miniDSP 2x8
USER MANUAL

Manual revision	Description	Date
V1.0	Initial revision	07-04-2011
V1.1	ADC volume control revision	26-04-2011
V1.2	Jumpers & Dip switch controls on new	30-09-2011
V1.3	IR remote & Firmware upgrade instructions	07-10-2011

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1   Product Introduction

miniDSP 2x8 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 miniDSP 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 miniDSP 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

MiniDSP 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 miniDSP package includes:
- 1 x miniDSP 2x8
- 1 x USB cable
- 1 x Step by Step startup guide

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DISCLAIMER / WARNING

An incorrect miniDSP configuration could easily damage your audio system. MiniDSP 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 miniDSP board **before** connecting anything to the outputs of the MiniDSP (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, miniDSP can not be responsible of any damages the board make cause to your system.
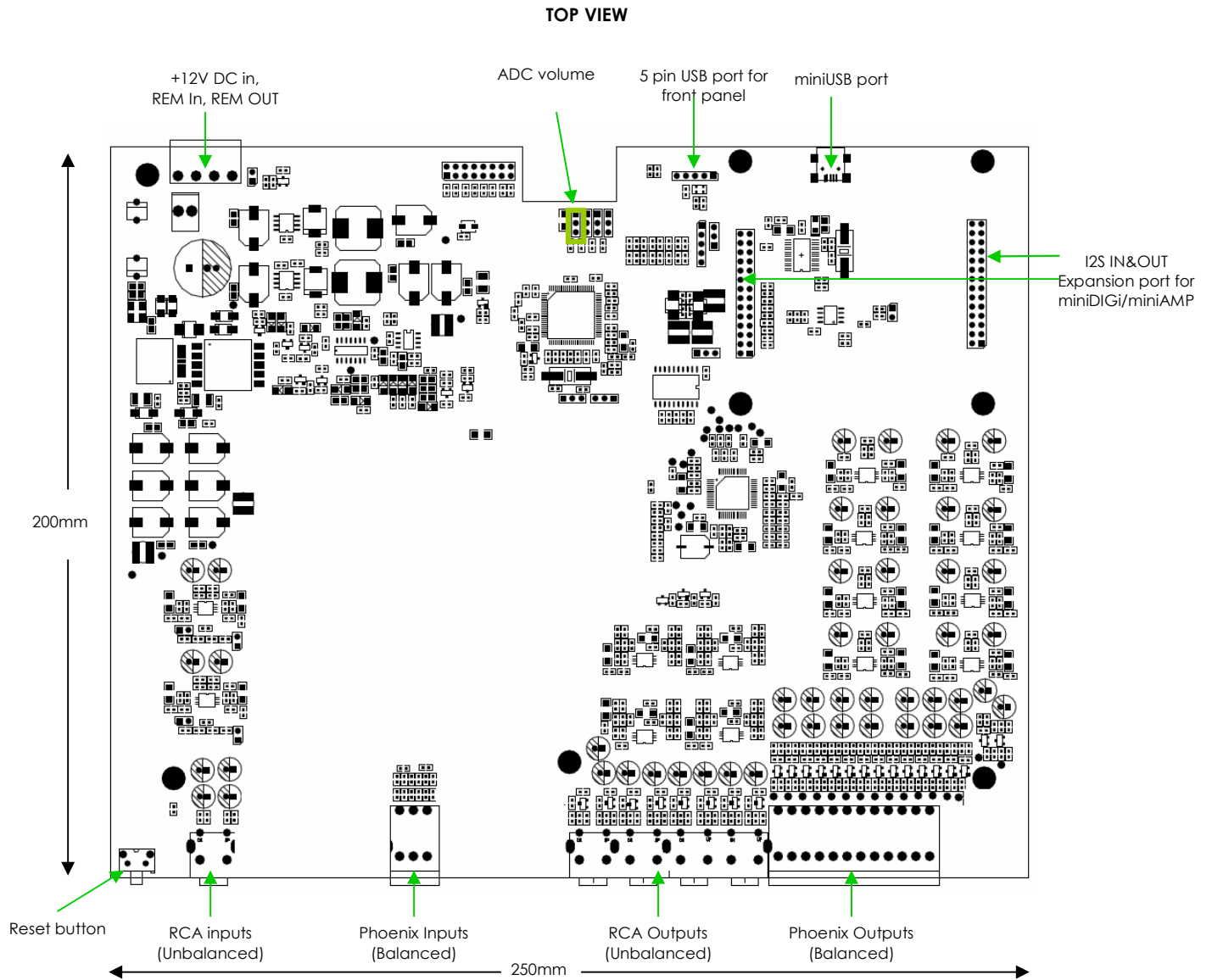
Finally, MiniDSP is a very flexible board and 99% of typical questions we receive at the tech support department are already answered in this user manual. So please take the time to carefully read this user manual. Thanks for your understanding!
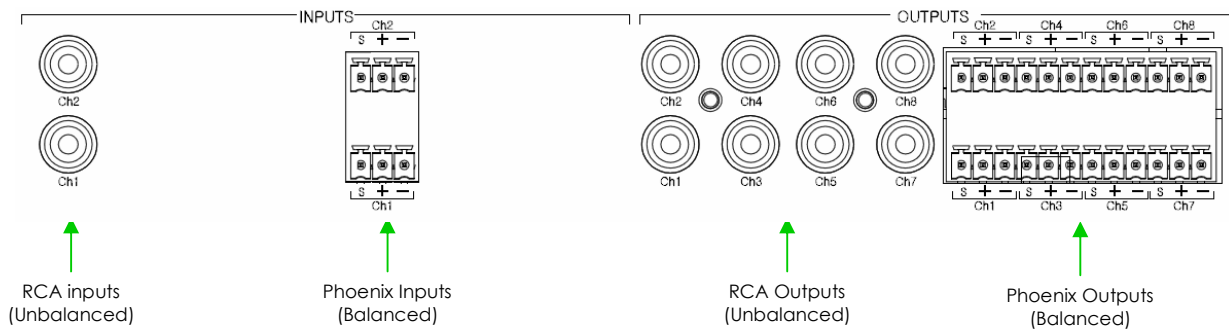

