied with your settings you can disconnect the DSP A8 MKII from the computer at any time without losing your settings. Your last configuration will be loaded at every power-up.



When connecting to your DSP A8 for the first time you have to calibrate the input level in order to adapt it to the signal output of your analog source (headunit). A failure to do so might seriously damage your system due to an excessive signal level. Please refer to “using the software” for more information on the calibration.

Minimum System Requirements for software installation

DSP A8 MKII software requires in a PC/MAC environment with the following minimum requirements:

PC Environment

- PC with 1GHz or higher processor clock speed recommended / Intel® Pentium®/Celeron® family, or AMD K6®/AMD Athlon®/AMD Duron® family, or compatible processor recommended.
- 512 megabytes (MB) of RAM or higher recommended
- USB 2.0 port
- Keyboard and mouse or compatible pointing device
- Microsoft® Windows® Vista® SP1/ XP pro SP2/Win7
- Microsoft® .NET Framework v3.5
- Adobe AIR environnement (latest version)
- Adobe Flash player (latest version)

MAC Environment

- Intel based MAC with 1GHz or higher processor clock speed recommended
- 512 megabytes (MB) of RAM or higher recommended
- USB 2.0 port
- Keyboard and mouse or compatible pointing device
- Mac OSX 10.4 or higher
- Adobe AIR environment (latest version)
- Adobe Flash player (latest version)

Content of package

- 1 x DSP A8 MKII
- 1 x Remote MCR
- 1 x Remote MCR 5m cable
- 1 x USB cord
- 1 x optical cable 1 m
- 1 x usb key with software and manual
- 2 x stickers
- 1 x power connector
- 4 x Screws (Mounting hardware)

Limited Warranty

An incorrect configuration of the DSP A8 MKII might damage your audio system. WaveFlex Caraudio under no circumstances can be held responsible for the consequences of an inappropriate use of the unit, we ask you to read this manual and the technical guidelines in its integrity to fully understand the use of the unit.

Generally speaking, you must always configure your DSP A8 MKII before connecting anything to its outputs (amplifiers or other). Doing so assures you that the software is properly installed and no damage to your system will occur.

Warranty Conditions

This Product is under the warranty of WaveFlex Caraudio for one year from the day of purchase. The commercial invoice issued by WaveFlex Caraudio is your proof of purchase.

The warranty is valid for any defects of the article. Excluded from the warranty are damages to the unit due to improper handling, modifications to the unit, dropping of the unit, the non-respect of the user manual or application notes and of course, wear due to the use of the unit.

Installation and connections

Before installing or connecting the unit, please read the following pages of this manual thoroughly for proper use.

