The Mandala USB Drum ~ Virtual Brain

www.mandaladrum.com

Synesthesia Corporation

v1.03

INTRODUCTION

Thank you for purchasing the Mandala Drum v2.0. I hope you enjoy exploring sonic terrains previously uncharted by performance-based electronic instruments. With unprecedented speed and sensitivity, the Drum translates your rhythmic nuances and tonal preferences into signals that generate sounds and transmit MIDI info, taking full advantage of the position and velocity of your strikes for new levels of electronic musical expression.

At Synesthesia Corporation, we are musicians who expect first-rate quality in the gear we use, and we strive to deliver that quality in our own products. Each Mandala Drum is hand-assembled and thoroughly tested before it is shipped, and we continually review the Mandala's capabilities in order to keep it updated with any possible improvements. We also provide complimentary tech support to our fellow explorers (email your inquiries to techsupport@synesthesiacorp.com), and welcome feedback and suggestions.

Thanks again for your support. I am confident you'll find the Mandala Drum an exciting vehicle with which to tap into your undiscovered sonic potentials. Happy travels!
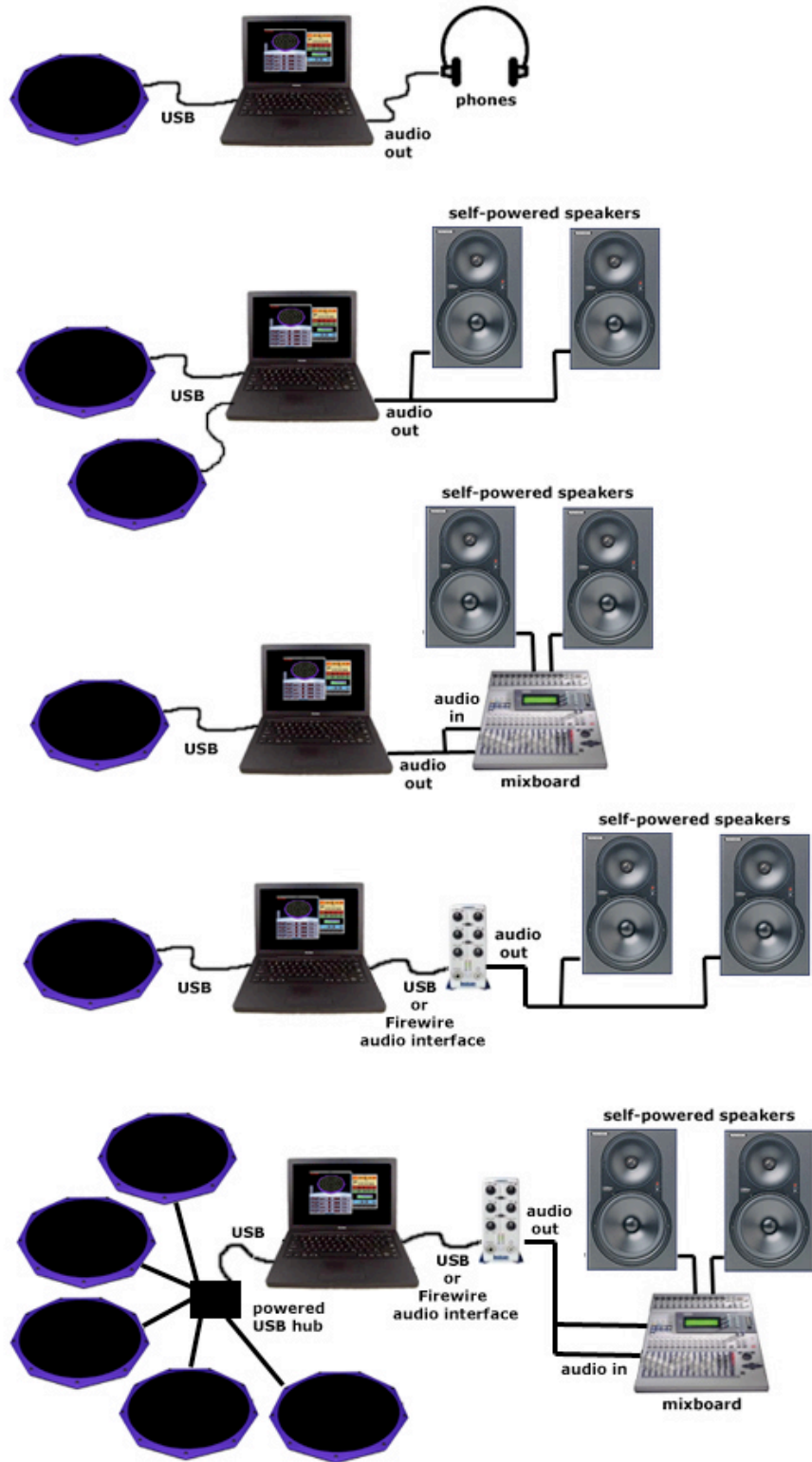
Sincerely,

Vince De Franco

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Some Possible Mandala Setups

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self-powered speakers · USB · audio out