WARRANTY TERMS

miniDSP Ltd 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**.

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2 System Connectivity

2.1 Board connectivity

TOP VIEW

+12V DC in,
REM In, REM OUT

ADC volume

5 pin USB port for
front panel

miniUSB port

I2S IN&OUT
Expansion port for
miniDIGi/miniAMP

200mm

250mm

Reset button

RCA inputs
(Unbalanced)

Phoenix Inputs
(Balanced)

RCA Outputs
(Unbalanced)

Phoenix Outputs
(Balanced)

FRONT VIEW

INPUTS

OUTPUTS

RCA inputs
(Unbalanced)

Phoenix Inputs
(Balanced)

RCA Outputs
(Unbalanced)

Phoenix Outputs
(Balanced)

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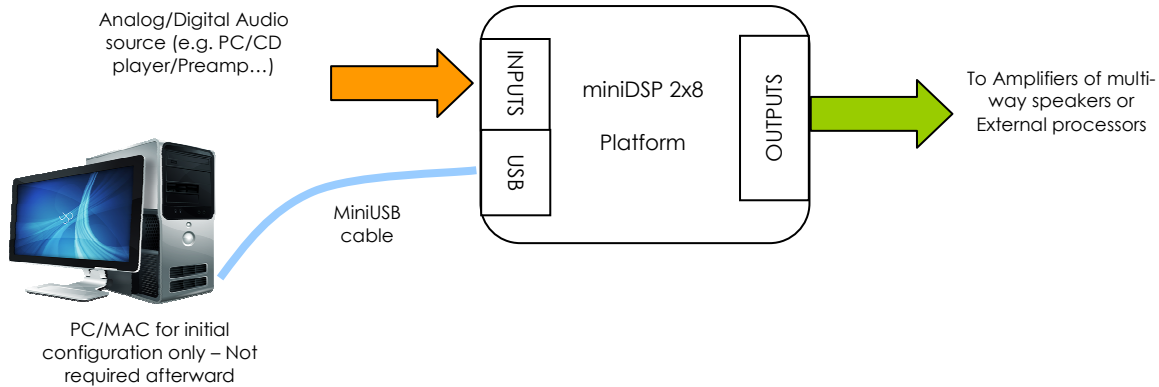
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2.2 Typical setup

The following diagram is a typical connectivity diagram for a basic setup with analog inputs, analog outputs. To prevent any damage, make sure the board is turned OFF before doing any connection modifications.

2.2.1 DC Power connectivity

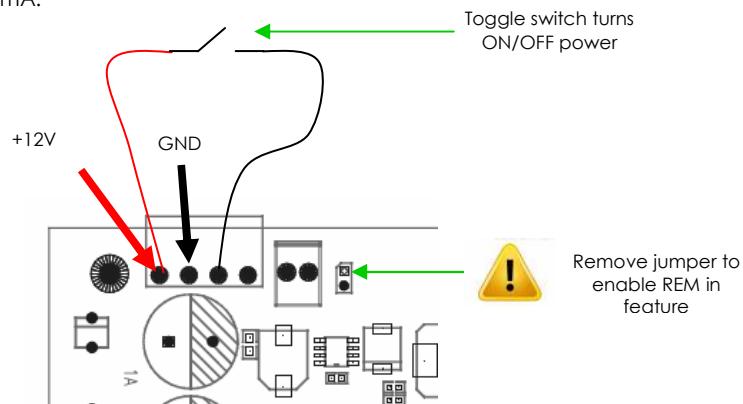miniDSP 2x8 requires a 12V regulated power supply of at least 1.5A (18W).
Be careful to apply the correct polarity to the Terminal block connector as below. For a quick confirmation, take a look underneath the PCB for the silkscreen labels.