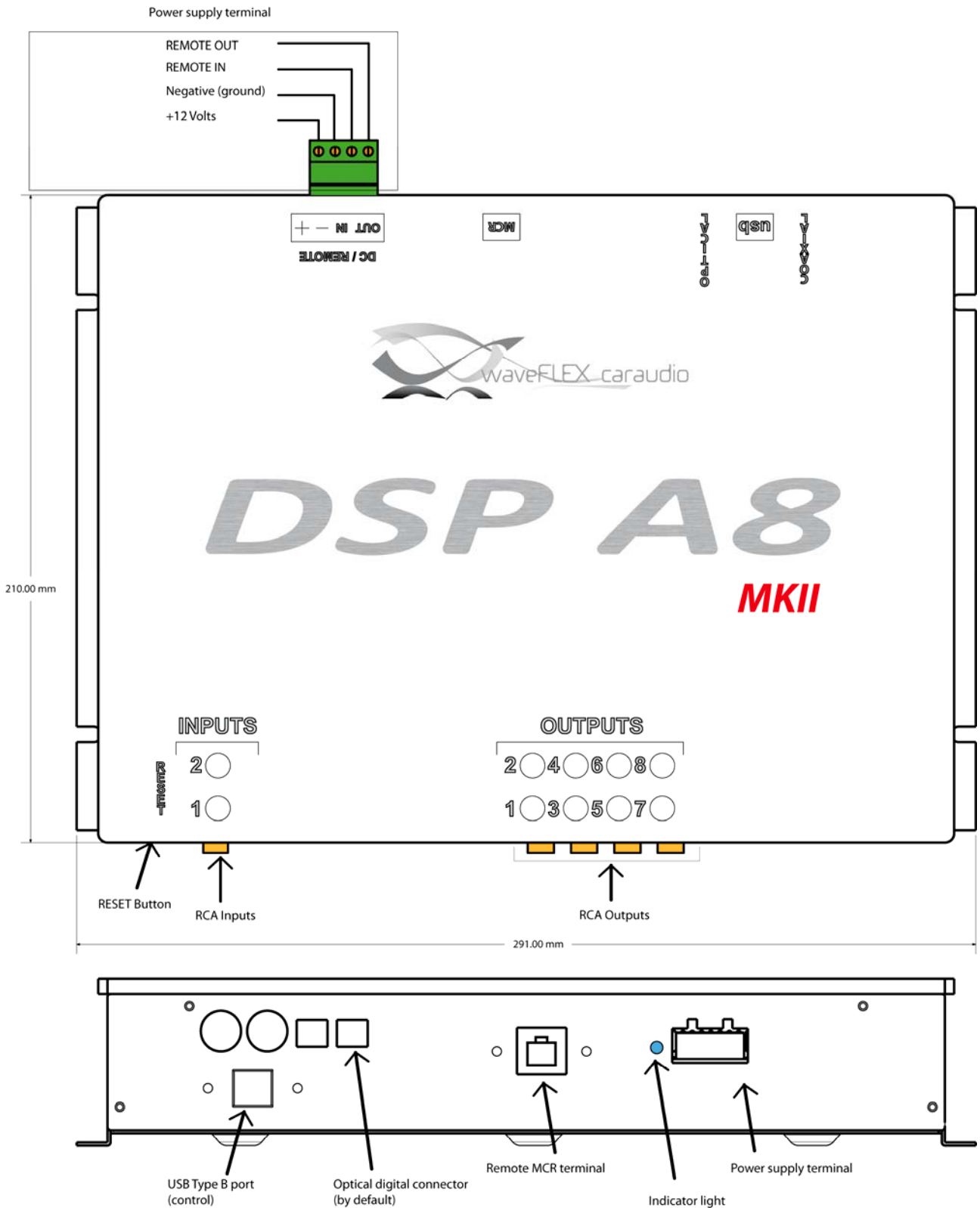
Warning

<p>MAKE THE CORRECT CONNECTIONS. Failure to make the proper connections may result in fire or product damage.</p>
<p>DO NOT SPLICE INTO ELECTRICAL CABLES. Never cut away cable insulation to supply power to other equipment. Doing so will exceed the current carrying capacity of the wire and result in fire or electric shock.</p>
<p>USE ONLY IN CARS WITH A 12 VOLT NEGATIVE GROUND. (Check with your dealer if you are not sure.) Failure to do so may result in fire, etc.</p>
<p>DO NOT DAMAGE PIPE OR WIRING WHEN DRILLING HOLES. When drilling holes in the chassis for installation, take precautions so as not to contact damage or obstruct pipes, fuel lines, tanks or electrical wiring. Failure to take such precautions may result in fire.</p>
<p>DO NOT USE BOLTS OR NUTS IN THE BRAKE OR STEERING SYSTEMS TO MAKE GROUND CONNECTIONS. Bolts or nuts used for the brake or steering systems (or any other safety-related system), or tanks should NEVER be used for installations or ground connections. Using such parts could disable control of the vehicle and cause fire etc.</p>
<p>KEEP SMALL OBJECTS SUCH AS BATTERY OUT OF THE REACH OF CHILDREN. Swallowing them may result in serious injury. If swallowed, consult a physician immediately.</p>
<p>DO NOT INSTALL IN LOCATIONS WHICH MIGHT HINDER VEHICLE OPERATION, SUCH AS THE STEERING WHEEL OR SHIFT LEVER. Doing so may obstruct forward vision or hamper movement etc. and results in serious accident.</p>
<p>HAVE THE WIRING AND INSTALLATION DONE BY EXPERT. The wiring and installation of this unit requires special technical skill and experience. To ensure safety, always contact the dealer where you purchased this product to have the work done.</p>
<p>USE SPECIFIED ACCESSORY PARTS AND INSTALL THEM SECURELY. Be sure to use only the specified accessory parts. Use of other than designated parts may damage this unit internally or may not securely install the unit in place. This may cause parts to become loose resulting in hazards or product failure.</p>
<p>ARRANGE THE WIRING SO IT IS NOT CRIMPED OR PINCHED BY A SHARP METAL EDGE. Route the cables and wiring away from moving parts (like the seat rails) or sharp or pointed edges. This will prevent crimping and damage to the wiring. If wiring passes through a hole in metal, use a rubber grommet to prevent the wire's insulation from being cut by the metal edge of the hole.</p>
<p>DO NOT INSTALL IN LOCATIONS WITH HIGH MOISTURE OR DUST. Avoid installing the unit in locations with high incidence of moisture or dust. Moisture or dust that penetrates into this unit may result in product failure.</p>

Precautions

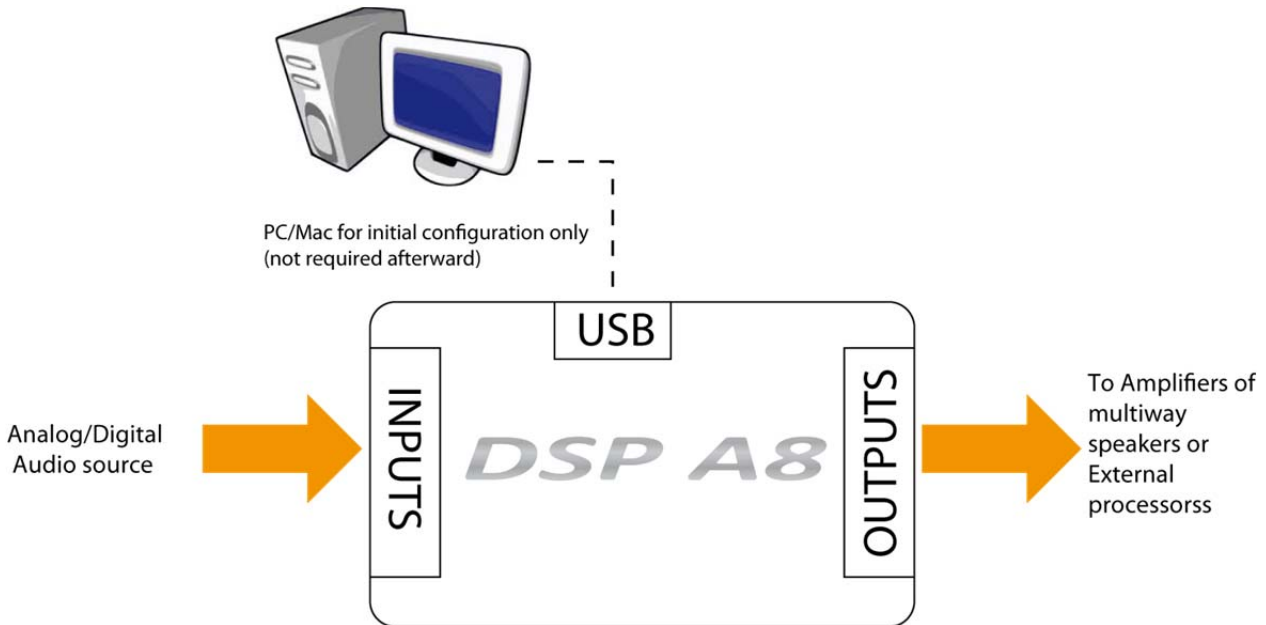
- Make sure to disconnect the negative (ground) pole of your car battery before installing the DSP A8 MKII. This will reduce the risk of damaging the unit by shorting the power connection.
- Make sure to make all connection according to the wiring scheme hereunder. Wrong connection may cause malfunctions and/or damage the unit.
- The DSP A8 MKII uses female RCA (cinch) connectors for connections to external equipment (i.e. head-unit or amplifiers) fitted with RCA connectors.