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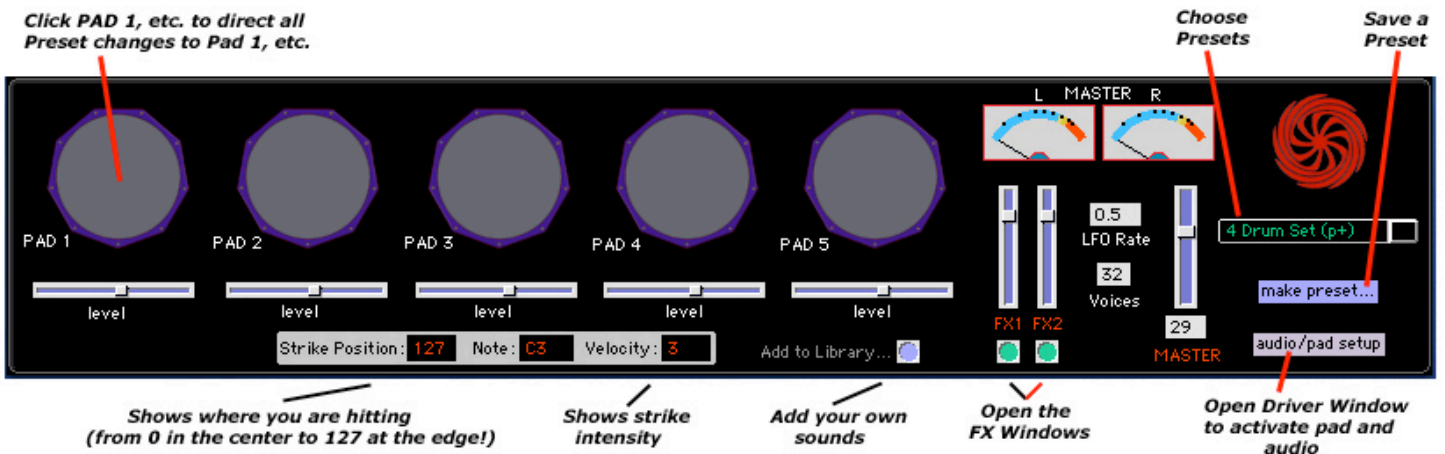
Mandala Quick Start

To get yourself rolling right out of the box with your new Mandala USB Drum just follow these simple steps….

- Connect your Mandala pad to your computer using the included 6ft USB cable.

- Insert the Virtual Brain installation DVD into your computer's drive and drag the relevant (PC or Mac) Virtual Brain folder onto your hard drive. (The Virtual Brain Program should remain in its Virtual Brain folder on your hard drive in order to properly recognize its support files.)

- Launch the Mandala Virtual Brain Application and proceed to the Audio/Pad Setup screen. On this screen enter the appropriate settings for the audio interface you will be using for your sound creation. You can play with a lot of the settings in this window in order to optimize the program for your particular usage (*see Driver Window below, as well as Driver Info, or Troubleshooting if necessary*). Also on this screen choose the MIDI input device you would like to assign to Pad 1 of the program by operating the pull down menu next to the words 'Pad 1'. You will see 'MandalaNNNN' in this menu where NNNN is a unique serial number assigned to your pad. Turn on communication with the pad by clicking the red 'on' light next to its name.

- Close the Audio/Pad Setup screen and **click on the 1st purple pad on the left side of the Master window**.

- Now choose from one of the presets in the preset menu under the red swirl in the Master window and play away. There is much to explore!

MASTER WINDOW

Click PAD 1, etc. to direct all Preset changes to Pad 1, etc.

Choose Presets

Save a Preset

Shows where you are hitting (from 0 in the center to 127 at the edge!)

Shows strike intensity

Add your own sounds

Open the FX Windows

Open Driver Window to activate pad and audio

After starting up the program, the Master window is the first place you need to visit in order to set up your session, select presets and save your work. Additionally, in the Master window you can adjust volumes, open the Effects windows, meter your output signal, set an LFO rate, and measure MIDI info sent from each strike of your drum.

PADS Virtual Brain software is ready for trigger signals from up to five separate Mandala drum pads. Whichever zone you strike on a drum will appear in the correlating pad icon.

VOLUMES Below each pad's icon is a volume slider that adjusts **Pad volume**. On the right side of the window, the **Master volume** fader will change the overall volume of all the pads together.

METERS Two analog-style meters help you regulate the **Master output volumes** of the left and right channels. As in life, stay out of the red whenever possible.

FX CONTROLS To send you further down the rabbit hole, two **virtual effects stacks** await your sonic debauchery. Access each

by clicking the buttons under the **FX volume faders**, which, by the way, control *post-effects* volume.

LFO RATE (Low Frequency Oscillator) We included an adjustable LFO to enhance use of your effects and zone info. This is one of the controllers discussed later in the manual.

MIDI INFO Along the bottom of the Master window are three displays of essential MIDI information about each strike of the drum. MIDI can divide any controllable parameter into 128 increments that measure note info.

Strike Position There are 128 strike positions from center to edge.

Note Trigger any of 128 notes.

Velocity This is a measure of the force with which the pad is struck. There are127 measurements from lightest to strongest strike.
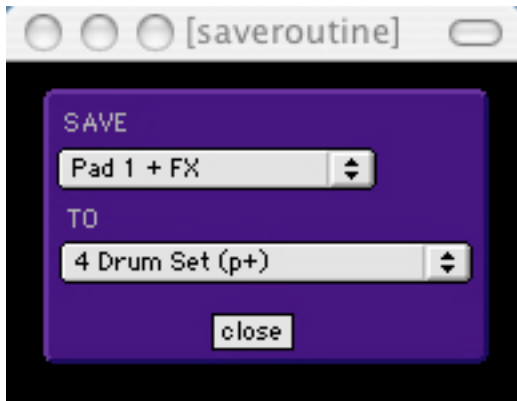
SELECTING AND SAVING PRESETS

This crux of the Mandala's functionality demands italics. The Preset list is the part of the Brain that contains your Mandala's personalities. Every preset you create makes your drum more unique, and the capabilities steadily increase.

PRESET LIST Next to the Master volume slider, you'll find a list of factory presets. Try them out by clicking and scrolling through the pop-up list. Once you start creating and saving your own presets, they'll all be accessible in this list.

