StringPort Reference Manual
for Guitar

StringPort Version 1648 for Mac OS 10.6
September 2010

Keith McMillen, Barry Threw, Chris Shaver, Ashley Adams, Nick Bonardi, Chuck Carlson, Joel Davel, Raja Das, Diane Douglas, Sarah Howe, Mike McHam, Marielle Jakobsons, Conner Lacy, Chris Muir, Miller Puckette, Danishta Rivero, Denis Saputelli, Mike Zawitkowski, and Michael Zbyszynski

Keith McMillen
INSTRUMENTS

The content of this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by Keith McMillen Instruments. Every effort has been made to ensure that the information in this manual is accurate. No warranties, express or implied, are made with regard to the quality, suitability or accuracy of this document. Keith McMillen Instruments reserves the right to change the contents of this document and/or the associated products at any time without the provision of prior notice to specific persons or organizations. Keith McMillen Instruments shall not be held liable for damages of any kind arising from the use, or the inability to use this product or its documentation, even if the possibility of such damage is known.

Product and brand names contained in this document are used for identification purposes only. Keith McMillen Instruments, the Keith McMillen Instruments Logo, the StringPort and StringPort logo are trademarks of Kesumo LLC. Apple, Finder, GarageBand, Mac, MacBook, Macintosh, Mac OS and QuickTime are trademarks of Apple Inc, registered in the U.S. and other countries. Windows is a registered trademark of Microsoft Corporation in the United States and other countries. Intel is a registered trademark of Intel Corporation or its subsidiaries in the United States and other countries. SONiVOX is the brand name trademark of Sonic Network, Inc. VST and ASIO are trademarks and software of Steinberg Media Technologies GmbH. ReWire, Recycle and REX2 are trademarks of Propellerhead Software AB. All other product and company names are trademarks or registered trademarks of their respective holders. All other names and designations of companies, products, trademarks, or brands used in this document are the registered property of their respective holders.

maxim digital audio (mda) VST Plug-ins are Copyright ©1998-2000, Paul Kellett (paul.kellett@maxim.abel.co.uk).
Mac conversions by Glenn Olander (glenn@greenoak.com) and Brian Chrisman (chrisman@divzero.com)
BeOS conversions by Christopher Lenz (cmlenz@gmx.de)
Based on the Steinberg VST PlugIn Software Development Kit which is Copyright ©1996, Steinberg Soft und Hardware GmbH. These plug-ins are free software and are provided 'as is' with no warranty of any kind. You may make and distribute copies. Check for the latest versions at http://www.maxim.abel.co.uk/vst/. This file updated 21 October 2000.

Table of Contents

Welcome

Thank you from Keith McMillen Instruments! We are excited to welcome you to the world of the StringPort polyphonic string-to-USB 2.0 converter.

Questions or Feedback? Contact Us!

If at any time you have any questions, please contact us:

Email: support@keithmcmillen.com
Web: www.stringport.com

Before Getting Started

There's a few things that you need to know before you start using your StringPort.

- When you first receive your StringPort, please check the StringPort downloads for the latest drivers and applications.
- **Keith McMillen Instruments cannot be held liable for damage resulting from installation and operation errors or improper use.**

System Requirements

We recommend the following for using the StringPort and StringPort software:

- An Intel Core 2 Duo 2.4GHz or greater Mac OS 10.6 or later.
- StringPort is a multi-core/multi-threaded application suite so more and faster is always better. Expect long load times and inability to run multiple applications simultaneously on slower machines.
- has 30 MB free hard disk space
- An instrument with a polyphonic pickup to provide audio to your computer through the D-13 input.

What's in the StringPort Package

When you open up the box you should find:

- 1 StringPort
- 1 USB A-to-USB B cable
- 1 Power supply

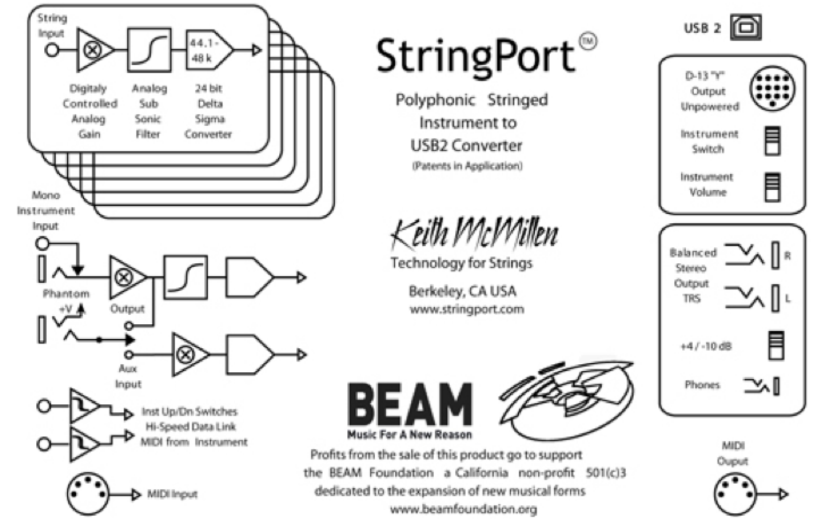
StringPort

StringPort is a polyphonic string-to-USB 2.0 converter with a unique, powerful, and extensible software suite that greatly expands the synthesis and processing palette of guitarists, violinists, bassists, and other stringed instrument players.

While string instruments are some of the most expressive ever created, it is a struggle for string players to wring emotion out of the computer based musical instruments that have been introduced to keyboard players over the last 25 years.

Coupled with an instrument with a polyphonic pickup and the industry-standard DIN-13 connector, StringPort allows string players to finally enter the world of synthesis, sophisticated processing and notation.

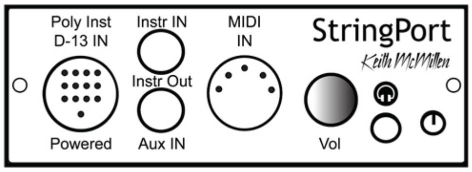
Stringed instruments simply don’t fit the simple event model on which MIDI is based. To avoid the limitations of MIDI technology, StringPort brings the actual sound of each string into the computer as an audio signal, where multiple analysis algorithms extract a string’s sonic properties with low latency and high resolution.

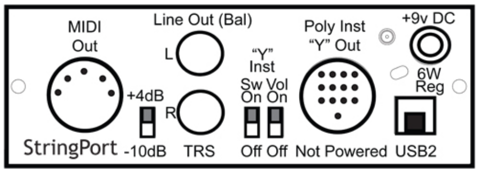


The resulting data is used to control software synthesis with an unprecedented degree of intimacy and expressivity. The entire system is optimized for the characteristics of string behavior and produces much more information than simple MIDI conversion.

The Hardware

The audio enters the StringPort through a 13-pin polyphonic output (such as a GK3 pickup or the output on a Zeta violin), Aux Input (with phantom power), or Instrument Input and is routed via USB2 into the computer. The StringPort also has a MIDI input and MIDI output.





The StringPort then sends a separate audio channel for each string, along with a summed mono signal, to the computer via USB2. The StringPort also includes a D13 output to pass through to legacy devices commonly used with polyphonic pickups.

The audio signals leave the StringPort hardware via USB2 and are fed into the powerful collection of bundled StringPort applications running on the host computer. The hardware also delivers processed audio information via balanced line outs and headphone jack.

Getting Started

Before you can expect to get sound to come out of your StringPort with the software make sure you do all of the following in this order:

1. Purchase a StringPort with the software at www.stringport.com
2. Download the Software from www.stringport.com
3. Unzip the software file into your Applications folder
4. Install the StringPort driver before hooking up the StringPort
5. Restart your computer and plug in the StringPort and turn it on
6. Hook up speakers and plug your instrument into the Din13 input on the StringPort Hardware
7. Check your System Preferences and Audio/MIDI setup to make sure your computer can find the hardware
8. Open up the SP-MainFrame application in your StringPort folder (highlighted in green)
9. Make sure you are connected to the internet and paste your license code into the field and license the software (**see the separate licensing guide document**)
10. Quit the Application and then re-open it so the license changes can take effect
11. Open up Audio Setup and make sure the StringPort driver is selected as the device
12. Open the Audio Input Window and make sure you can see signal coming in when you strum your instrument
13. Run Automatic Trim and save a preset for the trim settings
14. Turn up the Strings Monitor to make sure you can hear your instrument
15. Now your ready to start playing around! Open up an app of your choice and start exploring!