Connections



Standard configuration

The standard configuration shown in the diagram hereunder uses the analog inputs and outputs. To avoid any damage, make sure the unit is turned off before making the external connections.



Power connections

The DSP A8 MKII requires a DC power supply in the range from 9-16V, ground (negative) tight to vehicle ground. Make sure to apply the correct polarity to the power connector. For a quick check please refer to the wiring scheme on page 6 of this manual or refer to the markings directly on the unit. The DSP A8 MKII is protected against wrong polarity only if the supplied (external) fuse is used.

Remote power functions:

The « REMOTE IN » connection will turn the unit when the voltage is greater than 4V DC.

The « REMOTE OUT » is used to turn on your power amplifier(s) with a time delay of 2 seconds referring to the « REMOTE IN ». The “REMOTE OUT” can supply up to 250mA at 12 Volt DC.

The “REMOTE OUT” will be turning off when “REMOTE IN” goes below 4 volts. The DSP will be turn off after a delay off 6 seconds.

Audio connections

The DSP A8 MKII offers unbalanced as well as balanced connections both on the input and outputs. Please find hereunder the detailed possibilities for the connections. The DSP A8 MKII can be fitted with the optional digital input.

- Analog inputs (1 & 2)
 - o Type : unbalanced
 - o Connectors : RCA (cinch) for unbalanced connection
 - o Maximum input level : 2 Vrms (+8dBu) for unbalanced input)
- Digital input

- Type : SP/DIF (20 to 216 KHz stereo)
 - Connectors : Toslink (optical) or RCA (coaxial)
 - Both circuits are fitted with isolation transformers
- Analog outputs (1 to 8)
- Type : unbalanced
 - Connectors : female RCA connectors (unbalanced)
 - Maximum output level : 2 Vrms (+8 dBu) for unbalanced output

Software configuration

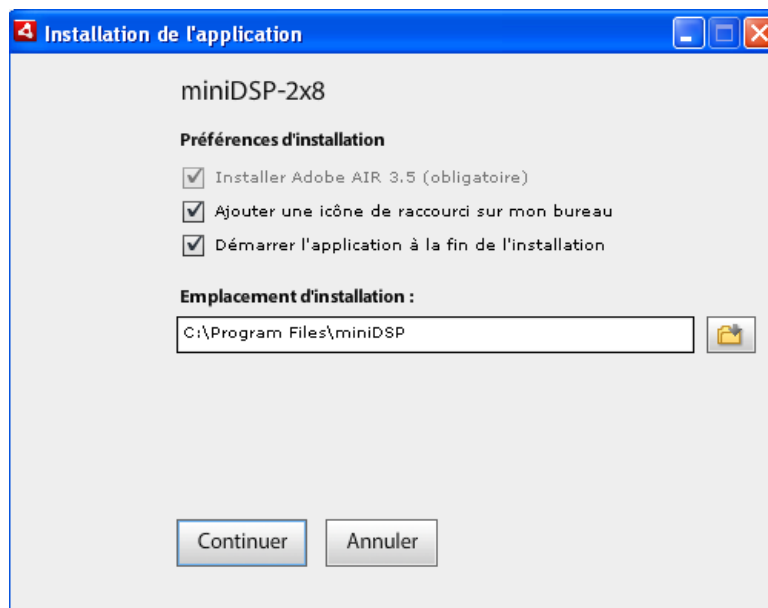
The DSP A8 MKII can be controlled and configured through the USB port. The configuration software will be sent separately on your order.

The following steps will show you how to install and use the software.



In order to familiarize yourself with the software interface, please do NOT connect any device to outputs before making sure you understand ALL the functions of the software.

- 1) You will have to download and install the following programs before proceeding to the installation :
 - a. Microsoft® @ [NET framework v3.5](#) (for PC only)
 - b. [Adobe AIR](#) environment (last version) – required for both PC/Mac
 - c. [Adobe Flash player](#) (last version) – required for both PC/Mac
- 2) Launch the installer by double-clicking on the icon of the software you have received by email and follow the instructions. The following screen should pop up:



Once properly installed the program should start automatically.