Top corner of the PCB
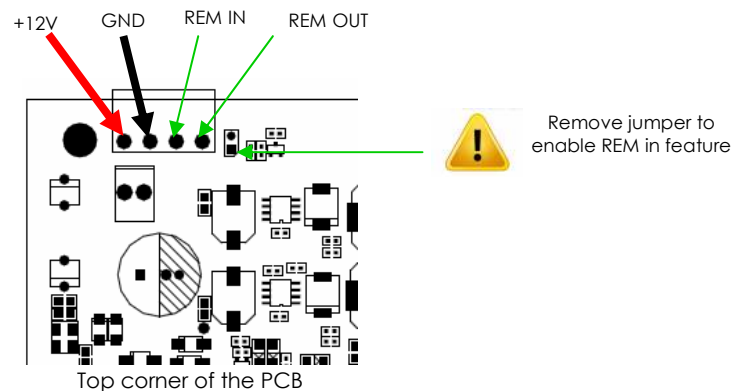
REM IN: The remote IN input will TURN ON/OFF the miniDSP above a threshold of 4V. It can be a useful feature for battery operated systems that do not want to drain the +12V from the battery that is always present. The behavior is as follow:
- o   0V <REM IN <4V: miniDSP 2x8 is OFF
- o   4V < REM IN < 12V: miniDSP 2x8 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.

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2.2.2 Audio connectivity

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

Signal	Max input/Max output
Maximum Input signal @ 0dBFS	RCA connector: 2Vrms (+8 dBu) or 0.9Vrms depending on input jumper position Phoenix Terminal block: 4Vrms (+14 dBu) with an unbalanced signal, 8Vrms with a balanced signal (20dBu)
Maximum Output signal @ 0dBFS	RCA connector: 2Vrms or 0.9Vrms depending on output DIP switch position Phoenix Terminal block: 4Vrms (+14 dBu) with an unbalanced signal, 8Vrms balanced with a signal (20dBu)

Balanced connection (In/Out): Follow connectivity as shown on underside of the board.
- o S = > Cable Shield
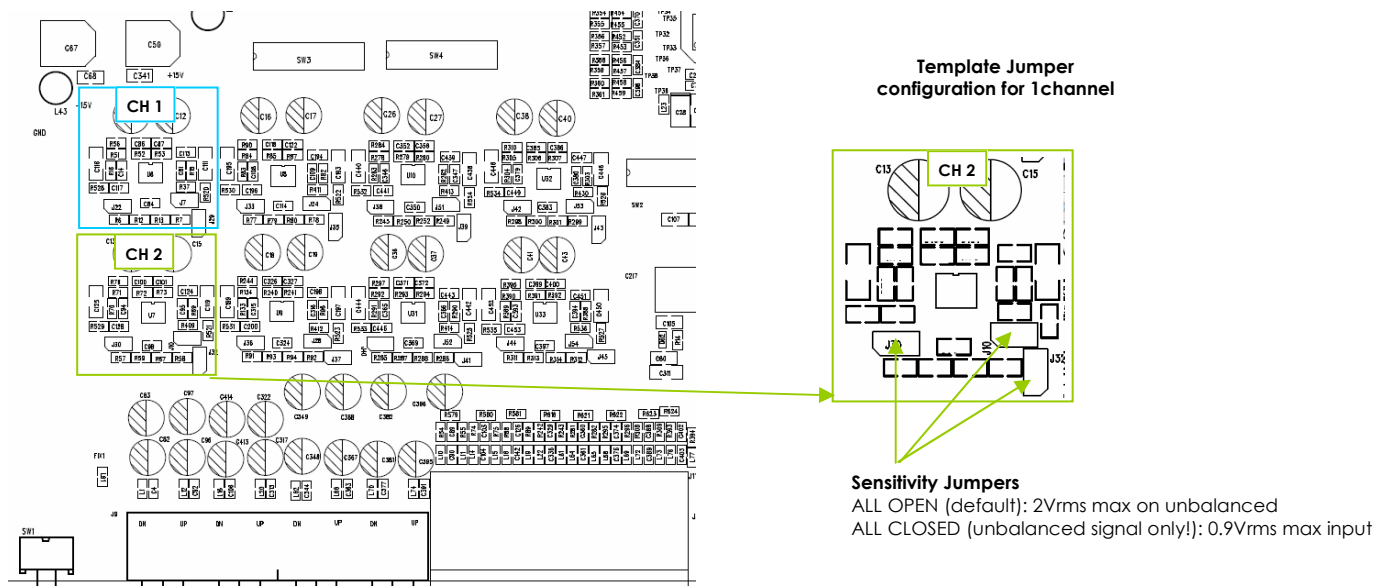- o + = > Positive cable
- o - = > Return cable

The latest board version is fitted with input and output jumpers allowing sensitivity (input) or gain (output) tuning. See below information. If you purchased a board from the earlier version and have a need for modifying the output gain, contact us at info@minidsp.com and we can help you.