MAKE PRESET Whenever you alter a preset – or create your own from scratch – you'll of course want to save your

customizations as proof of your alien virtuosity. Clicking here will open up the Save window.

SAVE WINDOW

Click on the SAVE bar to decide which type of preset to save. Your choices are:

Pad 1 + FX (p+) Save all zone and FX settings for Pad 1.
Pad 1 (p) Save zone settings only.
FX Only (fx) Save FX settings only.
Full Kit + FX (kit) Save all settings for all Pads in your kit.

Click on the 'to' bar to choose a location for your preset. You can overwrite factory presets or store your work in any of the 'unnamed' slots. Upon choosing a slot, you will be prompted to name the preset.

AUDIO PAD/SETUP This opens a very crucial window. So crucial, in fact, that you wont' hear anything until you tend to these settings. Time to open the Driver window.

DRIVER WINDOW

Set to 44100

Set as LOW as possible without hearing clicks and pops in your sound

Choose your pad from the pulldown menu - It will be called 'MandalaDrumNNNN' where NNNN is your built-in serial number

drivers

Audio — On

Driver — CoreAudio Built-in Output

Output Destination — Internal Speakers

Sampling Rate — 44100

I/O Vector Size — 128

Test Tone

Click to test your sound output

Output Channel 1 — 1 output

Output Channel 2 — 2 output

Set to 1 for Left

Set to 2 for Right

ON/OFF

PAD 1 — MandalaDrum1106

PAD 2 — MandalaDrum1106

PAD 3 — MandalaDrum1106

PAD 4 — MandalaDrum1106

PAD 5 — MandalaDrum1106

Devices

Activate your pad - cycle these on and off if necessary

CPU Utilization — 0. %   Update

CPU Limit — 0 %   Over

SAVE SETTINGS

Save Settings when your sound is right and you won't have to come back in here

(PC users set 'Signal Vector Size' as close as possible to your I/O Vector Size!!!)

Driver Assign an audio driver through which to hear the program's audio output. As an example, choosing CoreAudio Built-in Audio will send your sound out through your computer's speakers.

Output Destination Choose which of your hardware's outputs to use.

Sampling Rate To entirely dodge a lesson on the complexities of sampling rates, suffice to say the Virtual Brain defaults at the standard rate of 44.1KHz. Best not change this setting unless you know why you're doing it.

I/O Vector Size To optimize latency time between pad strike and audio output, set the I/O Vector as low as possible without compromising sound quality. It's a measure of how large the blocks of audio are that your audio interface (built-in or external) is putting out.

Signal Vector Size (PC only) can never be set higher than the I/O Vector Size. It is a measure of how much audio data is crunched at one time when the processor is formulating its output. Set this to the same value as the I/O vector size you settle on, or at least as close to it as possible. Choices vary from system to system.

Output Channels Choose which of your audio interfaces' output channels will route your audio signal to your eardrums.

Pad Router 1-5 This is where you assign Mandala drums—or other MIDI-triggering instruments—to each pad represented in the Virtual Brain. Every drum we make is given a unique ID tag so your computer recognizes each individually—crucial when using multiple drum pads.
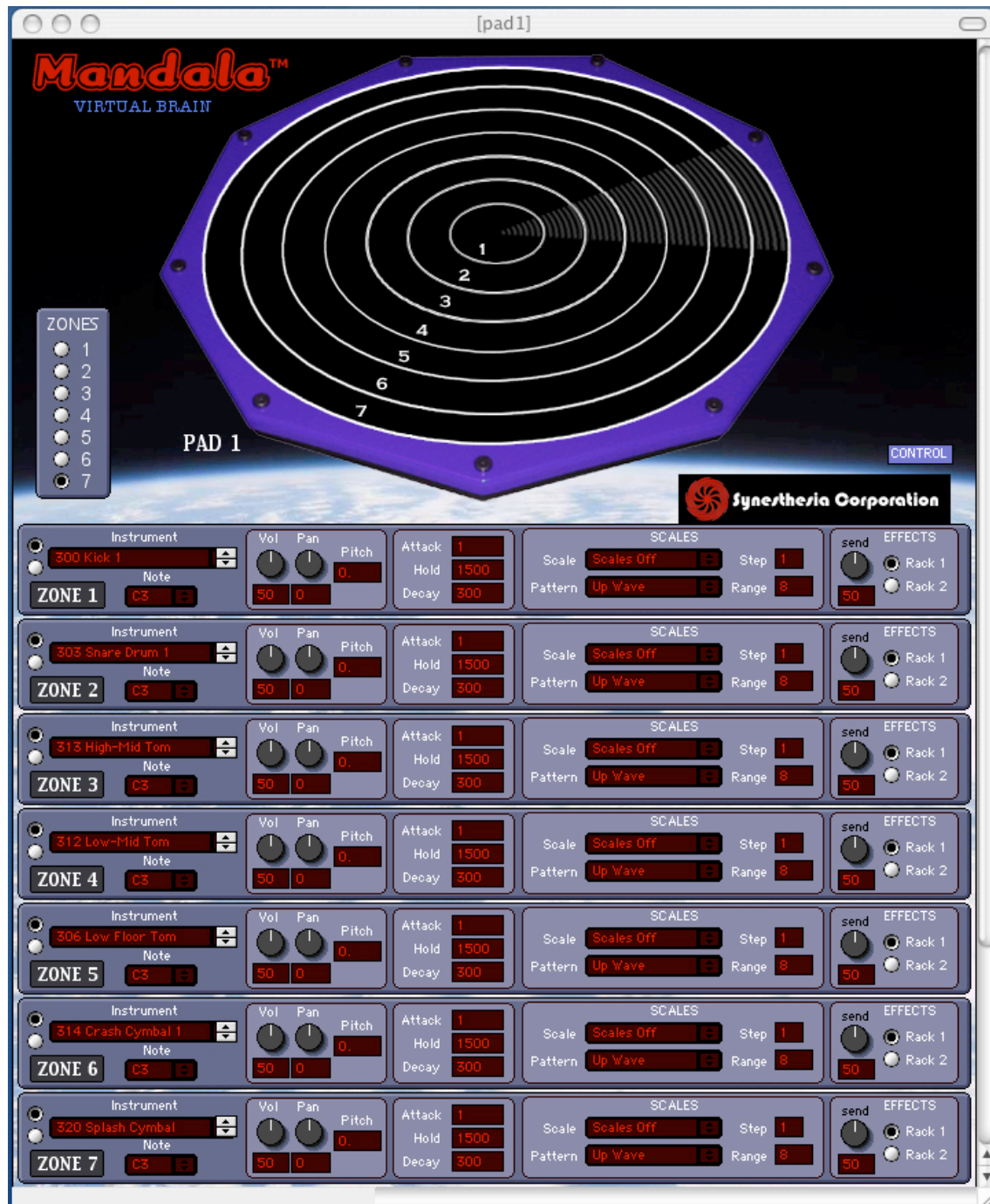
CPU Utilization This measures the percentage of CPU power the Brain uses at any given time. The percentage increases with the amount of Brain functions running simultaneously.