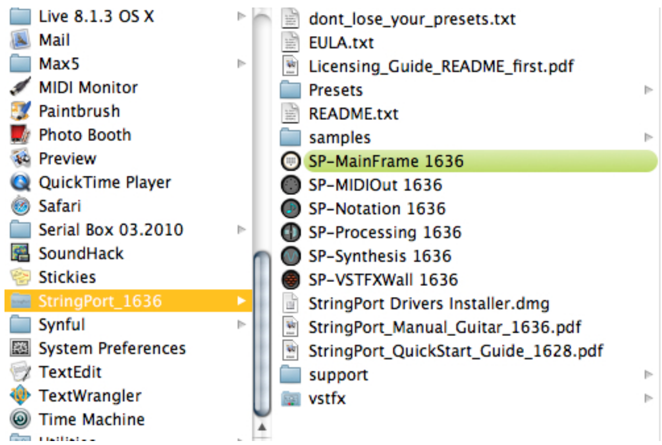
If you have trouble with any of these steps consult the chapters of the manual devoted to them (and linked to) for more information before trying to move to the next step. If you continue to have problems consult the Troubleshooting chapter. If these problems continue e-mail us at support@keithmcmillen.com with an explanation of your problem. The more descriptive you are about your problem, the more we will be able to help you. Thanks!

Downloading the Software

The first step after opening your StringPort package is to check your e-mail. You should receive an e-mail with a link to to download the StringPort Software along with a key code appropriate for the software you purchased.

Once the software has finished downloading, drag and drop the entire "StringPort" folder into your Applications folder.

The contents of the StringPort folder should look like this:



The folder has everything you need, including the driver, the software, a folder containing all the presets, another folder with samples, another folder with VSTs, and a support folder containing things the applications need to run.

There are also several useful documents including a readme file which includes information about the current version you have downloaded, a EULA (licence agreement), a Licensing Guide to help you out if you have trouble licensing the software, a Quickstart Guide for when you're first starting out, and the full StringPort Manual.

The SP-MainFrame application is highlighted because this is the main application. All other applications can be opened from within the Mainframe.

If it is your first time installing the software onto your computer you'll want to start by installing the StringPort driver.

Upgrading the Software

After downloading an upgrade from the StringPort downloads site you can just unzip the file into your applications folder. At that point you can either delete your old version or not. If you should decide to delete your old version remember to save your presets. See the Managing Presets chapter of the manual for more information on how to transfer your presets to a new version.

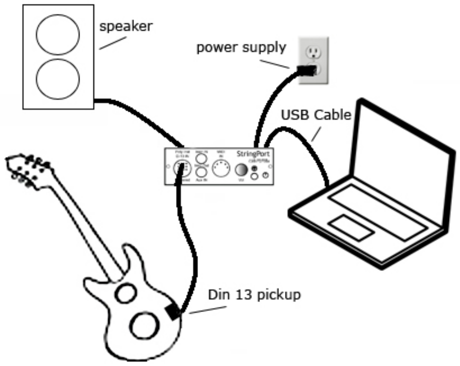
StringPort Audio/MIDI Driver

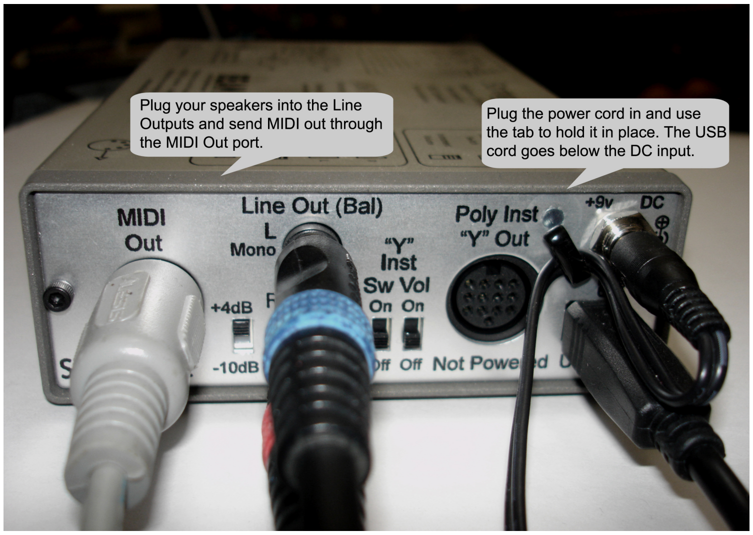
In order to use the StringPort polyphonic string-to-USB 2.0 converter, you will need to install the StringPort Audio/MIDI Driver included in the StringPort package. Make sure that when you install the driver, the StringPort is off. If you get an updated version of the software you don't need to reinstall the driver unless you notice a newer version of the driver.

Once you install the driver you'll want to connect and turn on the StringPort hardware and check your System Preferences and Audio/MIDI Setup to make sure it is showing up. If you are having trouble with this see troubleshooting.

Note: If the StringPort driver is not properly installed and the StringPort hardware is not connected and turned on the software will automatically quit after a few seconds.

How to Hook up the StringPort




Plug your speakers into the Line Outputs and send MIDI out through the MIDI Out port.

Plug the power cord in and use the tab to hold it in place. The USB cord goes below the DC input.

Back of the StringPort

- make sure the string port is powered by plugging it into the wall
- hook up the USB cable to the String Port and to your computer
- plug your instrument into the D-13 input
- plug in your speakers or headphones to the outputs in the back of the StringPort or the headphone jack in front
- turn on the String Port

VST Plugins

We have included a few VST plugins in the StringPort Package to get you started:

- SoundHack Freesound Bundle
- SoundHack Spectral Shapers (Trial version)
- mda-vst (VST bundle from Smartelectronix)
- Frohmage (Ohmforce)

Note: Pluggo is not currently supported

These plugins are contained in a folder within the StringPort directory called "vstfx". In order for the StringPort software to recognize other VST effects put the .vst file in the "vstfx" folder. Once you have successfully installed the VST plugins, they will become available to you in the VST Wall application of the String Port software (see **VST Wall** chapter on page 31 for more information) in the drop-down menu on each signal slot (string) upon starting the StringPort applications. **Note**: VST instruments **do not work** with VST Wall so don't put VST Instruments into this folder.

Using the StringPort Software Suite

The StringPort Software Suite gives you multiple apps to work with, all with their own way of allowing you to manipulate and control the sound of your instrument. You can stay simple and pick your favorite or you can explore different combination and use multiple apps simultaneously (only limited by the number of cores and the speed of your computer). All of these apps are contained within one main application: the **StringPort MainFrame**. Processing, VST Wall, Synthesis, MIDI Out, and Notation are all standalone applications that you need to launch in addition to StringPort.app in order to get them to instantiate in the MainFrame.

If you do not plan to use the features of an application, do not launch it. Your computer will run faster without it. Also set all unused applications to the **Off** preset as this will also conserve CPU cycles. In addition close any windows you are not using, especially graphics intensive windows such as Analysis and Input.

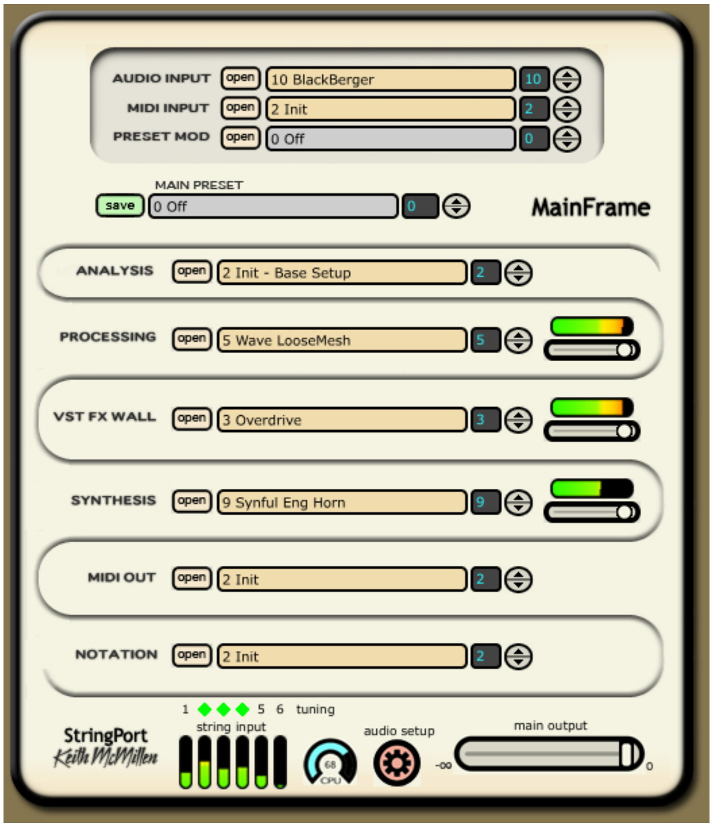
MainFrame

At the top you have the apps that involve set up:

- **Audio Input** - this is where you set up your string assignments and input levels
- **MIDI Input** - here you can set up an outside MIDI controller to use with the software
- **Preset Mod** - here you can set a source for controlling jumps between individual and main presets

The next line is where you can save a Preset that tells all of the apps below this line which preset of their own to use:

- **Analysis** - this is where the incoming audio from the Din13 input gets analyzed for use with various other apps
- **Processing** - open this up to check out other apps that will process your sound in their own unique way
- **VST FX Wall** - here you can use and control VST effects to process the sound from your instrument
- **Synthesis** - this app contains Synful and Classic, two applications that will allow you to synthesize your own sounds with your instrument
- **MIDI Out** - if Analysis is running your sound can be converted to MIDI notes that you can send out to other applications or out the MIDI output on the back of your StringPort
- **Notation** - here you can create recordings of your instrument to preview and convert into a MIDI file that you can then open in any notation software.