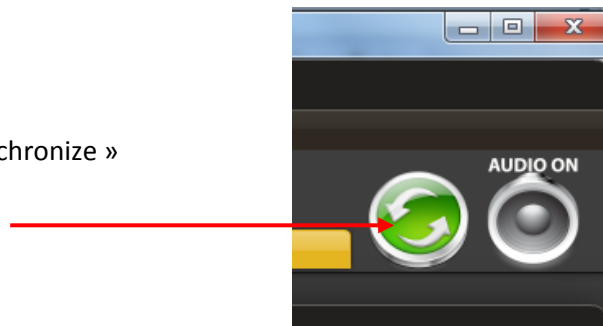
- 3) You can now connect the DSP A8 MKII to the USB port on your PC/Mac. The unit will be recognised as HID driver and no further driver installation is necessary.
- 4) The next step consists of synchronizing the PC with the DSP A8 MKII. Read the following steps thoroughly to perfectly understand how it works.

By default the software starts in « offline » mode, meaning that any changes you apply in the software won't have any effect on the configuration on the DSP A8 MKII. This is done on purpose to allow you to visualize the settings and to validate them before loading them into the RAM on the DSP A8 MKII.

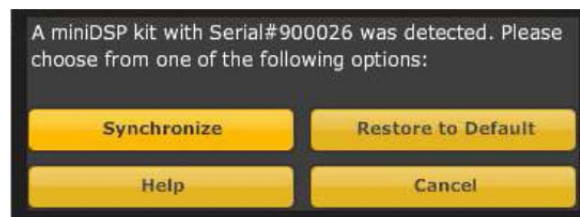
It's important to note that the software is only used to load your settings from the PC on the DSP A8 MKII, it's NOT possible to load the settings from the DSP A8 MKII on the PC/Mac. In other terms, make sure your preferred settings are saved on your PC if you want to be able to modify it later.

- 5) Now that we know how to use the configuration, the next step is to « connect and synchronize » the DSP A8 MKII with the software/PC by clicking on the green button in the top right corner of the screen. This button is only active in the "offline" mode and will fade out as no further synchronization is necessary.

Click on « connect & synchronize »

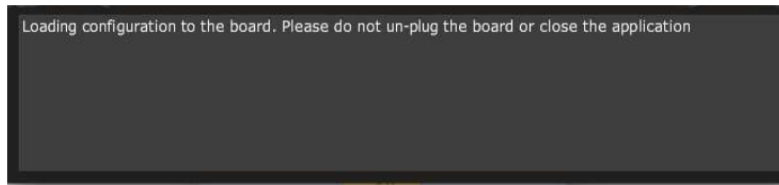


To validate the connection of the DSP A8 MKII to your PC/Mac via the USB cord, the window shown hereunder will pop-up:



- Tab « Synchronize »: with this option, the software configuration you see on the screen will be loaded into the DSP A8 MKII and the software will change into the « online » mode. Watch out, this choice will overwrite the current configuration in the DSP A8 MKII. If you want to load a different configuration into the DSP A8 MKII, click on "cancel" and open the chosen configuration file through "File/load"
- Tab « Restore to default »: with this option, the software will reset all the settings to the factory default. All your stored configurations on the DSP A8 MKII lost and cannot be restored.

During the synchronization the dialog shown hereunder will pop up. Do NOT disconnect the USB cord during the synchronization, the configuration might get corrupted.



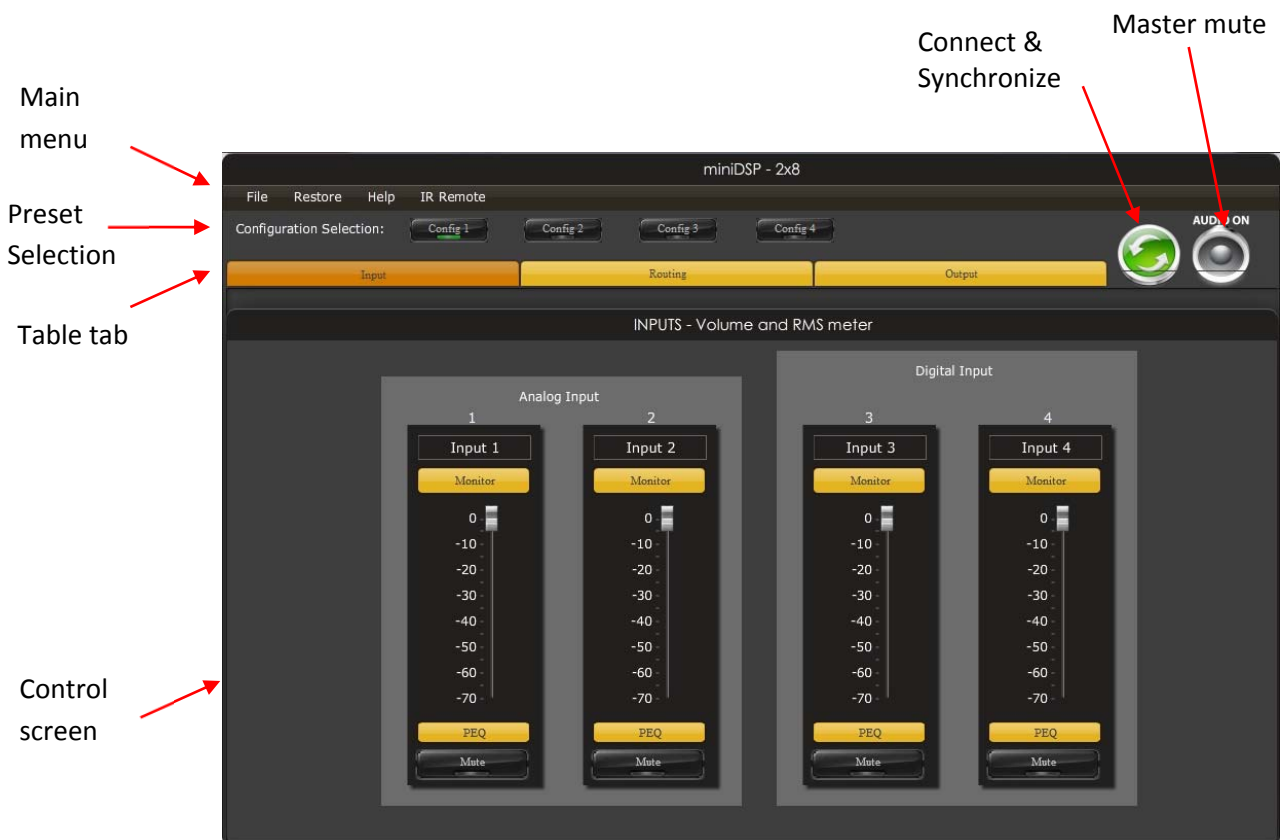
Once the DSP A8 MKII has been synchronized correctly the message « successful connection to the board » will pop up. From now on all changes to the configuration on the screen will be applied “on-the-fly” to the DSP A8 MKII. You are thus able to appreciate immediately the result of changes to crossovers, equalization and the other available functions.