CPU Limit Set the percentage of your CPU's power to be used exclusively by the Virtual Brain. OVER tells you when you've surpassed it, which ain't a good thing.

Update Click here for a reading of the CPU power in use by the Brain at that moment.

Save Settings Click here to make the Driver window default to your preferred settings every time you open the program.

PAD WINDOW

How 'Bout Those Zones? In case you haven't heard, the Mandala Drum Pad can be divided into concentric circles called **zones**, each ready for its own unique settings. Go to the Pad Control window to

assign sounds, configure note and scale parameters, and set other essentials mentioned below. When using multiple drums, clicking on each pad in the Master window will open up its own Pad Control window. The Brain software currently supports simultaneous use of up to five Mandala pads.

ZONE CHOICE Set your desired amount of zones to work with and you'll see the Pad divide itself accordingly. The whole Pad can be one zone or divided into up to seven zones. Zone 1 through Zone 7 lay out from the pad's center to its edge, respectively.

DASHBOARDS Dashboards are control panels that appear for each zone you are using.

Each Dashboard is divided into the following panels:

Instrument Click on this scroll menu to select from a list of hundreds of top-quality instrument samples. Select one of two buttons to the left of the instrument list to use sounds from the program library (top button) or from your own sample library (bottom button). Instruments between 300 and 500 are percussive and will not respond to the Note/Scale/Step/Range options below.

Note Scroll within this menu to choose what pitch your chosen instrument will play. (i.e. Fretless Bass plays D#4). You can liken the Mandala to a keyboard with up to seven keys. Each key typically hits a different note, right? So can each zone, if that's what you want. But that is really just the beginning. A zone's note selection plays an important role in setting up the next feature…

Scale Scroll through the list and choose a **scale** or **mode** to manipulate. Options include:

Major, Natural Minor, Melodic Minor, Diminished, Whole Tone, Pentatonic Major, Pentatonic Minor, Blues Major, Blues Minor, Ryuku, Gamelan, Indian, Combined Diminished, Chromatic, Ionian, Dorian, Phrygian, Lydian, Mixolydian, Aeolian, Locrian, scale off

Step Set up **which notes** to use within the chosen scale: 1 = every note, 2 = every other note (third intervals for you music school kids), 3 = every 3rd note (fourth intervals), 4 = every 4th note (fifth intervals), and so on…

Pattern Assign a **contour pattern** (literally, a *linear shape)* to your chosen scale's sequence of notes. Options include:

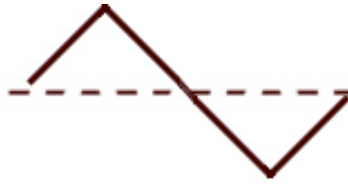*Upwave:*   *(up –> down –> up…)*

Up Rep: *(up –> up –> up…)*

Downwave :   *(down –> up –> down…)*

Down Rep :   *(down –> down –> down…)*

Fullwave Up :   *(up -> doooown -> uuuup…)*

Fullwave Down: *(down -> uuuuup -> dooown…)*

Velocity Up: the harder you hit, the *higher* the scale note you
          trigger

Velocity Down: the harder you hit, the *lower* the scale note you
          trigger

Random: any strike triggers a random note in the scale;

Range Program the scale's **tonal range** by deciding how many notes
      you want to fit into the contour

In the Dashboard you can also set a zone's **volume**, **pan** position,
and **pitch**, as well as set your effects **send** levels.

There are 3 ways to change a knob's value:

Course: Click and hold on the knob and move the mouse up or down.
Fine: Click and hold on the number and move the mouse up or down.
Finer: Click on the number and type a value with your keyboard.

AHD Envelope

The next section on the Dashboard is based on a classic ADSR (Attack, Decay, Sustain, Release). AHD (Attack, Hold, Decay) settings help you define certain characteristics of the sounds you trigger.

Attack Refers to how quickly the triggered sound reaches full volume. On acoustic instruments attack is almost immediate, but with an electronic instrument like the Mandala you can alter reality.

Hold Refers to the length of time that the sound sustains at full volume.

Decay Refers to how quickly the sound drops from its Hold volume.

Effects Racks

The final panel on the Dashboard is the Effects Racks router. Designate which group of effects to send your signal through. Use the faders to adjust the post-effects volume.

EFFECTS WINDOWS

Each zone can be routed into two separate "racks" of master effects. To open an effects window, click on FX1 or FX2 in the Master window. Behold, literally piles of effects!