AUDIO INPUT open 10 BlackBerger 10
MIDI INPUT open 2 Init 2
PRESET MOD open 0 Off 0
MAIN PRESET save 0 Off 0
ANALYSIS open 2 Init - Base Setup 2
PROCESSING open 5 Wave LooseMesh 5
VST FX WALL open 3 Overdrive 3
SYNTHESIS open 9 Synful Eng Horn 9
MIDI OUT open 2 Init 2
NOTATION open 2 Init 2

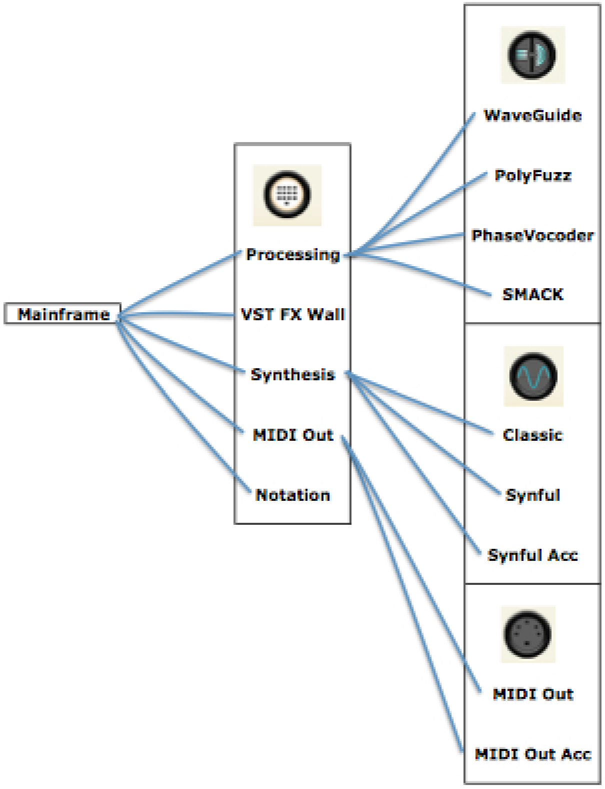
At the very bottom of the page are string level and tuner indicators for a quick view of the level and tuning of your strings. If your string is flat the shape above the string level will be blue. If it's sharp, it will be red. If tuned correctly the shape will be green (shown above). There is also a CPU indicator to help you see how CPU intensive the application is running on your computer.

Navigating the StringPort Software Suite

There are many applications in the StringPort software suite and you may find it overwhelming to navigate through the many windows if you are indeed using more than one app at a time. There are a few things to know that will make finding your way around easier. Each application includes a button that brings it's parent window to the front.

The image on the right shows the buttons you can find in each application and what the buttons lead to should you click on them.

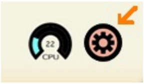
For example: The button shown in the box where it says "Synful" is the button that will appear in the Synful window. Clicking on that button will bring the Synthesis window to the front. Now that you're in the Synthesis window you will see the button shown in the box above where it says "Synthesis". Clicking on this button will lead you back to the MainFrame.

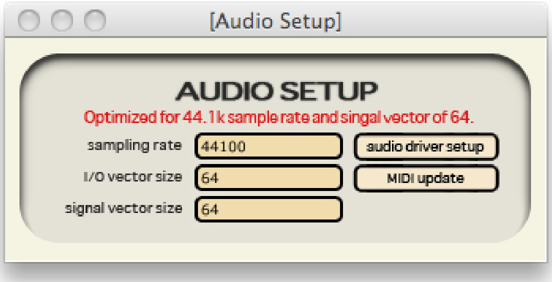


Audio Setup

Once the StringPort driver and software are installed and you open the application for the first time, one of the first things you should do is check your audio settings. A convenient CPU meter shows how much of the CPU (as a percentage) the application process is using. Again closing windows and setting unused applications to Off will free up cycles for your needed applications.

The main StringPort window has an audio setup button in the bottom right corner.




[Audio Setup]

AUDIO SETUP

Optimized for 44.1k sample rate and singal vector of 64.

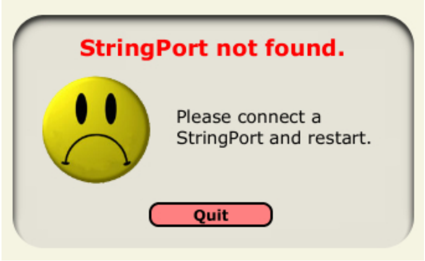
sampling rate 44100

I/O vector size 64

signal vector size 64

Click on it and you will see that you can change the sample rate, I/O vector size, and the signal vector size. The smaller the I/O and signal vector size, the shorter the latency. That is why these start at 64. However, at the cost of only a couple milliseconds, the larger your I/O vector is, the greater the processing power and the more effects you can use at once. StringPort is optimized for use at 44100 sample rate and 64 signal vector size so keep in mind that changing this might have unexpected consequences.

WARNING: The StringPort is the only Audio/ MIDI interface that can be used with the StringPort applications. If the StringPort hardware isn't attached and powered on when you open the StringPort software, audio will be disabled and the message on the right will pop up.


StringPort not found.

Please connect a StringPort and restart.

Audio Input

The Input window is used to adjust the gain for each string, and to map the StringPort inputs to application processing slots. The window has a row for each instrument string, with a Trim fader, spectrograph, monitor mute, a level indicator, and a tuner. There are simple tuning indicators on the Mainframe window as well for quicker access to the tuner. There is also a hex master trim for incrementing and decrementing all of the string's trim faders at once.

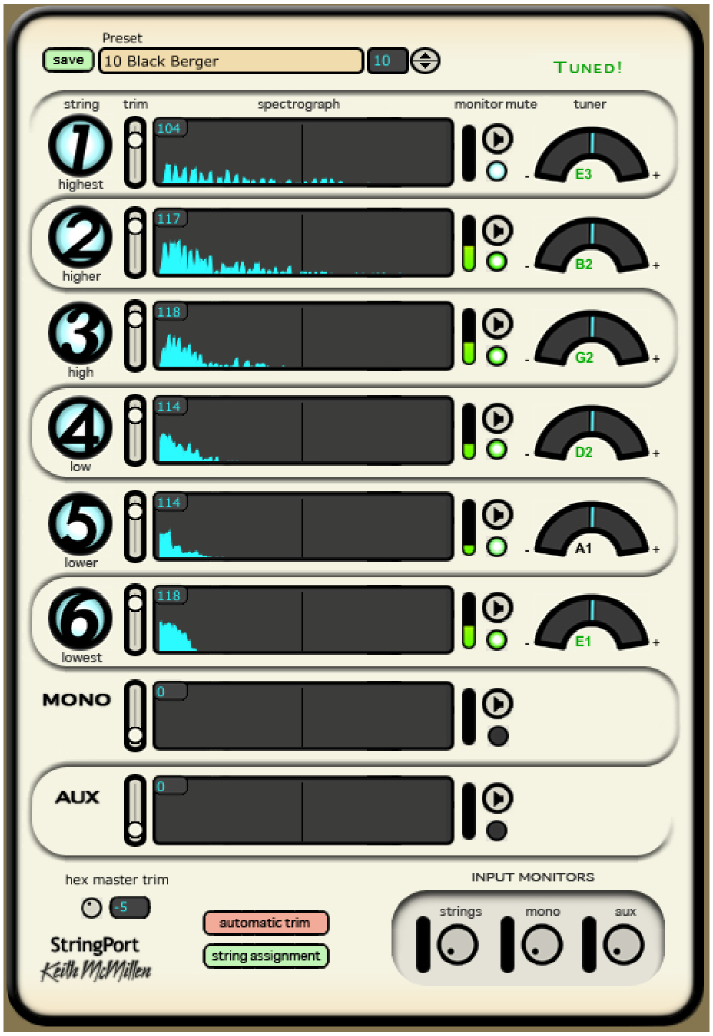
If Analysis is on you can use the tuner to tune your instrument. A tuned instrument will yield more accurate results by far.

There are two rows that display the Mono and Aux Inputs to the StringPort.

MONO - displays the mono signal from the D13 input if you have a GK-3 pickup and it is plugged into the guitar's built in output. You override this when you plug an instrument into the Instrument Input on the StringPort. MONO will then output and display the signal coming through 'Instr IN'.