Sensitivity Jumpers for unbalanced inputs
A set of jumpers is available to modify the input sensitivity (i.e. max input) from 2Vrms to 0.9Vrms for **unbalanced inputs only**. Sensitivity is the maximum signal before an input saturates so if your signal is too small (e.g. MP3 player), you can optimize your "gain structure" by modifying the input jumpers to 0.9Vrms for a "more sensitive" input.
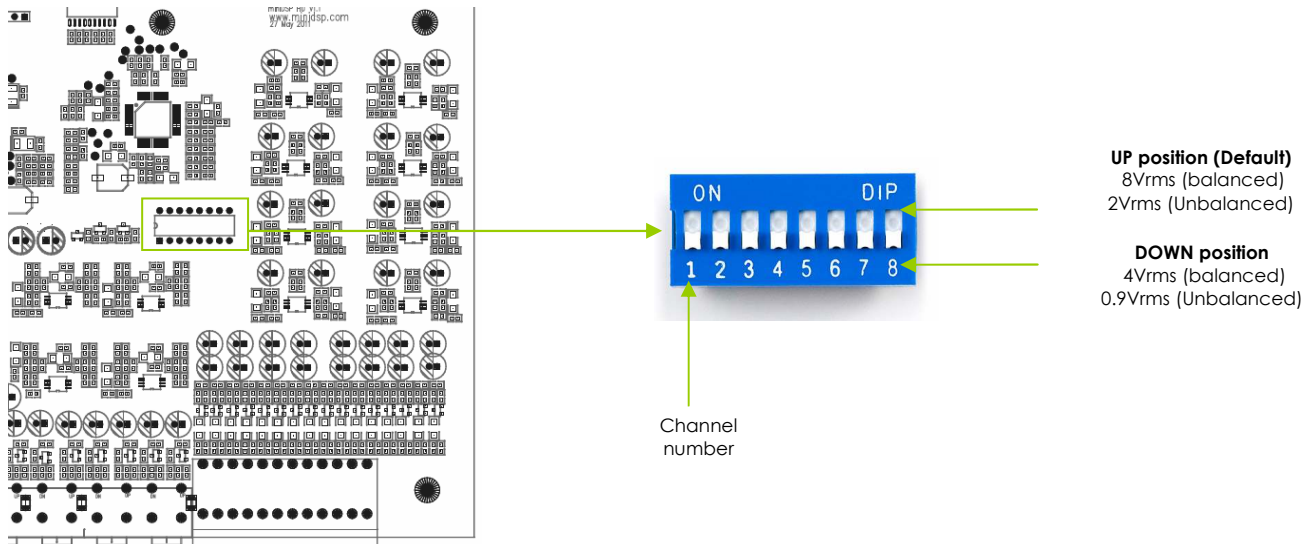
⚠️ Note that this jumper configuration should **not** be used when a balanced signal is used. Please make sure to carefully configure your jumper accordingly. By default, note that all boards are configured without jumpers (i.e. 2Vrms setting) so both unbalanced and balanced can be used.

Template Jumper configuration for 1channel

Sensitivity Jumpers
ALL OPEN (default): 2Vrms max on unbalanced
ALL CLOSED (unbalanced signal only!): 0.9Vrms max input

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Output gain control:
A blue DIP switch control on the output section allows user to control the output gain of both the unbalanced and balanced outputs on a "per channel" basis.

UP position (Default)
8Vrms (balanced)
2Vrms (Unbalanced)

DOWN position
4Vrms (balanced)
0.9Vrms (Unbalanced)

Channel number

2.2.3   Potentiometer for master volume control

A single external 10k or 100k logarithmic potentiometer (to be provided by user) can control all output channels (analog + digital).

All connections between the board and the potentiometer shall be done with the board turned OFF to prevent any damage to the electronic. See below diagram on how to connect the potentiometer directly to the connector. In the event of the volume control behavior being reversed (clockwise decreasing volume), simply swap the ground and 3.3V pins on the potentiometer.

Potentiometer Diagram
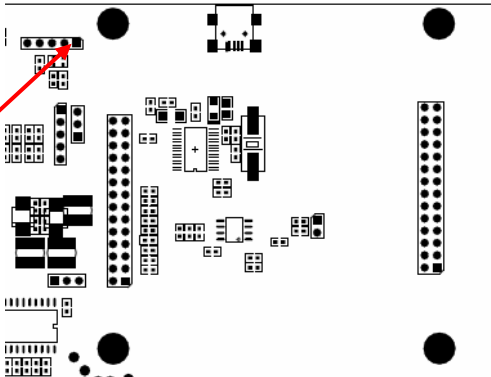
3.3V

Center tap

GROUND
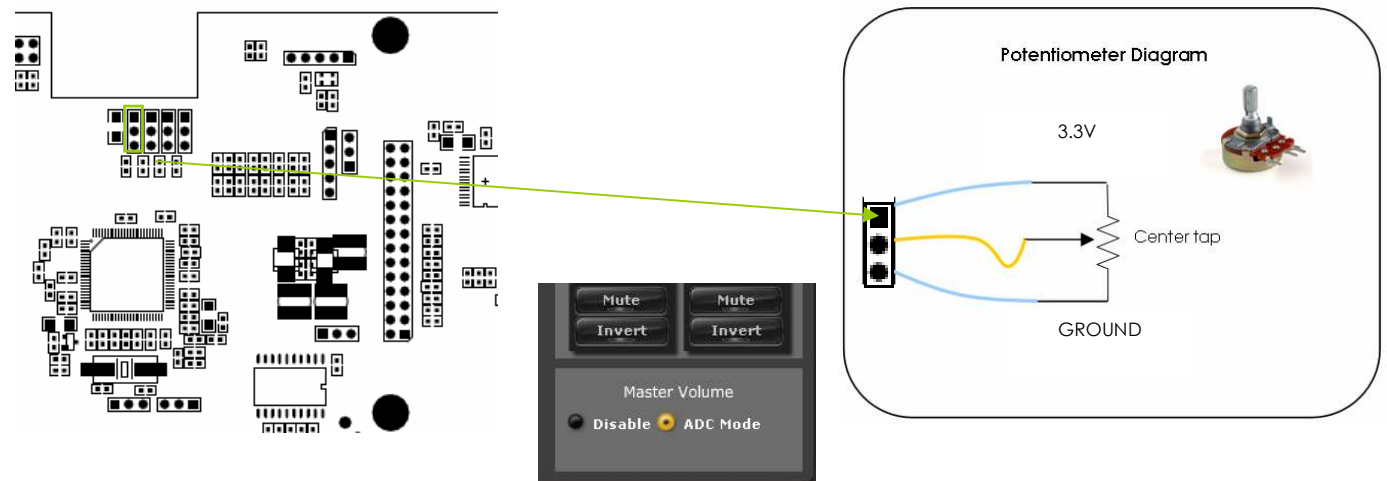
Once the potentiometer connected, you will need to enable the master volume control by ADC in the plug-in. In the output section of each configuration, make sure to enable the "ADC mode" as shown above.