In the next steps you will find the different possibilities of using the software.

Using the software

An improper configuration of the DSP A8 MKII can damage your audio installation. WaveFlex-Caraudio can under no circumstances be held responsible for the consequences of a wrong configuration. If in doubt concerning your parameters use the “offline” and/or disconnect all devices on the outputs.

Main screen



The Home screen includes the following:

- **Main menu**

- **File** : This tab gives you access to « load » and « save » which allows you to load or save your configuration files
- **Restore** : Allows you to reset the software to default configuration, or only the current configuration
- **Help** : Gives you access to the help menu

- **Preset Selection :**

The DSP A8 MKII offers the possibility to create 4 different presets and to load them quickly by clicking on the tab of the chosen preset. Each configuration file is automatically stored in the DSP A8 MKII.



Warning: When changing the preset tab you change from a valid configuration (volume, crossovers, equalization, etc.) to a “virgin” configuration which is probably not adapted to your audio installation. We suggest you to use the “offline” mode (i.e. do not synchronize the DSP A8 MKII or do not connect it at all) in order to prevent any damage to your install.

- **Table tab**

The DSP A8 MKII software is organized around the 3 main tabs selectable on top of the main screen. For the detailed functions of each tab refer to the information hereunder:

- « Input » tab
- « Routing » tab
- « Output » tab

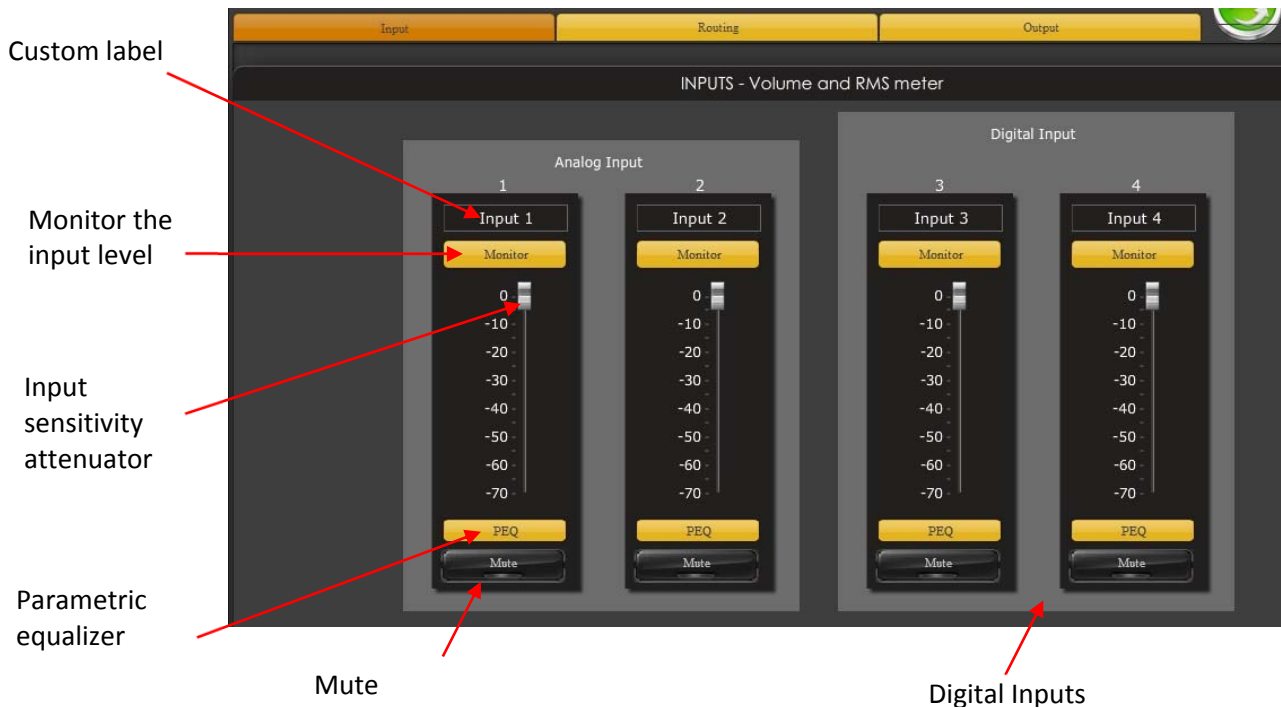
- **Connect & Synchronise :**

Allow connecting to the DSP A8 MKII when available.