AUX - displays the signal from 'Aux IN' on the StringPort. If you select Inst Out in the string Assignment window, the signal from your mono/ magnetic pickups will be sent out the lower ¼in jack and the Aux Input will be disabled.

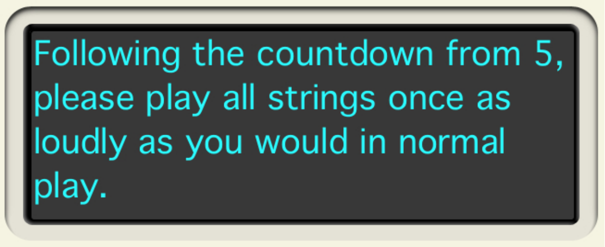
The meter light, below the mute button, displays the input level of each string. It is important for the signal processing applications that the input level does not clip. If the meter lights are red, please adjust the trim fader to attenuate the input level for that string.



At the bottom right of the INPUT window you will find the INPUT MONITORS. These include: a knob to audition the combined String Inputs, a knob to audition the Mono Input, and a knob to audition the Aux Input.

You can monitor the signal coming in through the StringPort directly by adjusting the corresponding gains. This signal is parallel to the rest of the StringPort applications. Use them to set string levels and tune your instrument. Once you have set your levels and tuned up, turn the monitor level down so as not to confuse the monitor signal with the one you will process through the rest of the StringPort applications. You can still leave the Aux and Mono Monitor level up if you wish to hear these signals.

Automatic Trim



Following the countdown from 5, please play all strings once as loudly as you would in normal play.

You can adjust the digitally controlled trimpots in the StringPort with an automatic trim system that allows you to simply strum your guitar to optimize the gain. Click on the 'automatic trim' button on the top left corner of the Input window and follow the instructions displayed. You should give each string one very strong pluck to correctly set these levels.

After setting the levels with automatic trim it's a good idea to turn up the strings monitor so that you can make sure auto trim gave you accurate levels. The strings should all sound equal in loudness and should not clip. This is the first place where you begin to affect the way things sound and how well the sound will be Analyzed and converted into MIDI so if everything looks and sounds good here you'll have better results further down the line.

String Assignment

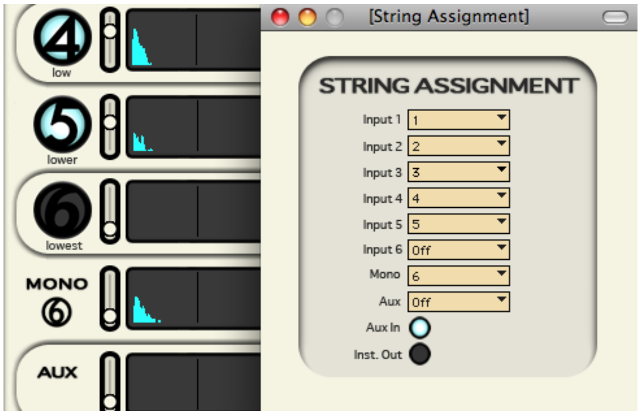
Each StringPort application has numbered processing slots that will affect each of your individual strings. By default, the processing slots will be assigned to the strings of your instrument in order from highest to lowest on channels 1-6. The StringPort applications DSP are optimized to take advantage of this ordering.

Some instruments have different wiring characteristics that may make the strings appear out of order to the StringPort applications. The String Assignment window, accessed through a button on the Input window, allows you to re-order your strings so that they appear in the correct processing slots.

If you have an instrument with fewer than six strings, you can re-route the Mono or Aux Inputs from the StringPort to the extra available processing slots. These slots only work with VST FX Wall and Processing. They will not function properly with Analysis, MIDI out or Synthesis applications.

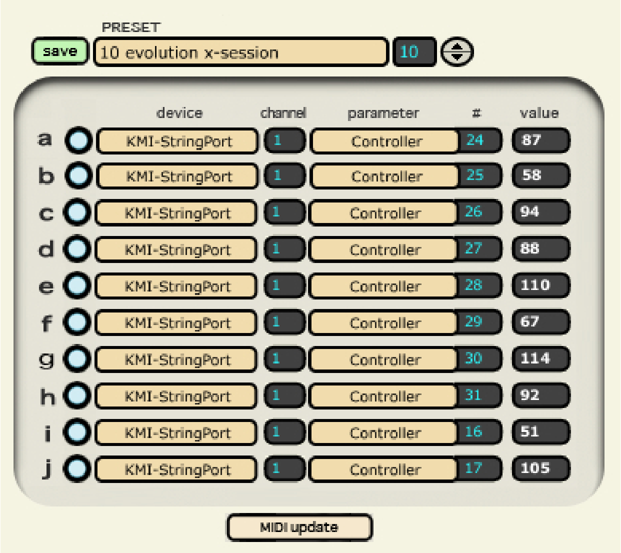
To do this, click on the "string assignment" button in the Input window. If you are playing a guitar, you will need to turn one of your strings off to access one of the 6 string slots. If you are playing a violin, you have 2 extra slots available to do this.

In the example to the right, Input 6 has been turned off. This means the input on string 6 is off. Also, the mono signal has been routed to Input 6, which enables you to process it as you would an individual string.



Input 1 1
Input 2 2
Input 3 3
Input 4 4
Input 5 5
Input 6 Off
Mono 6
Aux Off
Aux In ○
Inst. Out ●

MIDI Input



PRESET

save | 10 evolution x-session | 10

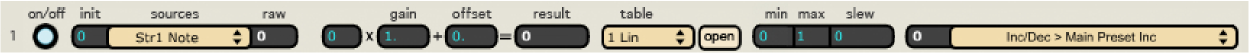
	device	channel	parameter	#	value
a	KMI-StringPort	1	Controller	24	87
b	KMI-StringPort	1	Controller	25	58
c	KMI-StringPort	1	Controller	26	94
d	KMI-StringPort	1	Controller	27	88
e	KMI-StringPort	1	Controller	28	110
f	KMI-StringPort	1	Controller	29	67
g	KMI-StringPort	1	Controller	30	114
h	KMI-StringPort	1	Controller	31	92
i	KMI-StringPort	1	Controller	16	51
j	KMI-StringPort	1	Controller	17	105

The StringPort can also receive data from external devices in the form of MIDI messages using the MIDI/OSC Routing window. Make sure you have plugged your MIDI device to the MIDI In on the StringPort. If you plug in the MIDI device after the StringPort software has been launched, you will need to hit the "MIDI update" button to recognize the device. Select the channel; type of parameter from three options: Note, Controller, Program Change; and parameter/controller number. You will find MIDI A-J as sources in all the modulation windows.

Preset Mod

Upon opening the Preset Mod window you will be confronted with an array of "mod lines." Every modline is identical, and they provide a standard mechanism for mapping MIDI sources and data from Analysis to the parameter destinations in a musically useful way.

From the modline in this window your parameter destinations can be set to increment or decrement your saved presets for any of the other windows. There are also destinations for the master volumes of the applications and also to start and stop recording in Notation. You can set up a MIDI footcontroller to select presets remotely and trigger your Main Preset to increment to a different preset, changing the tone of your sound. This allows you to create multiple presets and use them all within one piece without even having to touch your computer.



	on/off	init	sources	raw		gain	offset	result	table		min	max	slew		
1	○	0	Str1 Note	0	0 x	1. +	0. =	0	1 Lin	open	0	1	0	0	Inc/Dec > Main Preset Inc

Here's a quick introduction to the options available in every modulation line:

on/off - click on the circle to enable the modulation line and it will show a blue-green color. When disabled, the modline on/off appears dark.

init - the initial value. Adjust the initial value to preview what that value does to the rest of the modline. This is also the starting value in the absence of any raw data from the source.

sources - Choose what data source will control the individual modline. The source in the example above, "Str1 Note", means that the raw data will be the MIDI notes from the first string. See the Sources section of the **Appendix** for a list of available StringPort sources.

raw - the raw values coming from the selected source.

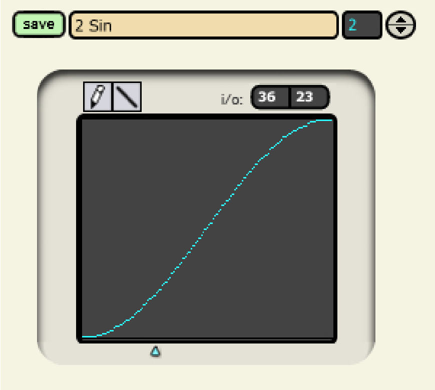
gain - this is the first place where you can use math to modify the signal. Whatever number is put in the gain box is multiplied by the "init." For example, if the parameter destination is a pitch speed control, clicking on the gain window and typing "2" will double the pitch (making it an octave higher) for every value received from the source. A value of "-2" however will have the opposite effect, and will either slow down the playback speed or even reverse it.

offset - set a value to add or subtract from the raw value after it has been multiplied by the gain value.

result - the resulting value, which is then applied to the table. If the result is within the range of min and max values, then it will be modified by the slew before finally impacting the parameter destination.

table - the result is compared to the given table, and used to plot the result on a chart. There are a number of table options, each which will affect the modulation as it changes value over time. See the **Loudness and Modulation Curves** list in the **Appendix** for more information on the different modulation tables to choose from.