2.2.4   Front panel USB port

For integrations requiring a panel mount USB connector, the miniDSP includes a 5 pin, 0.1" (2.54mm) pitch connector. Such connectors are very typical in the computer industry and look as shown below. Although a standard connector, you should confirm the pin-out with your manufacturer or you could easily cause damage to your computer or miniDSP kit.

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Pin 1 is here.

Pin out should be:
Pin1: Vcc (+5V)
Pin2: D-
Pin3: D+
Pin4: Gnd
Pin5: Gnd

In most cases, the pin4/5 can be identified by a black wire, but once again, DO check with the spec of the connector to prevent any short-circuits.

3 Software Setup

miniDSP platforms are controlled and configured over a USB connection. Our software, so called **plug-in**, must be purchased from our online webstore separately. The following section will highlight the steps required to configure the miniDSP plug-in.

> In order to familiarize yourself with the software first, do not connect any amplifiers to your miniDSP 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. Next, go to the User Downloads section of the miniDSP website. The purchased plug-in will be available for download once logged in with the credentials for your account.

3. Double click on the .air file to install the plug-in. The following dialog box will pop up.
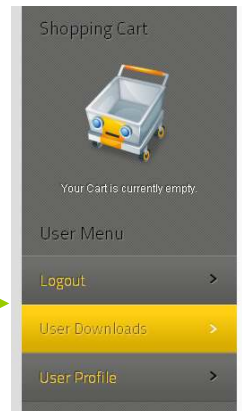
Once the configuration finalized, the plug-in will automatically boot up.

4. You can now connect the miniDSP 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.

5. 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 MiniDSP kit.

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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.

6. 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.
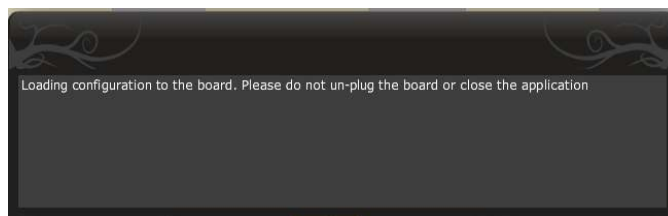
Connect & Synchronize ⟶

Providing your board is connected to the PC with a USB cable, the following important dialog box pops up with 4 options:
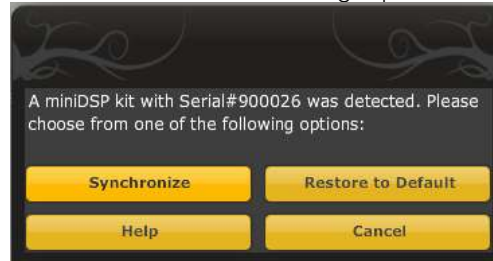
a) Synchronize: With this option, the current plug-in configuration will be loaded/flashed to the MiniDSP and your plug-in turned to "On-line" mode. Warning that it will overwrite whatever configuration was previously loaded on the board. If you'd like to load a different configuration, click cancel and go to the settings tab to load one of your previously saved configurations.
If you previously installed a different firmware version on your kit, this button will display: Synchronize & Upgrade. Meaning, the MiniDSP kit firmware will be upgraded to the current plug-in firmware along with the current settings you have.

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.

