

SYNTHESIS

USER MANUAL

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1 Product Introduction

Synthesis is a Digital Audio Signal Processor (DSP) capable of performing a wide range of applications, from filtering, equalization to time alignment. Typically located between an audio source (CD player/Receiver/Preamp/PC .. etc) and the amplifier, a DSP will provide unparalleled tuning flexibility to improve your audio system's performance. Using a PC/Mac machine and a USB connection, you will be able to control your platform from the "plug-in": an intuitive software application allowing real time modification to your configuration.

Besides its audio specs, a great part of our product concept lies in its simplicity of use. The sequence of steps required to control a DSP can be summarized as follow:

- Connect the board to your PC/Mac machine using a USB cable
- Launch the plug-in to configure settings as required.
- Click "Connect & Synchronize" your PC to the board
- Once synchronized, any change is real time and does not require any "Synchronization". All settings are also automatically saved to both the DSP and the Flash for long term memory.
- Once happy with your configuration, you can disconnect the board from your computer since from this point on, the audio configuration will run as last modified in on-line mode and recalled following every reboot.
- Enjoy!

Minimum System Requirements for software installation

Synthesis software requires in a PC/MAC environment with the following minimum requirements:

PC Environment

1. 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.
2. 512 megabytes (MB) of RAM or higher recommended
3. USB 2.0 port
4. Keyboard and mouse or compatible pointing device
5. Microsoft® Windows® Vista® SP1 / XP pro SP2/Win7
6. Microsoft® .NET framework v3.5
7. Adobe AIR environment (latest version)
8. Adobe Flash player (latest version)

MAC Environment

9. Intel based MAC with 1GHz or higher processor clock speed recommended
10. 512 megabytes (MB) of RAM or higher recommended
11. USB 2.0 port
12. Keyboard and mouse or compatible pointing device
13. Mac OSX 10.4 or higher
14. Adobe AIR environment (latest version)
15. Adobe Flash player (latest version)

Package content

Your Synthesis package includes:

- 1 x Synthesis DSP
- 1 x USB cable
- 1 x Step by Step startup guide

DISCLAIMER / WARNING

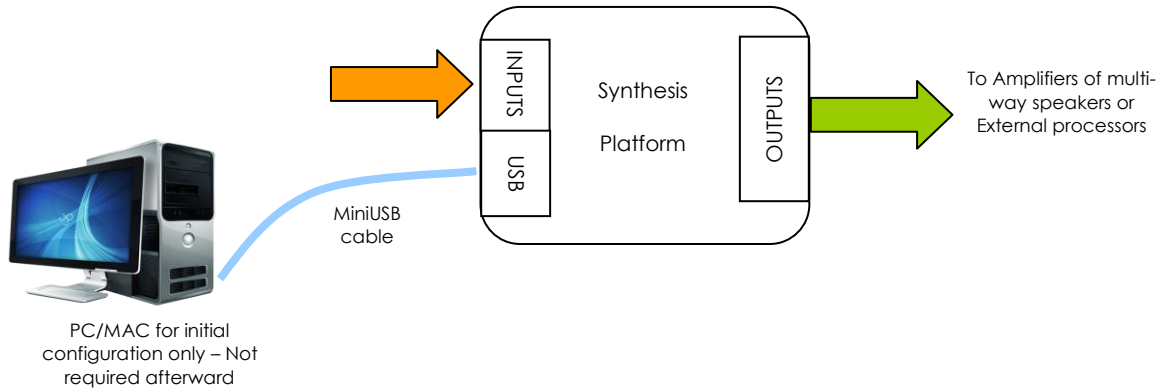
An incorrect DSP configuration could easily damage your audio system. Soundstream can not be responsible for any damage that may result from the improper use of this product. As with any other product, we do recommend that you carefully read the manual and other technical notes to insure you fully understand how to operate the board.