You can also view and edit the table by clicking "open". This allows you to draw in any kind of response curve. There are two modes to choose from for shaping your curve. Drawing mode (represented by the pencil button) lets you draw your own curve freehand. Line mode (represented by the line button) allows you to create more accurate straight lines. There is a slider at the bottom where you can test what the input value would do to the output value. Then, of course, you can save any of your own tables as a table preset.



The tables are all saved in the same preset list and are referred to globally throughout the StringPort Applications. That means when you save one custom table in one applications modulation window, that same custom table will appear in the same slot in all of the applications modulation windows.

min - the minimum value of data, which will affect the range or at what source value the effect will be triggered or modulate the parameter.

max - the maximum value of data or the highest range of value that will have an effect on the parameter destination. The reason the above modline's maximum value is set to 1 is because it uses a destination that increments when it changes from 0 to

1, therefore the other values are of no relevance.

slew - this affects the speed at which the modulation fades in or fades out. The larger the slew, the slower the effect will respond to the source. This is similar to the attack or release parameters found in other music technology.

parameter destination - the destination of the result of this modulation line. In other words: which parameter is going to be controlled by this modline. The parameter destination varies depending on which application modulation is being used. (For example PolyFuzz lists different parameter destinations than Phase Vocoder.) In the example above the destination is set to increment the Main Preset. This is a great way to move from one section of a piece to another.

One simple way of thinking of how a modulation line works is recalling the algebraic formula that plots a line on a grid or x and y axis:

$y = mx + b$

...is the same as:

(result) = (gain)(init or MIDI source value) + (offset)

The table further impacts what numbers are plotted for "x" (value) and "y" (result). If the result is within the range (defined by min and max) then it will apply to the parameter destination. However, you also have to take time into consideration. The slew will determine how quickly or slowly the result value will be applied to the parameter. Example: A very high slew on the phase vocoder scrubbing will make "scratching" feel slow as syrup. A very low or no slew will give a faster response.

The first step of setting up an interaction in the Modline is turning the line on by clicking the **on/off** button. It will turn to a bright blue. This indicates that the modline is active, and values from the source will pass through the modline to the **parameter destination**.

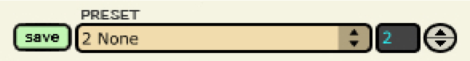
The next step is choosing a **source**. MIDI sources are selected from the ten MIDI input lines available in the MIDI Input window. A complete list of StringPort sources is available in the appendix.

Next select a **parameter destination**. These are different depending on which app your Modulation window comes from. You can also turn another Mod Line On and Off which can be useful for combining conditions. For example you can have a Mod Line turn on the envelope filter only above fret 7. Once you become familiar with this conditional modulation, many performance options become available.

Now take note of the relationship of your StringPort source to the change in your destination. This is a linear and fast relationship. If you wish the relationship between the two to be less fast, or more "smoothed out" increase the amount of "slew." If you wish to limit or expand the range of the destination that you are affecting, use the gain and offset controls to alter the result. If you wish to create a non-linear relationship between the two, you may use a different Table, or create a table yourself.

Presets

Almost every window in StringPort can be saved, named, and recalled as one of 99 available custom presets. In the StringPort main window, you can save and recall the presets of all the individual applications in various combinations. This enables you to create, save, and recall effects that use multiple StringPort applications quickly and easily.



PRESET: 2 None, 2

Anywhere that you see the word "save" or "preset" you have the option of saving the settings in that window or application.

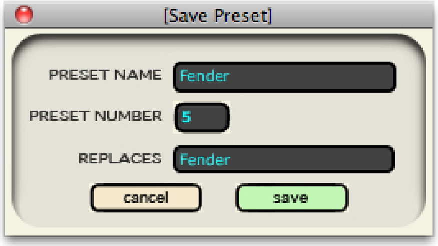
A preset can also be saved for the entire StringPort suite in the main window, so that settings from multiple applications can be recalled all at once.

Creating, Editing, Saving Presets

Creating presets and saving them is easy.

If for example you currently calibrated the trimpots to use the StringPort with your Fender guitar, and you want to switch to use your Gibson which you play a little bit differently, here's how you would do it:

From the Automatic Trim window, digitally adjust the trimpots as explained above.

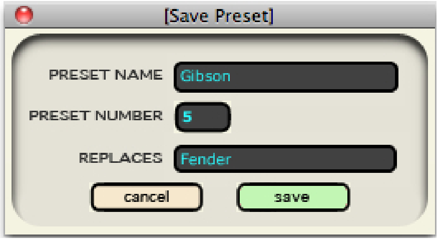


PRESET NAME Fender
PRESET NUMBER 5
REPLACES Fender

Click "save" to open up the "Save Preset" window.

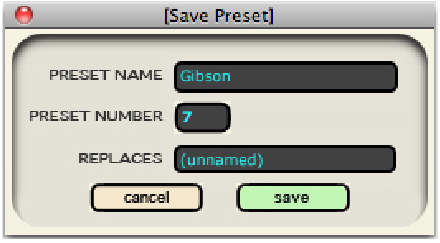
Choose the preset number slot to save your new calibration settings.

In the picture to the right, if I were to click "save" then my old calibration settings saved under preset 5 "Fender" would be replaced with the latest adjustments, and Preset 5 would now be called "Strad."



PRESET NAME Gibson
PRESET NUMBER 5
REPLACES Fender

Instead, use your mouse to click and drag the Preset Number to a blank "unnamed" slot (in this case "7") and give it a new name in the "Preset Name" field. This enables you to save multiple custom presets of a calibration.



PRESET NAME Gibson
PRESET NUMBER 7
REPLACES (unnamed)

This procedure of saving presets works the same throughout the StringPort software. Not only can you save presets for individual trimpots adjustments, but also save groups of presets for larger changes.

Factory Presets

The StringPort software comes with its own factory presets. There are a few standard presets you should know about that appear throughout all of the applications:

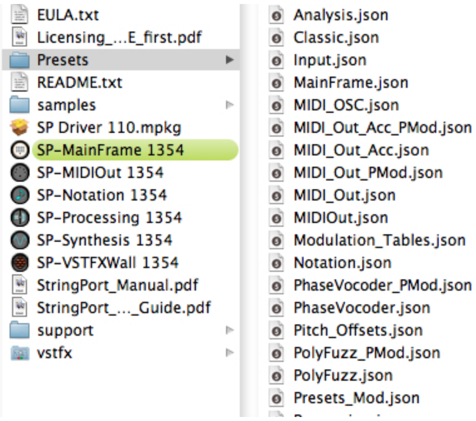
Off - This preset means that the application is off. If you aren't using an application you're definitely going to want to set it to Off in order to preserve as much CPU as possible.

No Change - When you use this preset in any application it will preserve the current settings that are already loaded in that application. It's a special preset that you'd want to use in a very specific situation. Let's say you're setting up your presets for a performance and you want to use a specific preset in Phase Vocoder in one section and later you want to use PolyFuzz along with that same preset from Phase Vocoder that you've been playing with. So you set up one of your Main Presets in Processing to start up with everything off except for the Phase Vocoder and then you make another Main Preset to have that same Phase Vocoder preset on and add in the one from PolyFuzz that you want to use... This is great except that when you switch from the first one you made to the second one, if you've altered any of the values in Phase Vocoder since you first loaded that preset, going to the second Main Preset will re-initialize all of the Phase Vocoder parameters and you'll probably end up hearing some sort of click. In order to avoid this situation you can choose the Phase Vocoder's "No Change" preset for the second Main Preset so that the application will not re-initialize when your preset is used twice in a row. **Warning**: do not use this preset as a starting point for setting up your own presets, instead use Init or one of your other presets.