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4 Plug-in Architecture

4.1.1   Main Page
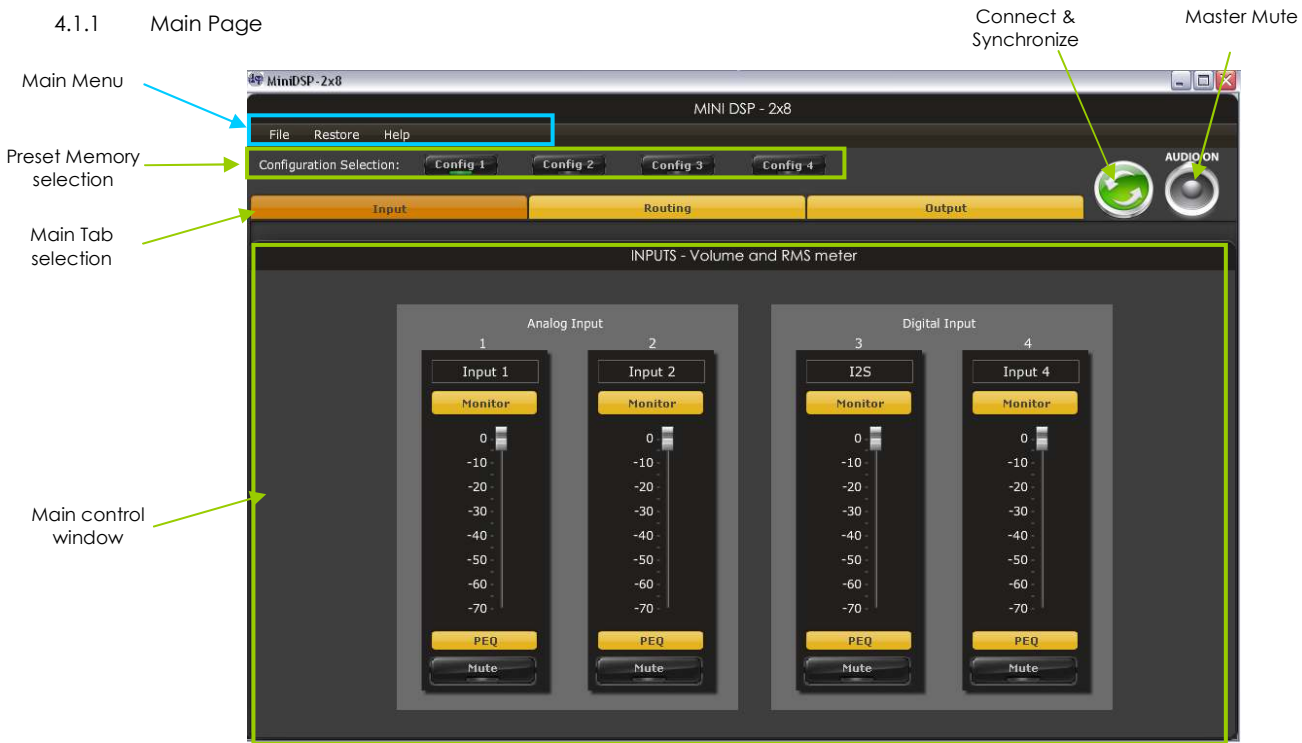
Main input page for the miniDSP 2x8 plug-in

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

4.1.2   Preset Memory selection

The miniDSP 2x8 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
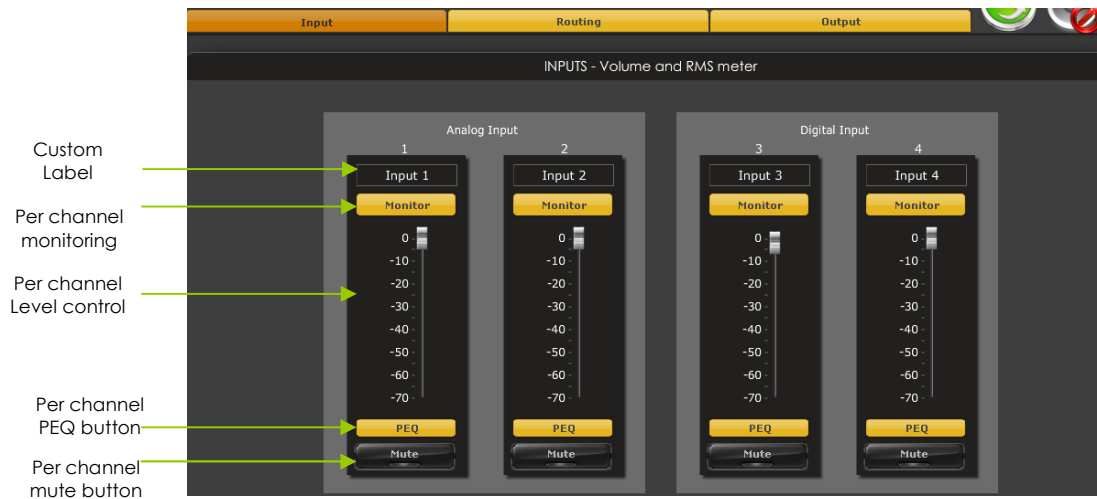

WARNING: By toggling configurations, you may go from a working configuration (i.e. correct volume/setup/Eq) to an unknown (or improperly configured) configuration. We therefore recommend that you perform a quick configuration offline (without being connected/synchronized to the processor) to prevent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

4.1.3   Input Tab

The first step in configuring your MiniDSP 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.

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Input   Routing   Output

INPUTS - Volume and RMS meter

Analog Input   Digital Input

1   2   3   4

Custom Label → Input 1   Input 2   Input 3   Input 4

Per channel monitoring → Monitor   Monitor   Monitor   Monitor

Per channel Level control →

Per channel PEQ button → PEQ   PEQ   PEQ   PEQ

Per channel mute button → Mute   Mute   Mute   Mute

4.2 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	
Analog In	Left L	Left M	Left H	Sub	Right L	Right M	Right H	Sub	S/PDIF 1	S/PDIF 2
Left	On	On	On	On	Off	Off	Off	Off	On	Off
Right	Off	Off	Off	Off	On	On	On	On	Off	On
Digital In	Left L	Left M	Left H	Sub	Right L	Right M	Right H	Sub	S/PDIF 1	S/PDIF 2
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

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				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

4.3   Output Tab

4.3.1   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.