As a general guideline, you should first configure your Synthesis board **before** connecting anything to the outputs of the DSP (loudspeakers/other output sources). Doing so will insure that you have the software correctly configured and won't cause any damage to your system. Once again, Soundstream can not be responsible of any damages the board make cause to your system.

WARRANTY TERMS

Soundstream warrants all our products to be free of from defects in materials and workmanship for a period of one year from the invoice date. Our warranty terms do not cover failure of the product due to an external trigger, misuse, servicing or usage outside of the recommended use. With this said, make sure to carefully read the user manual when customizing the board. Any board damage investigated as failure to follow proper installation may void the warranty. So if in doubt, **please make sure to contact us first**.

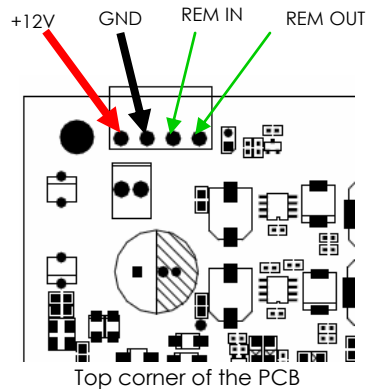
2 System Connectivity



2.1.1 DC Power connectivity

Synthesis requires a 12V regulated power supply of at least 1.5A (18W).

Be careful to apply the correct polarity to the Terminal block connector as below. For a quick confirmation, take a look underneath the PCB for the silkscreen labels.



REM IN: The remote IN input will TURN ON/OFF the Synthesis above a threshold of 4V. It can be a useful feature for battery operated systems that do not want to drain the +12V from the battery that is always present. The behavior is as follow:

- 0V < REM IN < 4V: DSP is OFF
- 4V < REM IN < 12V: DSP is ON

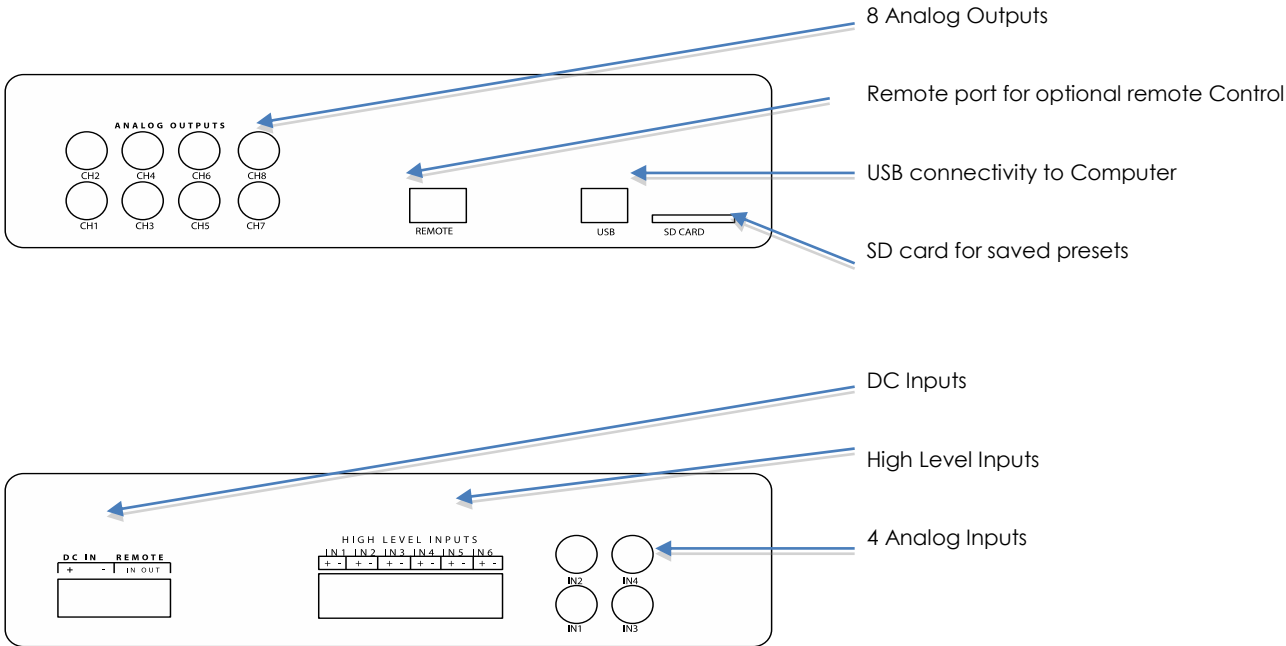


REM OUT: A delayed version of the REM IN is available as a REM OUT signal to trigger some amplifier or external piece of equipment after a 2seconds delay. It provides 12V @ 10mA.

2.1.2 Audio connectivity

Synthesis can accept both balanced and un-balanced audio inputs/outputs. See the below instructions for audio connectivity on your Synthesis.

Signal	Max input/Max output
Maximum Input signal @ 0dBFS	RCA connector: 2Vrms (+8 dBu) or 0.9Vrms High Level Inputs: 4Vrms (+14 dBu) with an unbalanced signal, 8Vrms with a balanced signal (20dBu)
Maximum Output signal @ 0dBFS	RCA connector: 2Vrms or 0.9Vrms 8Vrms balanced with a signal (20dBu)





In order to familiarize yourself with the software first, do not connect any amplifiers to your Synthesis outputs until you understand each object. Get to know the software first, then start playing audio...

1. The first step consists in downloading the following required frameworks:
 - o Microsoft • ® [.NET framework v3.5](#) or up (PC only)
 - o Latest version of [Adobe AIR environment](#) (Mac/Win)
 - o Latest version of [Adobe Flash player](#) (Mac/Win)
2. Double click on the .air file to install the plug-in.
Once the configuration finalized, the plug-in will automatically boot up.
3. You can now connect the Synthesis board to one of the USB 2.0 port of your PC. The device will be recognized as a HID driver and does not require any driver installation.
4. The next step is to gain control of the board by synchronizing the PC configuration to the board. Please read carefully the following section to understand how this process works.

By default, all plug-ins start in offline mode, meaning changes made on the user interface do not affect your configuration. It is designed in such a way that you can visually confirm your configuration before loading it to the Synthesis. You should also know that plug-ins can only synchronize from PC to board and are not able to "retrieve" a configuration from the kit. In other words, make sure your favorite configuration is saved on your PC if you ever decide to change the configuration.

5. Once the configuration checked, the next step is to "Connect & Synchronize" by clicking on the Green button on the top right. Note that this button is ONLY active in an unconnected mode. Once connected, it will disappear since no more synchronization will be required from there on.

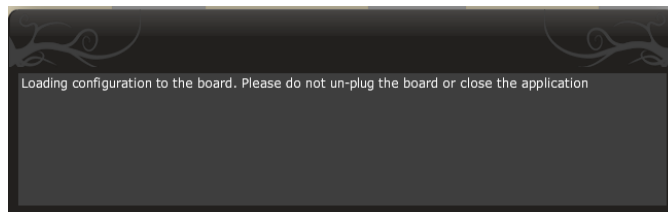
Connect & Synchronize



a) Synchronize: With this option, the current plug-in configuration will be loaded/flushed to the Synthesis and your plug-in turned to "On-line" mode. Warning that it will overwrite whatever configuration was previously loaded on the board. If you'd like to load a different configuration, click cancel and go to the settings tab to load one of your previously saved configurations.

b) Restore to Default: With this option, the software application resets all settings back to factory default and reload the firmware. Warning that all current settings will be lost and there are no ways to be able to recover them.

In either synchronization steps, the following dialog box will pop-up. It's very important that you do not un-plug the board in the middle of a firmware upgrades or you may corrupt the configuration.