FX Rack 1 The effects chain is:
Distortion > Filter Bank (includes State Variable/BiQuad/Comb/AllPass/Hilbert) > Stereo Flange > Ring Modulator > 3-Band EQ > Stereo Delay > Reverb*
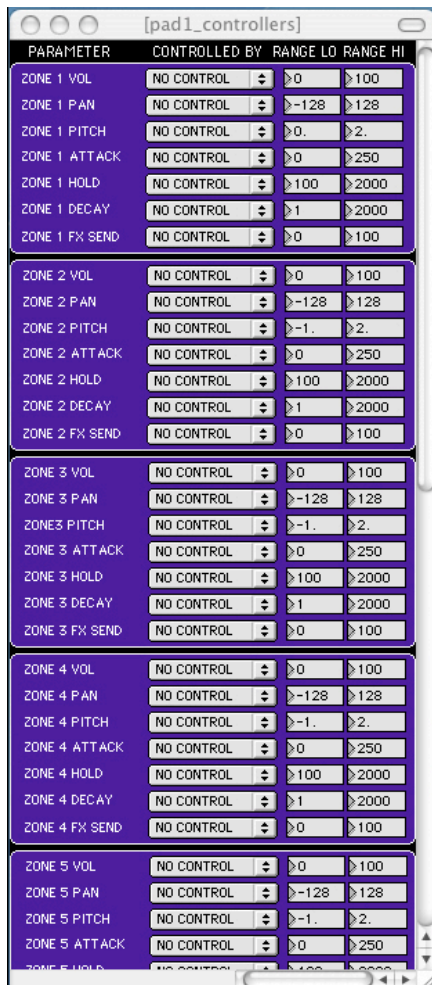
FX Rack 2 The chain is:
Filter Bank (includes PhaseShift/Resonant/Cascade/Teeth) > Stereo Flange > 3-Band EQ > Stereo Delay

*Reverb is a Master Effect. This means that if the reverb is on and turned up, you will hear it on the main outputs whether or not you're sending to an FX rack.

Every knob on every effect can be controlled in various ways. Use the Controller windows to set it all up.

CONTROLLER WINDOWS

The Controller windows allow you to assign real-time performance characteristics to control all adjustable sonic elements featured in the Virtual Brain. For example, you could increase distortion with stronger strikes of the drum, or change the panning depending where the drum surface is struck. Clicking the CONTROL button at the top of a **Pad window** or on the lower right in an **FX Rack window** will open the Controller windows. They can also be accessed from the View menu. Need we mention that controller options are available for each individual zone?

Parameter This refers to any sonic adjustment that can be assigned a controller. Please refer to the diagrams for a complete list of parameters, which are different depending on whether you're setting Pad controls or FX controls.

Controlled By Three types of commands can control the effects parameters. Strike Position (where on the drum surface a strike occurs) and Strike Velocity (how hard a strike it is) both measure real time actions. You can also assign your LFO (you can adjust its rate on the Master window, remember?) to oscillate within a parameter. You could create an auto-wah this way, controlling an EQ band via LFO rate, or rhythmically increase and decrease your Flange rate.

Range Lo/Range Hi Scale your controller data differently for every parameter you are controlling. As an example, you might set your volume to alternately increase and decrease at the rate of the LFO. Reducing the range would decrease the difference in the louder and softer volumes.

MENU BAR OPTIONS

FILE MENU

Audio+Pad Setup Open this window to set some vital preferences, including which audio driver to utilize. You can save your settings so the Brain defaults to your ideal setup everytime you start the program.

Preferences Come here to put a velocity boost on any of your drum pads. This feature is useful if, for example, you are playing the pad with your fingers and need a hotter signal. You can also

calibrate your drums position readout from this window, though you should only do so as a troubleshooting procedure.

Preset Hotkeys This is where you get to choose 10 presets from 10 pull down menus, each of which is assigned to a key across the top row of letters on your computer keyboard. Now while you play your pad a single touch of a button can call up your favorite preset instead of navigating through on onscreen menu.

Add Custom Sounds You guessed it. Scroll here to add sounds from other sources to your Mandala's sample library. The program accepts WAV, AIFF and SDII files.

To add custom sounds to the Virtual Brain library:

First, on your system…

Macintosh: Copy or move the samples you want to add into the UserSounds folder located in the same folder as you Mandala Virtual Brain application.

PC: Copy or move the samples you want to add into the UserSounds folder located in the Support folder which is in the same folder as you Mandala Virtual Brain application.

IMPORTANT NOTE: The names of your audio files should not be broken up into several words like 'big horn sample.wav'. *They should contain no spaces, like* 'bighornsample.wav' *or* 'big_horn_sample.wav'.

Now in the VB program either choose 'Add Custom Sounds' from the File menu bar option or click on 'Add to Library…' in the Master window. A small window will appear which allows you to

choose a user menu location for your new sound.
Once you choose a location a standard dialog box
will appear.

In the dialog box please navigate to the
UserSounds folder where you earlier copied or
moved your samples and choose the sounds you
want to add.

Now you have added your sound and it will be
visible as a choice in the Instrument pull down
menu of every zone of every pad!

*IMPORTANT NOTE: Please make sure to toggle the
radio button next to the Instrument list so the program
knows you want to see the User Instrument list as opposed
to the Program Instrument list.*

Import Preset Collection Load up a different set of presets,
maybe some that have been posted on the web or that another
Mandala player has sent you. Preset lists are exported and
imported as xml files.

Export Preset Collection You can save your entire preset list to a
file that can be called up when needed. You can then do things like
email a preset list to someone else, enabling them to play your
custom-made presets when they choose the 'Import Preset' option.
A very cool feature.