4.3.2   Monitor

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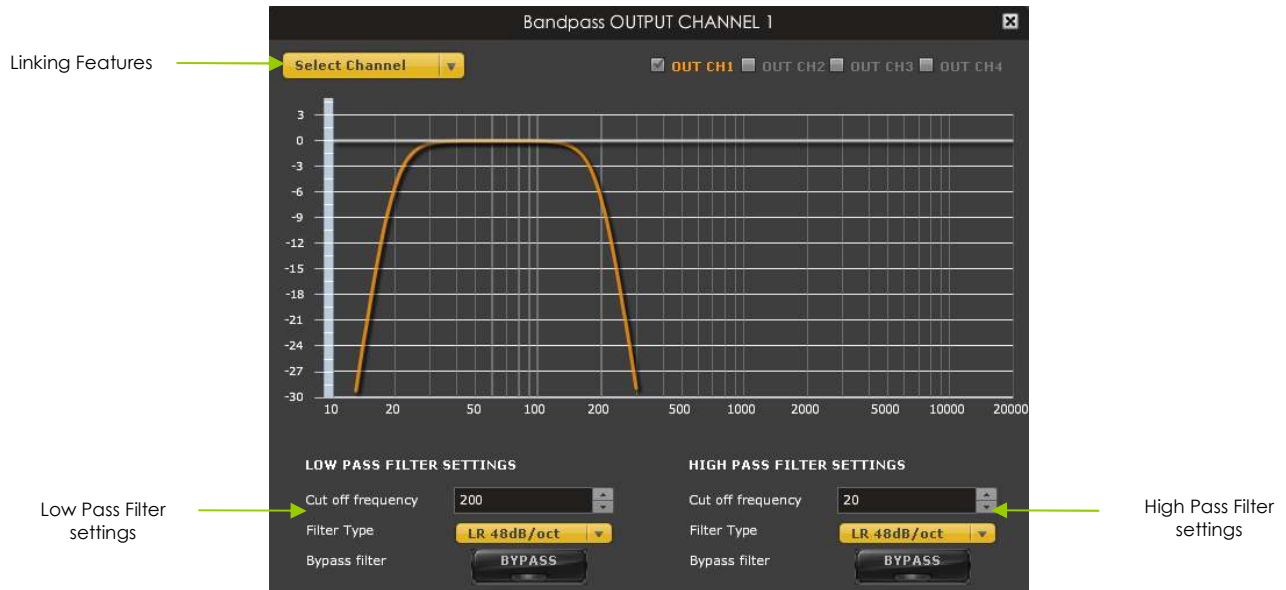
4.3.3   Output volume

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

4.3.4   Crossover

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

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Linking Features

Low Pass Filter settings

High Pass Filter settings

- Cut off frequency: Select the -3dB frequency by either entering the value or using the up & down arrows of the numeric box.
- Filter types:
  - o Linkwitz Riley (LR): Available in 12, 24, 48dB/oct
  - o Butterworth (BW): Available in 6, 12, 18, 24, 30, 36, 42, 48dB/oct
  - o 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.

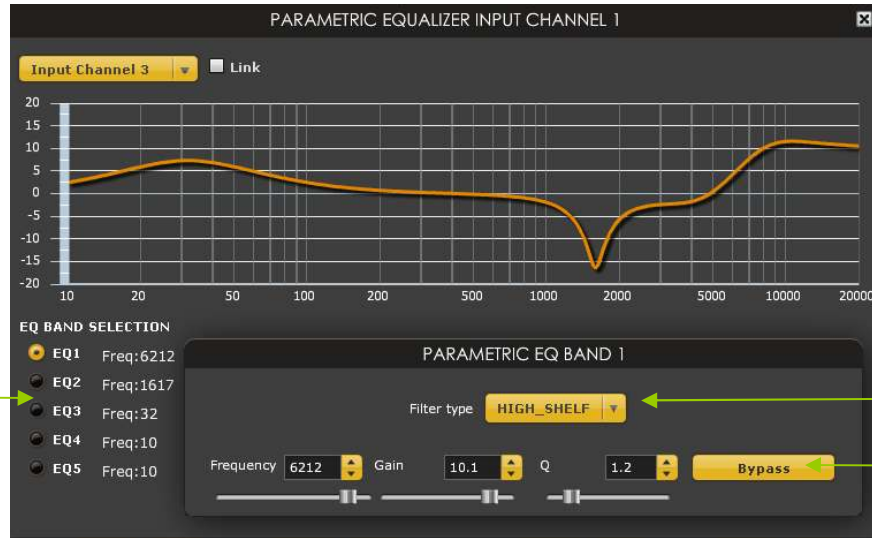Step 2: Click on the "Link" tick box to enable the linking.

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.

4.3.5   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.