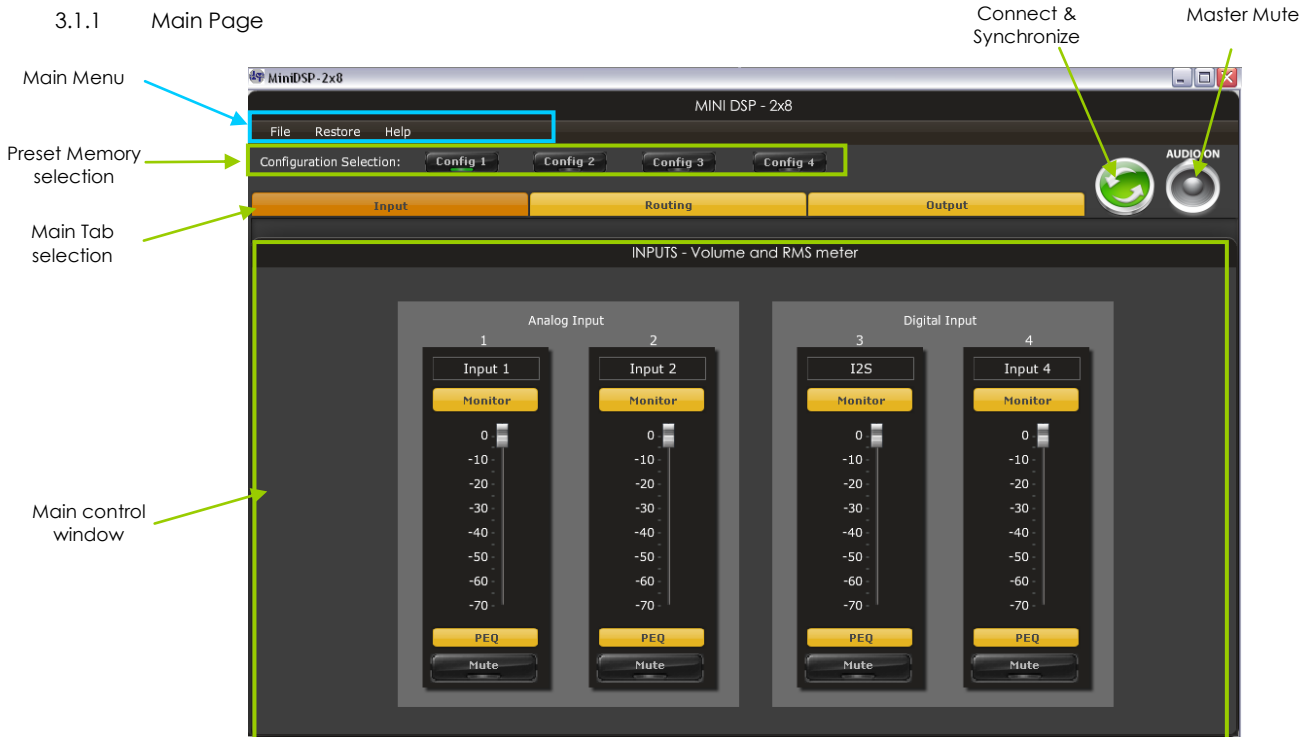


Once the board fully synchronized, a "Successful connection to the board" message pops up. From this point on, all changes to the configuration will be real time and live, therefore giving you the chance to hear the effect of your equalization, filtering, tuning...

Let's move on to the architecture of the software to understand how to setup your system.

3 Plug-in Architecture

3.1.1 Main Page



The main control page can be summarized in few core sections.

- File Access to Load/Save configuration
- Restore: Access to restore the whole system or only the current selected configuration (preset)
- Help: Link to the help file
- Main control tab: Allows selection between input, matrix and output control windows
- Main control window: Contains controls for the selected tab
- Synchronize button: Allows you to go online and gain control of your system
- Master Mute: Mute all inputs & outputs signal

3.1.2 Preset Memory selection

The Synthesis allows the user to create up to 4 preset memories for a quick reconfiguration of the processor. Under each configuration, all settings of the platform are saved.