- **Master Mute :**

Mute both the inputs and the outputs of the DSP A8 MKII.

INPUT Table



The first step consists of verifying that an input signal is present on the inputs of the DSP A8 MKII.

Calibrate the analog input level

The majority of manufacturers specify the output levels of the head units at full volume (i.e. zero attenuation) and auxiliary settings that can have an impact on output levels as tone adjustments for instance at their maximum .

The DSP A8 MKII offers the possibility to adjust its input sensitivity in order to work with head-units having an output in excess of 2 V rms.

To adjust the sensitivity of the analog inputs you first have to download the according audio file on our website. The provided audio file is a full range pink noise (20Hz - 20 KHz) with 0dB attenuation (i.e. full volume). Take care to use this file ONLY without any device connected to the outputs. We cannot be held responsible for any damage caused to your install for improper use of the provided audio file.

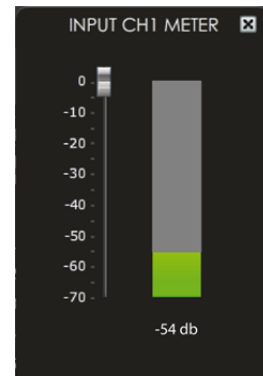
- Set your head unit to minimum volume (i.e. max attenuation)



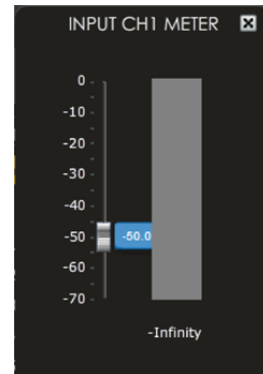
- Click on the « monitor » tab on either left/right input



- Slowly increase the volume of your head unit until you see the increase of the signal on the bargraph. This indicates that the DSP A8 MKII is indeed having a signal on its input.



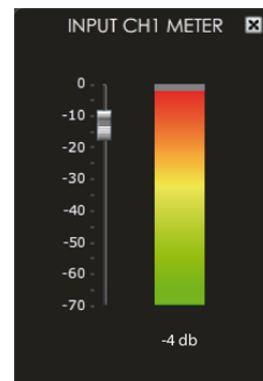
- Now set the cursor on the left hand side to a lowest value around -50dB.



- Set the volume of your head unit to its maximum or slightly less to prevent clipping



- Now set the cursor on the left hand side and adjust the bargraph to indicate a value between 0 and -6dB. Take your time for adjusting the setting properly.



The setting of the input sensitivity is now finished. You can now note the setting of the cursor for future reference if you wish.

Using the digital input (optional)

Nor particular setting or calibration is necessary for using the digital input, just plug in your digital input (Toslink or RCA/Coax).

ROUTING Table

This tab allows you to configure the signal routing inside the DSP A8 MKII. In other terms you can connect any input to any output or mix different channels (for instance mixing 2 channels for a mono subwoofer output)

The routing matrix is organized as follows:

- The horizontal lines are the inputs
- The vertical columns are the outputs
- The ON/OFF tabs define if the related input (horizontal line) are tied (or not) to the output (vertical column) at their crossings

The screenshot hereunder shows an example of a 3-way stereo configuration (Tweeter/Medium/Woofer) + 2 mono subwoofers using the analog inputs:

Analog In	Analog Out								Digital Out	
	Output 1	Output 2	Output 3	Output 4	Output 5	Output 6	Output 7	Output 8	S/PDIF 1	S/PDIF 2
Input 1	On	Off	On	Off	On	Off	On	On	Off	Off
Input 2	Off	On	Off	On	Off	On	On	On	Off	Off
Digital In	Output 1	Output 2	Output 3	Output 4	Output 5	Output 6	Output 7	Output 8	S/PDIF 1	S/PDIF 2
Input 3	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Input 4	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

All on

Mixing of input 1 & 2 (for mono subwoofer)

Input 1 on the upper horizontal line (upper RCA connector on the unit) is « ON » for the vertical columns of the outputs 1, 3 and 5 (upper RCA connectors of the unit). The input signal 1 is thus routed to the output channels 1, 3 and 5.

Input 2 on the lower horizontal line (lower RCA connector on the unit) is « ON » for the vertical columns of the outputs 2, 4 and 6 (lower RCA connectors of the unit). The input signal 2 is thus routed to the output channels 2, 4 and 6.

The tabs for the outputs 7 and 8 are both « ON » for input 1 and 2, this means that both inputs are mixed and send to both outputs 7 and 8.