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EQ band selection

Select the filter type

Per Band bypass EQ

4.3.6 Master volume control

The master volume allows control of all 10 outputs channels (Analog + digital) of the miniDSP unit. It is enabled when a 10k linear potentiometer is connected to the ADC input port. See the connectivity section for more information.
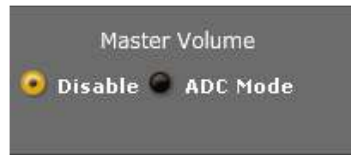
WARNING: Make sure to "DISABLE" the master volume control if you do not have any potentiometer connected to your unit. Doing otherwise will make the platform unstable (volume very low).

4.4   Load/Save/Restore a configuration

4.4.1 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.

4.4.2 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.

4.4.3 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.

4.4.4 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.

4.5   Firmware upgrade

In order to enable some new features, the miniDSP may require to be flashed with a new firmware. All the required tools and firmware files are already included in the in the installation folder of the latest plug-in starting from 4x10 b5 release. So the first step to make sure you have everything you need is to install the new plug-in by logging to the UserDownload section. Note that firmware upgrade tools is Windows only at this point of time. A mac tool is in the works.s

A warning may be shown during a synchronization if you have the incorrect firmware loaded on your platform.

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Once the new plug-in installed, please browse to \\Program Files\MiniDSP\MiniDSP-2x8\firmware_tools\Windows. Three files can be found there:
- Upgrade steps
- Upgrade Tool excecutable
- Firmware file

The firmware upgrade summarizes to few simple steps:
      1. Unplug the DC power
      2. Press and hold the reset button while pluging the power to the board
      3. Release the reset button
      4. Connect the USB to the
      5. Open Upgrade Tool
      6. Click Open Hex File
      7. Choose the lastest hex file
   8. Click Program/Verify
      9. Reset Device
That's all. You're ready to move on to using a new firmware.

4.6 IR remote learning feature

This feature is enabled on

In an effort to keep the platform compatible with the most common IR standards and not ask users to add another remote to your pile, we implemented an IR learning feature. This feature allows you to use any remote compatible with the NEC/Philips RC6 and Sony IR standards. Learning an IR commands goes as follow:
      1) Connect & synchronize the board to the newly downloaded plug-in
      2) Under the new "IR Remote Plug-in", click on the "IR Learning menu" to reach the following dialog box.
      3) Ten commands are available for control from a remote. They include:
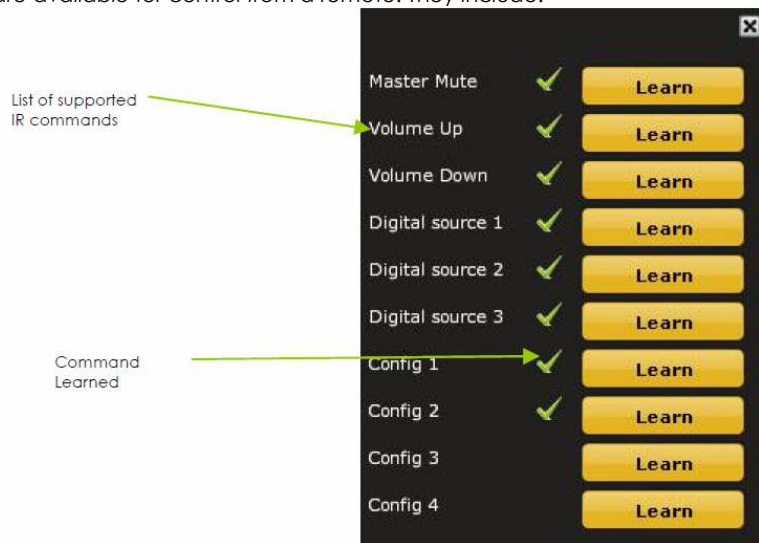
- Master mute
- Volume Up: 1dB increments with ramping down when holding button
- Volume Down: 1dB decrements with ramping down when holding button
- Digital Source 1/2/3 used for a new I/O card (OUT OF SCOPE of this beta testing)
- Config 1/2/3/4: Used to select one of the config built under the software. Make sure you've previously pre-configured these first!

To program a command, 2 simple steps:
- While connected and synchronized: Press the "LEARN button"
- Point the remote to the IR receiver and press the button to learn the command. A dialog box will confirm a successful learning and a green arrow appears once the command learned.

In case the platform fails to learn the remote command, you most likely do not have a Philips RC6/Sony/Nect compatible remote. Please try another remote.

Feature such as Config 1-4 selection can **ONLY** work when the unit is not connected/synchronized to the plug-in. Command for Digital source selection is for future only and does not apply to any miniDIGI setup.

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5 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	- 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	- 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	- 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	- Confirm the file format of your file (.xml) - Confirm the version of the file	10
5	Cannot connect to the board	- If using external DC supply, try connecting the board with USB power only	10
6	Cannot install software	- Confirm that you installed the required frameworks (Adobe Air/ Microsoft .net / SP2 XP)	10
10	Problem unsolved by above suggestions	- Have a look at our forums to see if someone else already had this issue. - Send us an email (info@minidsp.com) with a clear explanation of the symptoms and descriptions of the troubleshooting steps you already performed	n/a

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