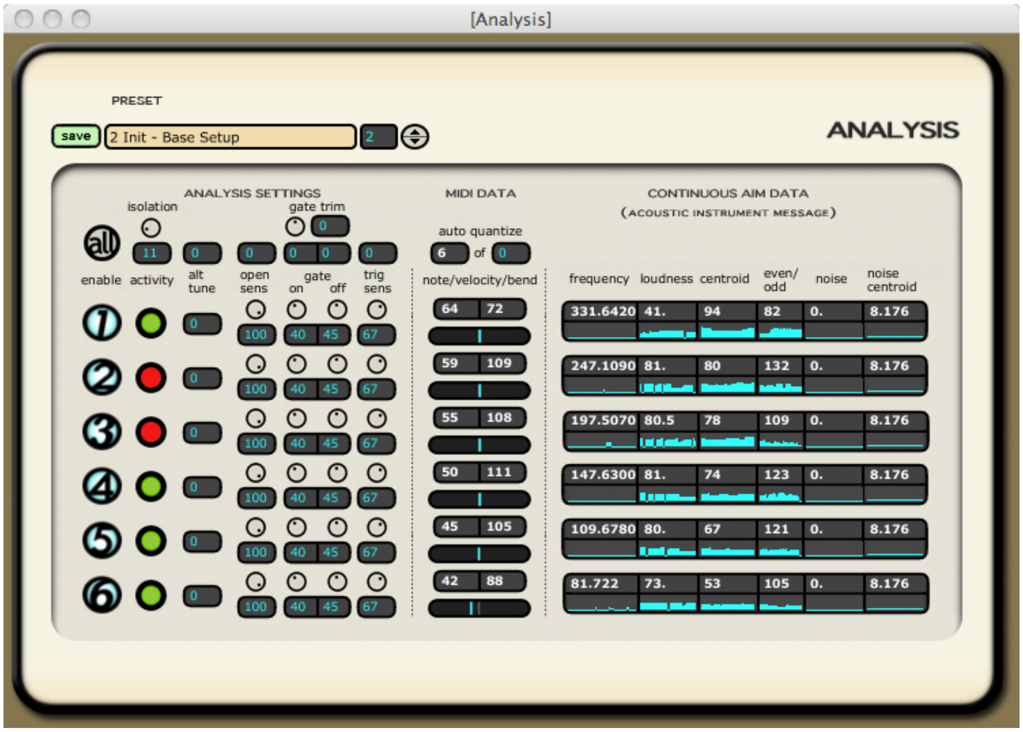
Init - This preset is a base/neutral preset which acts as a good starting point for setting up your own presets or starting out as simply as you can.

Managing Presets

In order to ensure that your presets are not lost when updating the StringPort software, you should be aware that all presets are saved within a folder in your StringPort directory called "presets". You can copy this folder to a folder outside the StringPort folder, so as not to lose them when you update. The folder must be called "presets" and be in the StringPort directory in order for the presets to be recognized when the application is in use.



Analysis



Analysis is a single window that allows you to set up and see the data being analyzed by the StringPort software.

You can turn the flow of data on or off for each individual string. We also support alternate tunings. If you change the tuning of any string of your guitar you just have to indicate how many halfsteps above or below you've moved from the standard tuning of that string.

Each string can be set to have a specific Gate On level or loudness. The higher the number (which is in dB) the higher the loudness of your playing will have to be in order to trigger the note. The Gate Off threshold works in a similar way – the lower the number the longer the string will stay on. Gates also have a master trim that will increment or decrement both the gate on and the gate off together.

The Trigger sensitivity allows you to set how sensitive Analysis will be in recognizing each new pluck. The Open Sens lets you adjust the sensitivity of the open string. 100 means the open string will be 100% as sensitive as the fretted notes. 50% will be half as sensitive. 0 will turn off open strings – very handy for certain jazz and lead styles.

Here you can also set the isolation, which makes the accidental bumping of strings less likely to cause them to turn on. A high Isolation value will require each string to have a definite beginning with respect to adjacent strings that are already sounding. A lower setting makes all strings more equally sensitive.

Every time a note is triggered, the "activity" light will turn red. If the light is green that means the amp-gate is on. When the green light goes on (indicating that a note is sounding), you can view the MIDI Data and the Continuous AIM Data (Acoustic Instrument Message). The MIDI Data column shows the MIDI Note, the velocity, and the pitch bend of the note.

At the top of the MIDI Data column is the auto quantize feature, which allows you to select how many strings need to be playing at the same time in order to turn pitch bend off. This allows you to decide that if you're playing a chord, you want all the notes to be quantized to a semitone all the time, while you can still play one or two notes and bend the pitch.

The Continuous AIM Data (Acoustic Instrument Message) gives you more information than just the MIDI Data. The information displayed in this column of the window is frequency, loudness, centroid, even/odd, noise, and noise centroid:

frequency - the frequency of the note as opposed to the MIDI note

loudness - this value is represented in dB, in half dB increments. Therefore to find the current level of the signal in dB you must multiply this value by 0.5. This gives a total representable dynamic range of 127 dB.

centroid - Centroid represents the "center of mass" of the spectrum. Perceptually, it has a robust connection with the impression of "brightness" of a sound. It is calculated as the weighted mean of the frequencies present in the signal, with their magnitudes as the weights.

even/odd - The Even/Odd Harmonic Balance is the ratio of odd harmonic energy to even harmonic energy in a signal. This allows the disambiguation between sounds with predominantly odd harmonics, such as clarinets, and sounds with predominantly even harmonics, such as trumpets. A signal with completely odd harmonics is represented as 1, with 50% even/odd balance as 127, and completely even harmonics as 255.

noise - Noise Amount is the ratio of the energy of the non-harmonic part of a signal to the total energy. It is close to 0 for a purely harmonic signal and close to 255 for a purely noisy signal. Note: used for bowed instruments only.

noise centroid - Noise Centroid represents the "center of mass" of the spectrum of the **non-harmonic** part of the signal. It is calculated as the weighted mean of the frequencies present in the non-harmonic part of the signal, with their magnitudes as the weights. Note: used for bowed instruments only.

You can use this data to modulate parameters in Preset Modulation, as well as PolyFuzz Modulation. Which means that you can, for example, map the loudness of the note you play on a string to the Filter frequency in PolyFuzz. By playing loud and soft repeatedly, you create a wah wah effect on the signal being processed.

There is no modulation controller for Analysis because this application is what sends data to the rest of the modulation controllers throughout the StringPort software.

Loudness Curves

You can modify incoming loudness data by a loudness curve in order to provide different types of dynamics in response to your playing. You can select one of 13 loudness curves or to leave the data unaltered (linear). For a complete list of available loudness curves see Loudness and Modulation Curves in the **Appendix**.

Processing

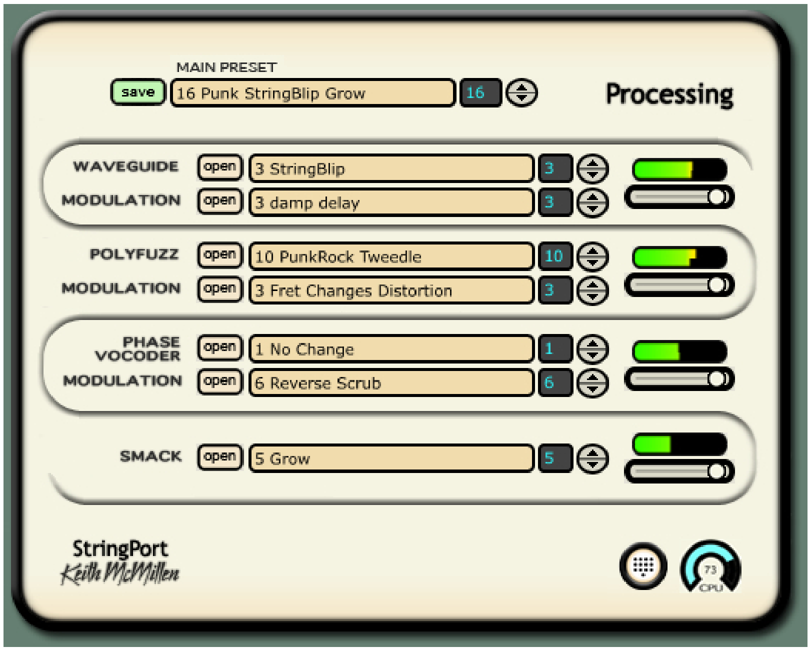
The processing window contains the apps that allow you to process the sound of your instrument:

Wave Guide - a physical modeling tool that uses digital wave guide synthesis.

PolyFuzz - a string of effects including pitch shifting, filters, modulation, amp simulation, delay, etc...