OUTPUT Table



File Restore Help IR Remote

Configuration Selection: **Config 1** Config 2 Config 3 Config 4

Input Routing Output

AUDIO ON

Output

Analog Output

Digital Output

Master Volume
 Disable ADC Mode
 IR Mode

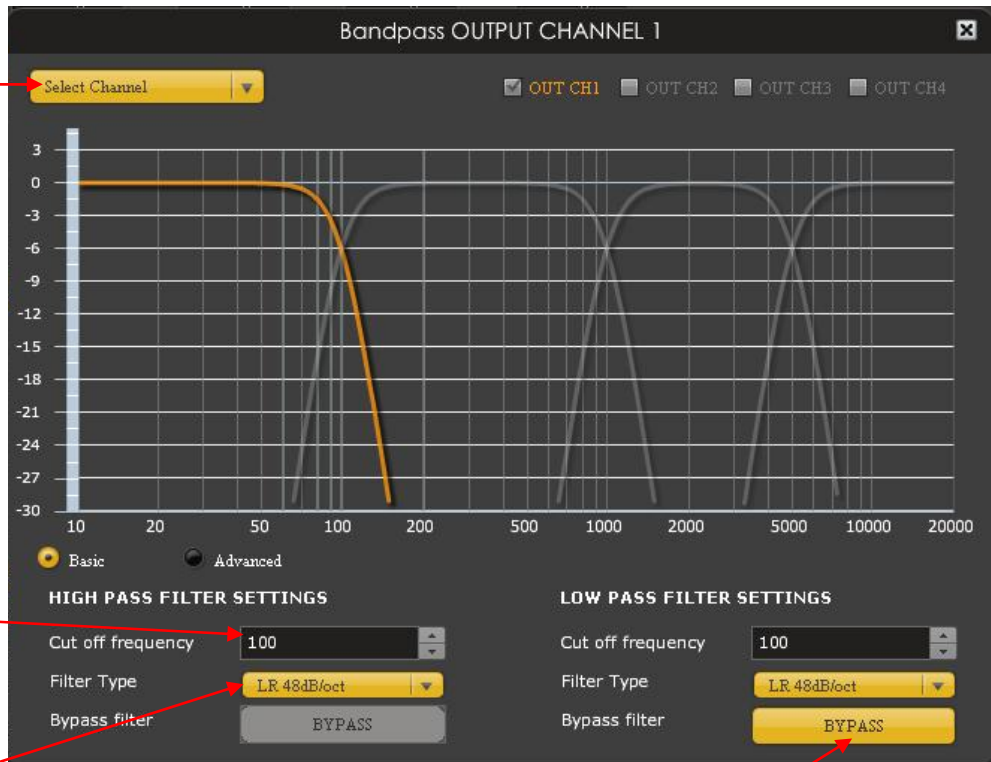
Choice of Master volume control unit

- Custom label: Allows you to rename each output according to your installation.
- Signal monitor : Working the same way as the input signal monitor it allows you to know your exact output signal level in dBfs
- Output signal level slider : Allows you to adjust the output signal level independently for each output channel
- Mute : Allows your to mute the corresponding channel
- Invert : Allows you to invert the polarity of the corresponding output (equals 180° phase rotation)
- Master volume: Tick « IR MODE » if you have connected the optional MCR Remote unit. Otherwise leave the setting on “DISABLE”
Refer to the MCR remote manual for more detailed information.
- Crossover: Allows you set define both low-pass and high-pass filters for the corresponding channel. The different possibilities and settings are shown hereunder:

Scroll-down menu « Link »

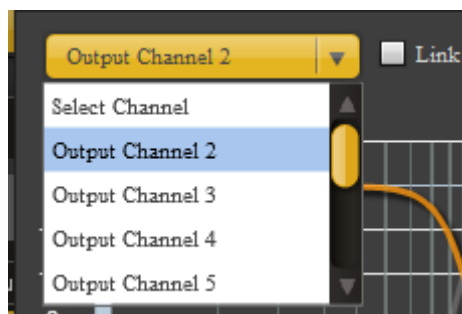
Cut-off frequency

Filter type

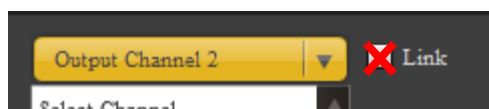


Bypass

- **Cut-off frequency :** Chose your desired cut-off frequency using the up/down tabs or directly enter the value with your numeric keyboard
- **Filter type :**
 - Linkwitz-Riley (LR) : Available as 12, 24 and 48 dB/octave
 - Butterworth (BW) : Available as 6, 12, 18, 24, 30, 36, 42 and 48 dB/octave
 - Bessel : Available as 12 dB/octave
- **Bypass :** Allows to activate or bypass the chosen filter
- « Link » in the scroll-down menu : Allows you to link the filter of the selected channel with any other channel
 - Step 1 : Select the channel you wish to link in the scroll-down menu