Placed at the top of the user interface, the use of configurations couldn't be easier. Simply toggle between configurations by clicking on the config button. The currently selected configuration



WARNING: By toggling configurations, you may go from a working configuration (i.e. correct volume/setup/Eq) to an unknown (or improperly configured) configuration. We therefore recommend that you perform a quick configuration offline (without being connected/synchronized to the processor) to prevent any damage to your equipment.

3.1.3 Input Tab

The first step in configuring your Synthesis consists in making sure audio is being fed to the input correctly. To do so, click on the button labeled "inputs". The RMS meter will quickly indicate the average value of the input signal in dBFS (i.e. relative to the full scale of the ADC or 24bit I2S signal). Individual faders control the digital gain at the input and per channel mute status.

This meter displays dB full scale (dBFS) values and will saturate at 0dBFS (full scale of the ADC). Do make sure to keep the signal below 0dBFS (red color) and with enough headroom (say 10dB) to prevent saturation during the typical audio peaks of a music source.



3.2 Matrix Tab

The matrix DSP object is the DSP object linking inputs to outputs. While very typical on commercial DSP products, it may be new for some of you. The following section will summarize the basics of configuration.

Matrix switchers work as a "matrix" where:

- Rows are inputs
- Columns are outputs
- And the status(ON/OFF) of the buttons at the crosspoint of rows (inputs) & columns (outputs) will define the routing and mixing of the audio to one of 8 outputs.

The following configuration shows how the matrix should be configured for a 4way configuration with:

- Left analog audio input being routed to analog outputs 1-4
- Right analog audio input being routed to analog outputs 5-8

Crosspoint buttons (ON)

	Analog Out								Digital Out	
	Left L	Left M	Left H	Sub	Right L	Right M	Right H	Sub	S/PDIF 1	S/PDIF 2
Analog In										
Left	On	On	On	On	Off	Off	Off	Off	On	Off
Right	Off	Off	Off	Off	On	On	On	On	Off	On
Digital In										
Spdif	On	On	On	On	Off	Off	Off	Off	Off	Off
Spdif	Off	Off	Off	Off	On	On	On	On	Off	Off

Analog inputs in Rows

Digital inputs in Rows

Note how labels of input channels and output channels followed on the Matrix mixer to simplify your routing.

Let's illustrate the concept of configuration of this block using a 3way configuration + 2 subs where both Left & Right signals are being mixed (combined).

Mixing happens when multiple crosspoints are enabled within a column

	Analog Out								Digital Out	
Analog In	Left L	Left M	Left H	Right L	Right M	Right H	Sub1	Sub2	S/PDIF 1	S/PDIF 2
Left	On	On	On	Off	Off	Off	On	On	Off	Off
Right	Off	Off	Off	On	On	On	On	On	Off	Off
Digital In	Left L	Left M	Left H	Right L	Right M	Right H	Sub1	Sub2	S/PDIF 1	S/PDIF 2
Spdif	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Spdif	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

3.3 Output Tab

MiniDSP-2x8

MINI DSP - 2x8

File Restore Help

Configuration Selection: Config 1 Config 2 Config 3 Config 4

Input Routing Output

Output

1 2 3 4 5 6 7 8

Analog Output

Output 1 Output 2 Output 3 Output 4 Output 5 Output 6 Output 7 Output 8

Monitor Monitor Monitor Monitor Monitor Monitor Monitor Monitor

0 -10 -20 -30 -40 -50 -60 -70

Output volume

Crossover control

PEQ control

Mute control

Polarity control

Output delay

Delay in ms (0-9ms)

Dist: 0.003 Dist: 0.344 Dist: 0.344 Dist: 0.344 Dist: 0.344 Dist: 0.344 Dist: 0.344 Dist: 0.344

Digital Output

S/PDIF 1 S/PDIF 2

Monitor Monitor

0 -10 -20 -30 -40 -50 -60 -70

Xover PEQ Mute Invert

Master Volume

Disable ADC Mode

Master volume control

3.3.1 Custom Label

The custom label feature allows you to input a user defined label for each output channels: A handy feature to remember the output configuration of your system.