Phase Vocoder - this app gives you 6 tracks for samples that you can control

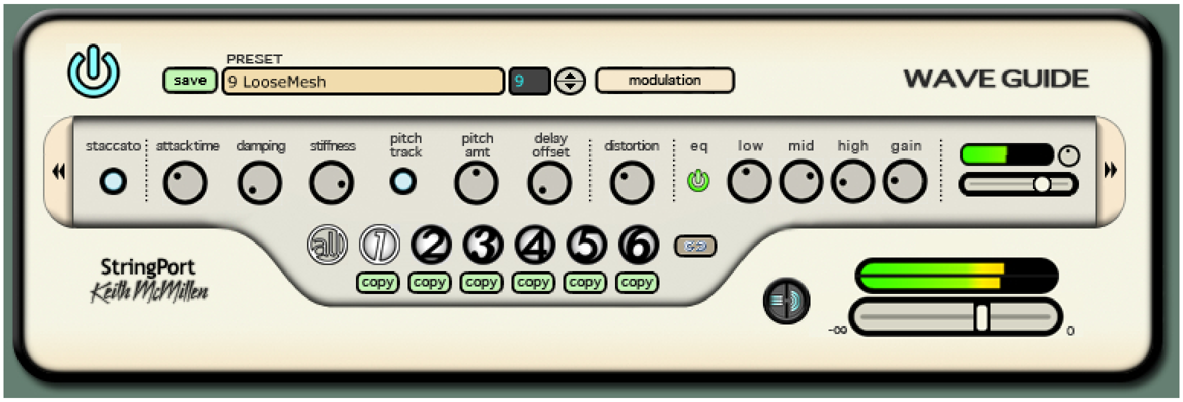
SMACK - in this app you can modulate the sound of each string of your instrument using Formant Generation, Wave Shaping, Octave Generation, Voltage-Controlled Filtering, Pitch Shifting, etc...



MAIN PRESET 16 Punk StringBlip Grow 16
WAVEGUIDE 3 StringBlip 3
MODULATION 3 damp delay 3
POLYFUZZ 10 PunkRock Tweedle 10
MODULATION 3 Fret Changes Distortion 3
PHASE VOCODER 1 No Change 1
MODULATION 6 Reverse Scrub 6
SMACK 5 Grow 5

Modulation - all of these apps have modulation windows that go with them except for Smack. The modulation windows gives you a way to control the app using data from Analysis or MIDI Input

Wave Guide



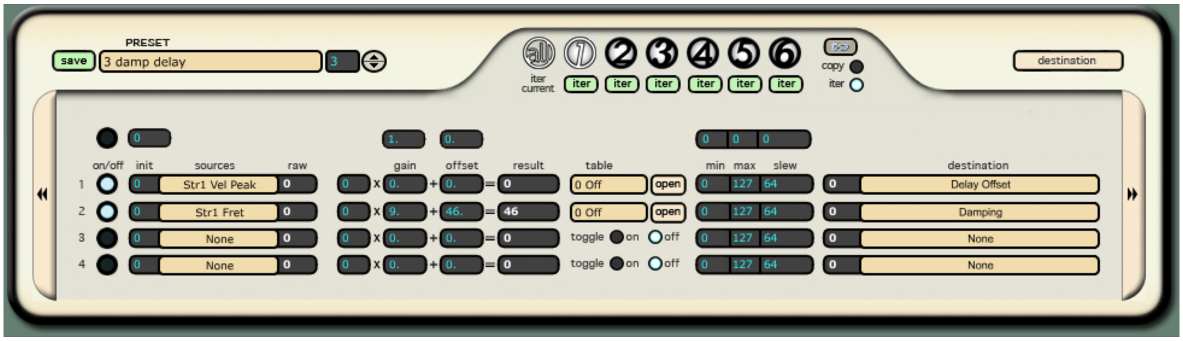
Our Wave Guide application allows you to use Digital Waveguide Synthesis with your instrument. It's an established physical modeling tool giving you the ability to guide your sound in exciting ways. The physical model that we're emulating is a mesh like the skin on a drum. Using this application allows you to use the sound from your instrument and process it through a mesh emulator.

Something to be aware of is that the "attacktime" dial only applies when "staccato" is on. A longer attack time will give you a longer staccato note. Using the "damping" dial would be similar to muting the head of a drum with your hand giving the effect of a shorter decay time the harder you push on the drum head (or the higher you turn up the damping dial). "Stiffness", according to our physical model, is how hard the surface of the drum is. This gives the effect of a brighter sound the stiffer it is.

Click the modulation button to go to the modulation window for this app.

Modulation

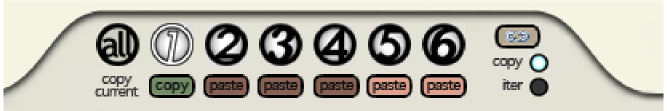
There are four modlines in WaveGuide's modulation window. The first 2 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.



	on/off	init	sources	raw		gain	offset	result	table		min	max	slew	destination	
	●	0				1.	0.				0	0	0		
1	○	0	Str1 Vel Peak	0	0	0.	0.	0	0 Off	open	0	127	64	0	Delay Offset
2	○	0	Str1 Fret	0	0	9.	46.	46	0 Off	open	0	127	64	0	Damping
3	●	0	None	0	0	0.	0.	0	toggle ● on	○ off	0	127	64	0	None
4	●	0	None	0	0	0.	0.	0	toggle ● on	○ off	0	127	64	0	None

The Modulation window for WaveGuide gives you access to the same modulation sources as the Preset Modulation window. However, the parameter destinations listed are relevant to the WaveGuide application. Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline.)

String Select



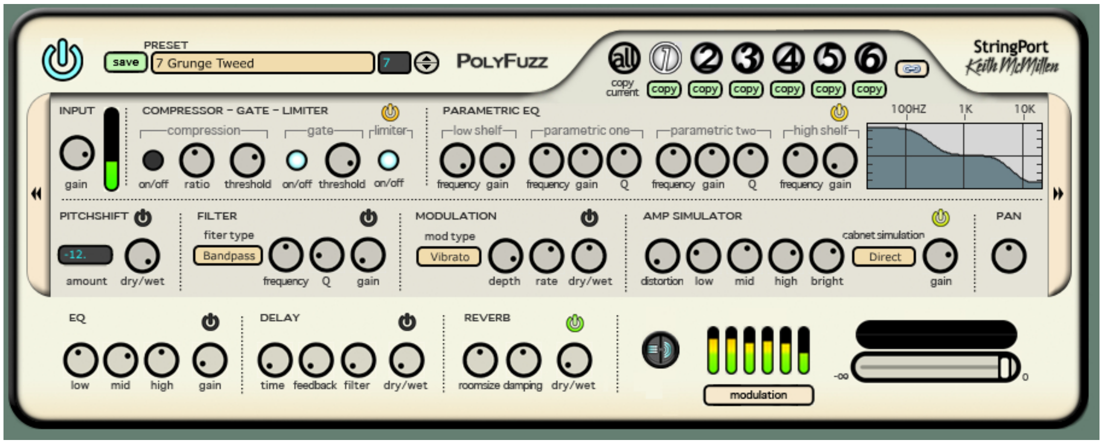
Modulations are mapped to each individual string so that you can change different parameters for each string if you want to. You can also copy and paste modulations from one string to another if you decide to make some of the modulations the same. Once you have selected the 'copy' button it will become darker and the rest turn into 'paste' buttons. You can now paste the settings saved onto any of the other strings by clicking on any of the five other paste buttons. You will know your settings have been successfully moved to a new string when its button turns darker. When you finish copying from the string you selected, click again the copy button again and all the buttons will go back to the default display.

You can affect all the strings equally by selecting the 'all' button. This will enable you to save time by automatically changing the settings on the rest of the strings to match the one you change manually.

Using the "iter" mode to copy and paste modlines onto different strings will copy an iteration of your string source to correspond with whichever string you're on: For example: if your source on string 1 is "Str1 Loud" then if you're in "iter" mode you can paste it to string 2 and its new source will be "Str2 Loud", whereas if you were in "copy" mode it would be copied exactly to string 2 as "Str1 Loud".

PolyFuzz

PolyFuzz includes all of the standard signal processing: Compressor, gate, limiter, basic and parametric equalizers, pitch shift, filters, audio modulation (vibrato, flanger, chorus, ring mod), amp simulator, panning, EQ, delay, reverb, and pre and post gain/volume levels. Use this to enhance the basic sound of each string on your instrument, or to control and modulate these parameters for effect during performance. The signal flow of the sound through the effects goes from left to right by row. Each effect has a power button that turns the effect on and off and doubles as a simple level meter. If the level going into that effect is clipping because it is too loud, the power button will turn red. Everything inside the indented space is specific to each string but the EQ, Delay, and Reverb apply to all strings together.



Click the modulation button to go to the modulation window for this app.