- Step 2 : Tick the « Link » box to activate the link

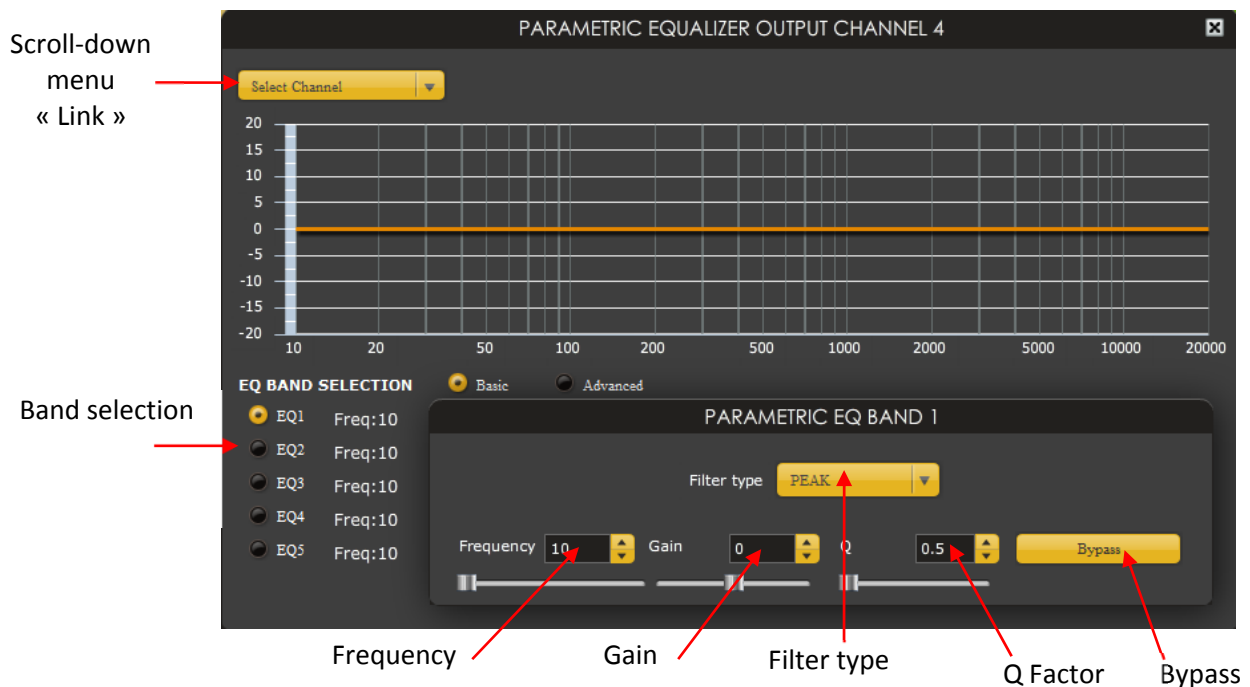


A warning will pop up asking for confirmation.



You can resume the link anytime by un-ticking the « Link » box.

- **Parametric equalizer** : This tab gives you access to the parametric equalizer settings



- **EQ Band selection** : Click on the EQ band you want to modify
- **Frequency** : Chose your desired frequency using the up/down tabs or directly enter the value with your numeric keyboard
- **Filter type** :
 - Peak
 - High-Shelving
 - Low-Shelving
 - Sub EQ (or Linkwitz transform, 2 EQ bands needed)
- **Gain** : set your desired filter level
- **Factor Q** : desired quality factor Q of the filter
- « Link » in the scroll-down menu : Allows you to link the filter of the selected channel with any other channel (same procedure as for “filters” above)
- **Bypass** : Allows to activate or bypass the chosen filter

Troubleshooting

No sound (no signal on output)	<ul style="list-style-type: none"> - Check that you have a signal on the VU-meter on the input - Check that no « mute » tab is activated, both on inputs and outputs - Check that the « Master Mute » tab is not activated - Check that you are in « connected » mode - Reset the unit to factory settings
No signal on the inputs (VU meters)	<ul style="list-style-type: none"> - Check that you are in « connected » mode - Check that the « Master Mute » tab is not activated - Check the signal output level of your head-unit
No sound (signal on the output) but signal on the input	<ul style="list-style-type: none"> - Check that you have correctly configured the routing matrix - Check that no « mute » tab on the output is activated
Impossible to save a configuration file to the unit	<ul style="list-style-type: none"> - Check the file extension of your .xml file
Can't connect to DSP A8	<ul style="list-style-type: none"> - Check your USB connection
Software does not install	<ul style="list-style-type: none"> - Check that you have installed the necessary framework (Adobe Air/Microsoft.net/Xp SP2)
Other problems this troubleshooting guide did not resolve	Contact us via email explaining you problem

Features

- 5 bands parametric equalizer on both inputs and outputs (20hz to 20Khz with 1 Hz steps, 0.1 dB steps, Q factor with 0.1 steps, type peak, high shelving, low shelving and Linkwitz transform)
- Independent pass-band on each output (10 to 20 KHz with 1 Hz steps, 13 different slopes,
- IIR filters on each input and output (8 biquad on each input, and 16 biquad on each output)
- 0 to 9 ms time alignment
- Phase polarity 0-180°
- 0 to -70db attenuation on each input and output
- Muting and monitoring on each input and output
- Integration in [Room Equalizer Wizard](#)

Technical description

- Analog inputs (1 & 2)
 - Unbalanced (RCA)
 - Maximum input signal: RCA input: 2Vrms (8 dBu) in unbalanced mode
- Digital input:
 - SPDIF (20 to 216 KHz)
 - Optical toslink or coaxial RCA
 - Each circuit isolated with transformer
- Analog outputs (1, 2, 3,4,5,6, and 8)
 - Unbalanced (RCA)
 - Maximum output signal: RCA input: 2Vrms (8 dBu) in unbalanced
- Technical features:

Sample rate: 96 KHz
Bandwidth: 20 Hz à 20 KHz
Dynamic range: 114 dB
THD + N: 100 dB

- A/N & N/A converters
 - Type: Cirrus logic CS42528F1
 - Sample rate: 96 KHz
 - Dynamic range: 114 dB (ADC) and 114 dB (DAC)
 - THD + N: up to 100 dB
 - Stereo separation: 110 dB

- DSP:
 - Type: Analog devices SigmaDSP ADAU144x
 - Maximal sample rate: 192 KHz
 - Speed: 172 MHz
 - RAM size: 12K
 - Precision: 28/56 bits double
 - Dynamic range: 139 dB
 - THD + N: 133 dB

- Communication:
 - Type: USB 2.0 plug and play driverless
 - Connector type: mini USB
 - Compatibility: XP/Vista/7/MAC
 - Software: MiniDSP 2x8

- Power supply:
 - Type: PWM
 - Maximal input voltage: +16 volts (minus to chassis ground)
 - Efficiency: 95%
 - Remote out output voltage: +12v
 - Remote out maximal current: 0.25A
 - Delayed remote out : > to 2 seconds
 - Delayed DSP shut off : > to 6 seconds
 - Consumption: 20W@12V max

- Case:
 - Galvanized steel sheet 10/10 with grained powder paint
 - Top plate: gloss black PMMA 5 mm thickness with printing

- Size: 290x210xh55 mm
- Weight: 2.5 kg