3.3.2 Monitor

Allows you to monitor the input meter of that specific channel on a RMS meter. Note that the information is shown in dBFS

3.3.3 Output volume

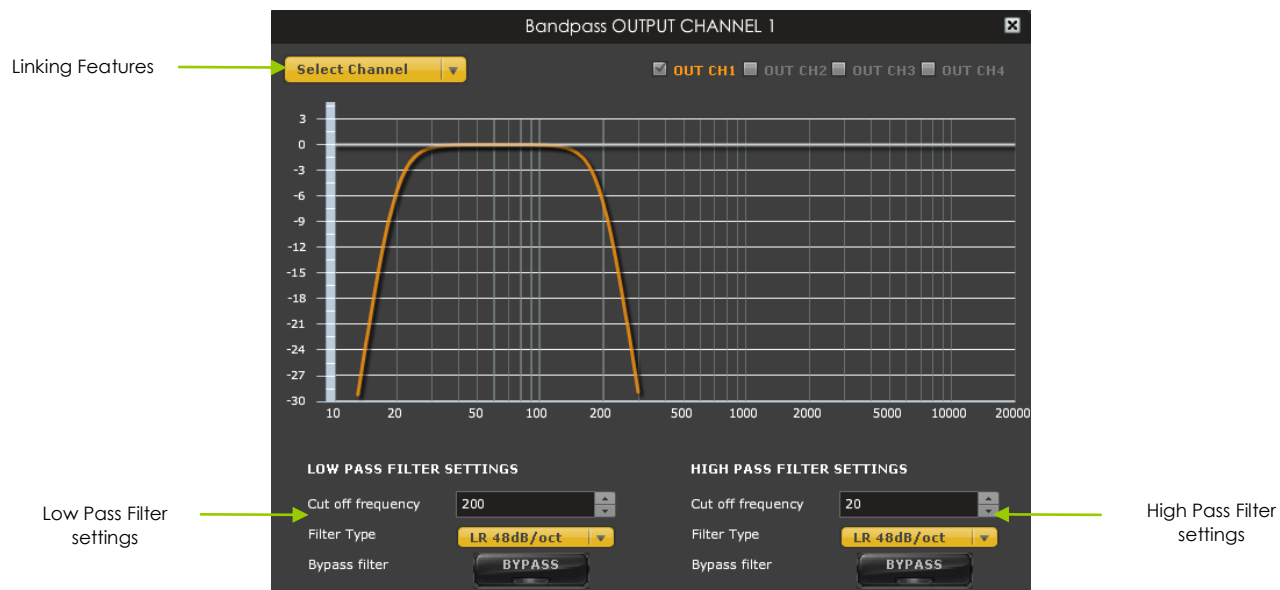
A fader control for 0 to -70dB digital gain control. Similar to the input volume control.

3.3.4 Crossover

Controls for the Low& High pass filters are available when clicking on the Xover (crossover) button:

The log scale graph gives you the equivalent response of the applied filter. By pointing the mouse anywhere on the plotted curve, the dB attenuation and respective frequency are displayed.





- Cut off frequency: Select the -3dB frequency by either entering the value or using the up & down arrows of the numeric box.
- Filter types:
 - Linkwitz Riley (LR): Available in 12, 24, 48dB/oct
 - Butterworth (BW): Available in 6, 12, 18, 24, 30, 36, 42, 48dB/oct
 - Bessel: Available in 12dB/oct
 Each filter has different phase and amplitude characteristics. We recommend you to look online for more information about the specifics of each filter.
- Bypass button allows you to Enable/Disable the filter. Make sure to bypass the filter if you do not need the filter enabled.
- Linking feature allows you to link real time the settings of two crossover windows: a handy feature for stereo environments requiring synchronized changes to both left and right channels.