VIEW MENU

From here you can select any Pad window, Effects window or
Controller window.

And finally……

ADVANCED MODE

For the MIDI-savvy who just can't resist, **preset #250** lets you customize each zone's MIDI channel and note number, as well as position controller channel, number and values from center to edge and velocity controller channel, number and values from soft to hard. Quit the VB while this preset is loaded and your customized MIDI configuration will be saved in your pad for controlling other applications.

TIPS & TROUBLESHOOTING

Q. What's the deal with this Audio/Pad Setup window driver thing? I don't understand any of the settings.

See the Driver Info section below.

Q. Do I need to add an Audio Interface to my computer in order to play my Mandala?

Every computer is unique in its ability to output sound from a piece of software. While many computers do not need any help out-of-the-box in producing quality sound others may struggle when certain parameters and features of the Virtual Brain software are activated. Audio interfaces can connect internally to computers as well as externally by way of a USB or firewire cable. Many interfaces are available ranging from very affordable to quite expensive and their use can only help any professional audio software you intend to use.

Q. How do I mount my Mandala drums?

The mounting bracket on each Mandala will connect securely to either a 9.5mm L-Rod or a 10.5mm L-Rod. You also have the option of using a snare stand to mount your pad.

Q. Whenever I change the preset or set up anything with multiple zones my drum only plays whatever sound is registered to zone 1 or 2.

Make sure you have clicked on the 1st purple pad (#1 of 5) in the Master window when you start the program before you start changing presets in the Master window. Even though you see Pad 1 in the Pad window you may need to click on the 1st of 5 to get the program looking at your particular pad.

Q. My Mandala is not showing up as a choice in the pull down menu in the Audio/Pad Setup window.

If you do not see 'MandalaNNNN' (NNNN is your individual pad's onboard serial number) in the Pad pull down menu in the Driver window then here are some things to know…

Because your Mandala pad circuitry is MIDI compliant its driver is a component of your computer's operating system. For this reason it is NOT necessary to reinstall your Mandala software if your Mandala pad is not showing up in your driver window.

Make sure if you are connecting the Mandala to your computer through a USB hub that the hub is powered. Non-powered hubs do not provide enough juice to keep your Mandala running.

Please do the following:

Make sure neither the Virtual Brain nor The Beauty application is running.

Disconnect the USB cable from your Mandala pad.

Mac users: Open Audio MIDI Setup located in the Utilities folder in your Applications folder and click on MIDI Devices. Plug the USB cable back into your Mandala pad and verify that it shows up in the MIDI Devices window. If not, disconnect and reconnect the pad again. Please refrain from pushing the cable into the pad with excessive force.

PC Users: Open Device Manager (get there by right clicking on My Computer and choosing Properties). Plug the USB cable back into your Mandala pad and verify that 'USB Audio Device' shows up under 'Video Game and Sound Controllers' in the Device Manager. If not, disconnect and reconnect the pad again. Please refrain from pushing the cable into the pad with excessive force.

Once the pad is recognized by your system please open up your Mandala applications and begin your setup.

*** If your pad is unplugged while one of the Mandala applications is running you will need to quit the application and reconnect the pad before continuing.

Q. When I hit my pad I see numbers light up in more than one purple drum in the Master window.

Proceed to the Audio/Pad Setup window and make sure you only have one pad activated by way of the red On/Off buttons. Now reset each On/Off button for the pads you are not using by turning each one On and then Off again (unless you are playing multiple pads!).

Q. My SoundBlaster isn't putting out clean sound when I play my Mandala.

There is a very handy (and free!) 3rd-party Universal ASIO Driver which has been known to work miracles compared to the drivers that SoundBlasters usually use. It's called ASIO4ALL and it's downloadable at http://asio4all.com.

Q. Can I connect my Mandala to my computer through a USB hub?

Yes you can, as long as the hub is a *powered* USB hub.

Q. How do I connect multiple Mandalas to the same computer?

You can either connect your Mandalas to any available USB ports on your computer or connect them through a powered USB hub which is connected to a USB port on your computer.

Q. Can I connect more than 5 Mandalas to the same computer?

Theoretically you can connect 128 USB devices to your computer, so, yes you can connect as many Mandalas to your computer through powered USB hubs as you would like. The Virtual Brain software handles up to 5 Mandalas but you can configure as many as you would like to control 3rd-party audio programs like Battery 3, LIVE, Reason, Logic, Protools, GarageBand, BFD, Reaktor, etc. Put together a kit of 16 of them!

Q. I can't get my custom sounds to play.

See 'Add Custom Sounds' earlier in this manual. Make sure your sounds are WAV, AIFF or SDII. Make sure there are no spaces in the names of your sounds and they are properly placed in the UserSounds folder where they belong. Click the bottom radio button next to the Instrument list in order to switch the zone's sounds from program list to user list.

Q. My Virtual Brain seems to be crawling. What can I do?

Not all computers can handle the requirements of the VB when it is running full tilt with many of its features activated. You always have the option to reduce the number of voices in the Master window and also turn off effects in the effects racks in order to reduce CPU load.

Q. How do I use Mandala pads and the Virtual Brain application with other MIDI and audio programs like Reason, Battery 3, BFD, Reaktor, Logic, GarageBand, LIVE, etc.?

MIDI

Your Mandala pad is a USB MIDI controller just like a musical keyboard. It will show up as an input device in the MIDI Device input window of other applications. (Please see the

MIDI data question below if you would like to configure its MIDI output differently than its default settings.)

AUDIO

If you would like to route the audio out from the Virtual Brain program into another audio application on the same computer for the purpose of recording or sound manipulation you have several options. You can use your Audio Interface's Loopback Mode if your device offers that option or if you are a Mac user you can use an extension called Soundflower.