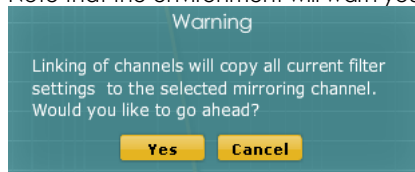
Step 1: Select the channel you would like to link to from the drop down menu. The linking feature will link these two channels together.



Step 2: Click on the "Link" tick box to enable the linking.



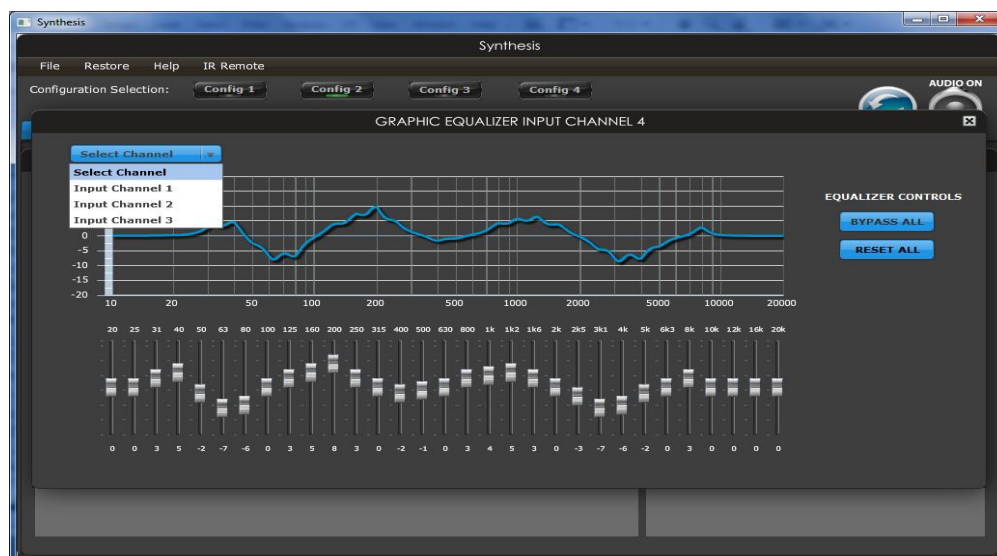
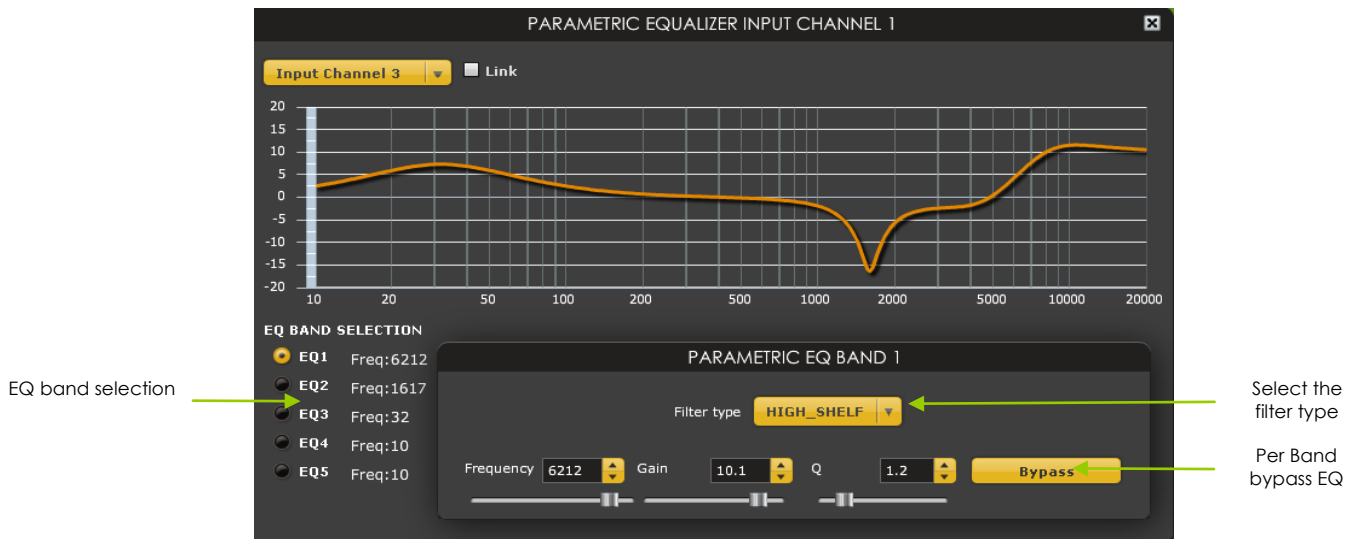
Note that the environment will warn you that all current PEQ settings of the current channel will be copied over to the linked channel.