For Mac users Soundflower is available from Cycling '74 as a free download at the following location:
http://cycling74.com/downloads/soundflower

Once you have installed Soundflower it will be available as an option in your VB driver pull down menu. Choose Soundflower(2ch) in the VB Driver window. Now in programs like LIVE and GarageBand you just choose Soundflower(2ch) as an input source for the tracks or channels you would like to feed from the Virtual Brain.

To send VB audio into Logic it's just a little more complicated…

> You must install Soundflower on your system and then create an Aggregate Device in the Audio MIDI Setup app on your Mac. This combines Built-in Output with the Soundflower buss. You do this by checking the Use box by Built-in Output and then checking the Use box next to Soundflower(2ch). Now you have created an Aggregate Device with 2 inputs and 4 outputs. Do this without the VB or Logic running.
>
> Now open the VB and choose Soundflower(2ch) as your audio driver in the audio/pad setup window. Then open Logic and go to Preferences-Audio and choose Aggregate Device for Device. Now create a stereo track and set its inputs to 1

and 2 and record enable the track and you will get the sound straight off the Soundflower buss from the VB. You will hear it in Logic because your Out should be set to 1 and 2. You can record it too. Remember the Master fader in VB can still alter the level of the signal that is sent out of the VB to Logic.

If you are using a sound card and happened to choose it along with Soundflower to make an Aggregate Device in Audio MIDI Setup instead of Built-in then you will have to choose the appropriate Inputs to the track in Logic so it corresponds with the proper channels. It may not be 1 and 2 anymore, but some higher numbers depending on your sound card.

Q. What MIDI data does my Mandala output?

In the Virtual Brain application each time you load a preset or change a parameter the settings that are particular to the pad itself (NUMBER OF ZONES, NOTES, SCALES) are saved in your pad's internal memory so that you can use your pad as a standalone MIDI controller with other programs without having to open the Virtual Brain application.

When you are running the VB program your Mandala is always configured as follows:

Zone 1 puts out MIDI note C3, MIDI Channel 1
Zone 2 puts out MIDI note C3, MIDI Channel 2
Zone 3 puts out MIDI note C3, MIDI Channel 3
Zone 4 puts out MIDI note C3, MIDI Channel 4
Zone 5 puts out MIDI note C3, MIDI Channel 5
Zone 6 puts out MIDI note C3, MIDI Channel 6
Zone 7 puts out MIDI note C3, MIDI Channel 7

Position controller = MIDI controller 3, MIDI Channel 1
(range: 0 center to 127 edge)

Velocity controller = MIDI controller 2, MIDI Channel 1
(range: 0 soft to 127 hard)

Whatever preset you currently have loaded shows you the number of zones and the notes and scale patterns that your pad will put out as MIDI data if you were to quit the program at that time and proceed to run a different program with your pad as a standalone MIDI controller. This would be no different than connecting a musical keyboard to control a program but now with the Mandala you have the option of using a drum!

ADVANCED: If you want to change any aspect of the MIDI data that your pad puts out in order to control other audio programs in a custom way then please set the VB to preset 250 ADVANCED MODE. Here you can set Zone MIDI Channels and Notes as well as Position and Velocity Controller MIDI Channels, Controller Numbers and Ranges. As you change these settings they are saved in your pad's circuitry. You can quit the VB while preset 250 is loaded to keep these settings in your pad. Restarting the VB will restore your pad to its default settings which allow it to communicate properly with the VB. If you want to reload a custom setup you create in preset 250 then press the Save Settings button there when it is configured the way you want and then press Load Settings when you return later to set your pad that way again.

DRIVER INFO

Available drivers depend on your computer, the sound card you are using, if any, and your computer platform. Choose the fastest driver protocol supported by your soundcard, which will likely be ASIO with Windows, or Core Audio for Mac. For Windows you can also use DirectSound and Multimedia (MME), but expect a delay between the time you play and the time you hear it.

Core Audio - This is the default audio driver for the VB on Macintosh. It interfaces with the system's built-in Core Audio system and can be used with the built-in audio of the computer, or, with the proper software support, a third-party hardware interface, such as ASIO.

DirectSound (Windows only) - Developed by Microsoft and works well depending on your sound card. If you adjust the interface for an acceptable amount of latency, you may hear glitches and clicks in the audio that can only be fixed by increasing latency.

MME (Windows Only) - This is the standard Windows audio driver. Most sound cards support this interface and work with it quite well. However, MME is less suitable than DirectSound due to its comparatively high latency.

ASIO (Windows only) - If you have a third-party audio interface which supports ASIO (a cross-platform audio hardware standard developed by Steinberg), and it is installed correctly, it will be found by the Virtual Brain application. You may have as many ASIO devices as you wish; they will all be found by the driver and will appear in the Driver pull-down menu in the Audio/Pad Setup window preceded by the word ASIO. ASIO is highly recommended for its low latency and high performance.

I/O Vector Size (I/O stands for input/output) controls the number of samples that are transferred to and from the audio interface at one time. The I/O Vector Size may have an effect on latency and overall performance. A smaller vector size may reduce the inherent delay between hitting the pad and audio output, but may introduce crackling when the limit of your interface is reached.

Signal Vector Size is how many audio samples the VB calculates at a time. This can be less than or equal to the I/O Vector Size, but not more. Changing the signal vector size won't have any effect on latency, but the larger you set it, the more performance [less crackling] you can expect.

Optimizing performance when you are close to the limit of your CPU's capability is a trial-and-error process. That's why the VB provides you with a choice of vector sizes.

Use the Test Tone as you experiment with the Driver settings to make sure you are getting the results you want. Once you find the best configuration hit 'Save Settings' and you should be set from then on.

INCLUDED SAMPLE INSTRUMENTS

0, NO SOUND;
1, 1 Piano (Amb. Staccato);
2, 2 Piano (Amb. Sustenato);
3, 3 Piano (Close Staccato);
4, 4 Piano (Close Sustain);
5, 5 Electric Piano 1;
6, 6 Electric Piano 2;
7, 7 Clavinet;
8, 8 Glockenspiel;
9, 9 Music Box;
10, 10 Vibraphone;
11, 11 Marimba;
12, 12 Marimba (Stick);
13, 13 Xylophone (Kantilan);
14, 14 Church Organ;
15, 15 Electric Jazz Guitar;
16, 16 E. Guitar Muted Dry;
17, 17 E. Guitar Muted Rev.;
18, 18 Guitar Harmonics;
19, 19 Acoustic Bass (DI);
20, 20 Acoustic Bass (Mic);
21, 21 Fretless Bass;
22, 22 Synth Bass 2;
23, 23 Pizzicato;
24, 24 Ocarina;
25, 25 Synth Lead (Square);
26, 26 Synth Lead (Sawtooth);
27, 27 Charango;
28, 28 Synth Pad (New Age);
29, 29 Synth Pad (Warm);
30, 30 Synth Pad (Bowed);
31, 31 Synth Pad (Sweep);
32, 32 Synth FX (Ice Rain);
33, 33 Sitar;
34, 34 Shamisen;
35, 35 Koto;
36, 36 Kalimba;

37, 37 Tingly Bell;
38, 38 Steel Drum;
39, 39 Taiko Huge;
40, 40 Tabla (Tuned Style);
41, 41 Synth Drum;
42, 42 Santoor;
43, 43 Harp;
44, 44 Crystal;
45, 45 Detuned Organ;
46, 300 Kick 1;
47, 301 Kick 2;
48, 302 Side Stick;
49, 303 Snare Drum 1;
50, 304 Hand Clap;
51, 305 Snare Drum 2;
52, 306 Low Floor Tom;
53, 307 Closed Hi-Hat;
54, 308 High Floor Tom;
55, 309 Pedal Hi-Hat;
56, 310 Low Tom;
57, 311 Open Hi-Hat;
58, 312 Low-Mid Tom;
59, 313 High-Mid Tom;
60, 314 Crash Cymbal 1;
61, 315 High Tom;
62, 316 Ride Cymbal 1;
63, 317 Chinese Cymbal;
64, 318 Ride Bell;
65, 319 Tambourine;
66, 320 Splash Cymbal;
67, 321 Cowbell;
68, 322 Crash Cymbal 2;
69, 323 Vibraslap;
70, 324 Ride Cymbal 2;
71, 325 High Bongo;
72, 326 Low Bongo;
73, 327 Mute High Conga;

74, 328 Open High Conga;
75, 329 Low Conga;
76, 330 High Timbale;
77, 331 Low Timbale;
78, 332 High Agogo;
79, 333 Low Agogo;
80, 334 Cabasa;
81, 335 Maracas;
82, 336 Short Whistle;
83, 337 Long Whistle;
84, 338 Short Guiro;
85, 339 Long Guiro;
86, 340 Claves;
87, 341 High Wood Block;
88, 342 Low Wood Block;
89, 343 Mute Cuica;
90, 344 Open Cuica;
91, 345 Mute Triangle;
92, 346 Open Triangle;
93, 347 Tabla Both Ga;
94, 348 Tabla Both Ra;
95, 349 Tabla Ga 1;
96, 350 Tabla Ga 2;
97, 351 Tabla Ga 3;
98, 352 Tabla Kat;
99, 353 Tabla Na 1;
100, 354 Tabla Na 2;
101, 355 Tabla Ra;
102, 356 Tabla Ta;
103, 357 Tabla Ti;
104, 358 Tabla Tun;
105, 359 70s Data;
106, 360 Analog Snare 1;
107, 361 Analog Snare 2;
108, 362 Chirp;
109, 363 Depth Charge 1;
110, 364 Depth Charge 2;
111, 365 Depth Charge 3;
112, 366 Electro Snare;
113, 367 Impact 1;

114, 368 Impact 2;
115, 369 Impact 3;
116, 370 Impact 4;
117, 371 Impact 5;
118, 372 Kicker Valve;
119, 373 Low Kick 1;
120, 374 Low Kick 2;
121, 375 Low Kick 3;
122, 376 Low Kick 4;
123, 377 Low Ride 1;
124, 378 Low Ride 2;
125, 379 Photon Can;
126, 380 Pluckt;
127, 381 Power Punch 1;
128, 382 Power Punch 2;
129, 383 Reverso;
130, 384 Rubber Air;
131, 385 Rubbery Tom;
132, 386 Seismic;
133, 387 Short Bell;
134, 388 Space Kick 1;
135, 389 Space Kick 2;
136, 399 Space Kick 3;
137, 400 Surface Ring;
138, 401 Talking Kick 1;
139, 402 Talking Kick 2;
140, 403Talking Kick 3;
141, 404 Tech Snare;
142, 405 Thud;
143, 406 Thumper 1;
144, 407 Thumper 2;
145, 408 Thumper 3;
146, 409 Thumper 4;
147, 410 Thumper 5;
148, 411 Thumper 6;
149, 412 Thumper 7;
150, 413 Tick Kick;
151, 414 Tom Valve;
152, 415 Whammo 1;
153, 416 Whammo 2;

154, 417 Whistlin' Tom 1;
155, 418 Wiggly Vox 1;
156, 419 Wiggly Vox 2;
157, 420 Yarble;
158, 421 Yelp;
159, 422 Zap;