At anytime during the operation, you can decide to "unlink" the channels by simply clicking on the "link" tick box.

3.3.5 Parametric Equalizer

- EQ band selection: Select one of the 6 x Parametric Equalizers
- Filter type: Select between Peak, Low Shelf, High Shelf
- Bypass: Disables the equalization but doesn't reset the settings. A handy tool to check the influence of equalization on your system without resetting to zero. Note that the bypass button is per-band Bypass (not overall).
- Linking feature: Similar to the crossover dialog box, you can link up two EQ settings together.



Graphic EQ

- 31 Bands of Equalization on each output
- Bypass all will turnoff graphic EQ
- Reset all: Warning with reset any current configuration

3.4 Load/Save/Restore a configuration

3.4.1 Load configuration:

Use this feature to load a previously saved configuration. The file must be as .xml format and previously saved from this plug-in. For complexity reasons, inter-plug-in compatibility is not available.

3.4.2 Save configuration

Use this feature to save your audio settings configuration. The following dialog box allows you to save the file anywhere on your PC as a .xml format. All 4 memory preset configurations will be saved.

3.4.3 Restore Factory default

Use this feature to restore the board back to factory default. Warning that all configurations will be restored back to default from this action.

3.4.4 Restore Factory default

Use this feature to restore the board back to factory default. Warning that settings of all four configurations will be blanked back to default.

4 Troubleshooting

The following symptoms were found to be the most likely cause of issues.

Item#	Symptoms	Troubleshooting recommendation	If not solved go to item
1	No audio on outputs	<ul style="list-style-type: none">- Make sure that audio signal is shown on the RMS input meters.- Double check that input & output mute buttons are not enabled- Confirm that master mute is not enabled- Confirm that you are synchronized and live- Click "Restore to Factory default" while connected	3
2	No audio on RMS input meters	<ul style="list-style-type: none">- Check your connectivity- Double check the strength of your input signal.- Confirm that master mute is disabled	10
3	Audio on input RMS meters but no audio on outputs	<ul style="list-style-type: none">- Make sure the matrix mixer is set to send audio to the output channels in a mixer plug-in- Check the output mute status for each channel	10
4	Cannot reload configuration	<ul style="list-style-type: none">- Confirm the file format of your file (.xml)- Confirm the version of the file	10
5	Cannot connect to the board	<ul style="list-style-type: none">- If using external DC supply, try connecting the board with USB power only	10
6	Cannot install software	<ul style="list-style-type: none">- Confirm that you installed the required frameworks (Adobe Air/ Microsoft .net / SP2 XP)	10
10	Problem unsolved by above suggestions	<ul style="list-style-type: none">- Have a look at our forums to see if someone else already had this issue.- Send us an email (tech@soundstream.com) with a clear explanation of the symptoms and descriptions of the troubleshooting steps you already performed	n/a