Modulation

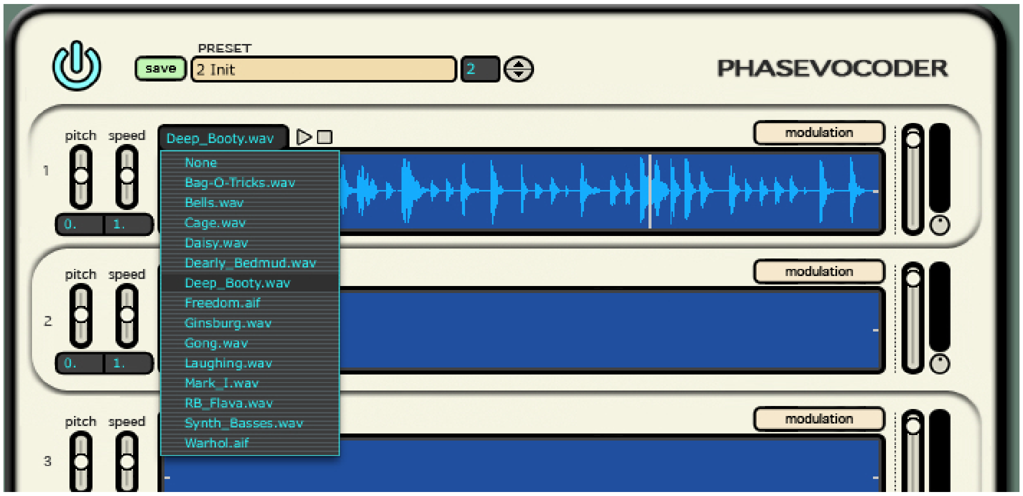
There are six modlines in PolyFuzz's modulation window. The first 4 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.

The PolyFuzz Modulation window gives you access to the same modulation sources as the rest of the modulation windows (the sources that come from Analysis). However, the parameter destinations listed are only relevant to the PolyFuzz application. For example: You can only send your modulations to PolyFuzz parameters like "Filter frequency" or "Ringmod depth". Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline. Also see the **String Select** section on page 22 for a more in depth explanation of the string select and copy functions.)

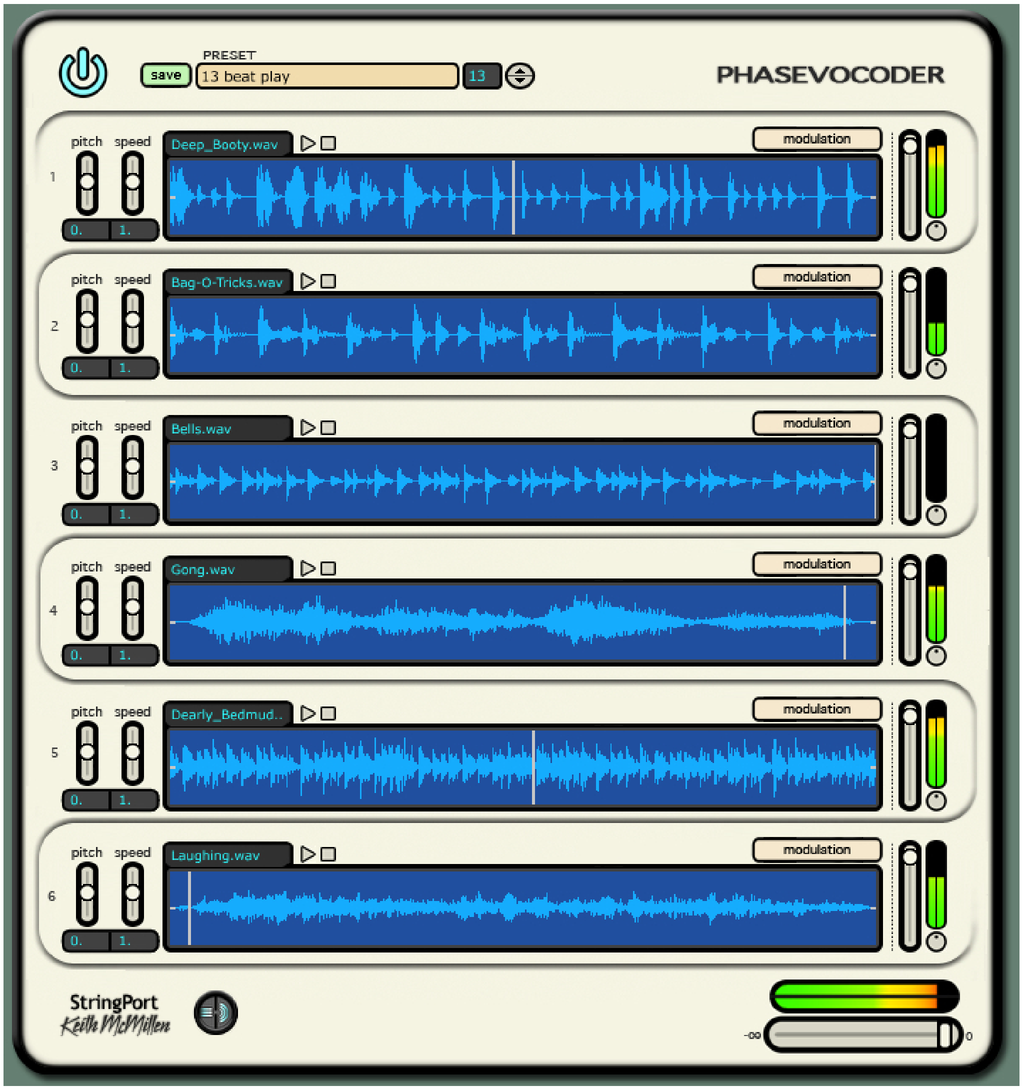
Here you can map the data coming in from Analysis to Polyfuzz signal processing settings for EQ, Filter, Amp Simulator, RingMod, etc.

Phase Vocoder

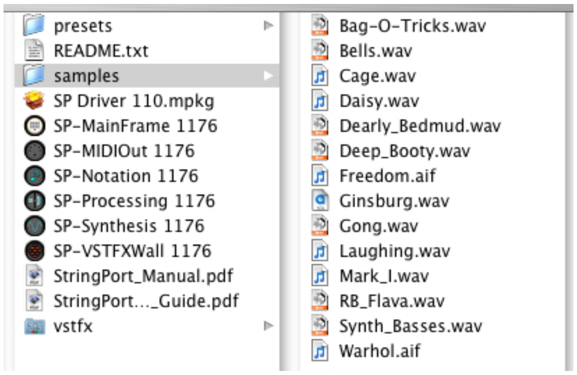
The StringPort Phase Vocoder uses the phase information of specific audio files to scale both the pitch and speed of the samples. There are 6 tracks for 6 different samples making it possible to polyphonically control samples using modulation parameters of the StringPort.



When you first open the Phase Vocoder window, you will see blank tracks. You can select your samples from the menu above the top left corners of the waveform displays. StringPort comes with a several samples of its own. Once you have selected which samples to use you can set up modulations for the tracks so that you can control the Phase Vocoder with your instrument or a MIDI source.



The samples that come with the StringPort software are kept in a folder that the software refers to when populating the menu where you select which audio file to use. This folder of audio files can be found in the directory where the StringPort folder was installed, most likely in Applications>StringPort>samples>



presets
README.txt
samples
SP Driver 110.mpkg
SP-MainFrame 1176
SP-MIDIOut 1176
SP-Notation 1176
SP-Processing 1176
SP-Synthesis 1176
SP-VSTFXWall 1176
StringPort_Manual.pdf
StringPort..._Guide.pdf
vstfx

Bag-O-Tricks.wav
Bells.wav
Cage.wav
Daisy.wav
Dearly_Bedmud.wav
Deep_Booty.wav
Freedom.aif
Ginsburg.wav
Gong.wav
Laughing.wav
Mark_I.wav
RB_Flava.wav
Synth_Basses.wav
Warhol.aif

Any .wav or .aif audio files that are copied into this folder will immediately appear available to the Phase Vocoder and can be uploaded to any of the six tracks. This way you can use your own audio samples in Phase Vocoder.

Click the modulation button to go to the modulation window for this app.

Modulation

There are six modlines in Phase Vocoder's modulation window. The first 4 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.

Like in PolyFuzz Modulation, the Phase Vocoder Modulation window gives you access to the modulation sources available from Analysis and MIDI Input. In Phase Vocoder each string represents a different track (string 1 corresponds to track 1, etc...). Here you can map sources to Pitch Speed settings, Gain, Transport settings such as: distance, location, scrub, start, stop, loop. You can control the playback of all six samples using any of your strings' modulation sources or a MIDI source that you set up in **MIDI Input** (see page 13). Some parameter destinations in Phase Vocoder require a special explanation:

Transport > Play Once - if this destination receives a value that goes from 0 to any positive number the corresponding track will play through the sound file once and then stop.

Transport > Stop - any positive number will cause the corresponding track to stop playing.

Transport > Play Loop - a value that goes from 0 to any positive number will cause the corresponding track to playback and loop continuously.

Transport > Play from Here - if you have previously stopped the sample or if you've been scrubbing through it, "Play from Here" will play the sample from the point you stopped it or the last place it was scrubbed from. Any value will cause it to do this.

Transport > Scrub - values determine where in the sound file you're scrubbing. 0 is the beginning and 127 is the end.

Transport > Distance - if this destination receives any positive value, the sample will play that far into the sound file. 0 meaning the very beginning and 127 meaning the very end.

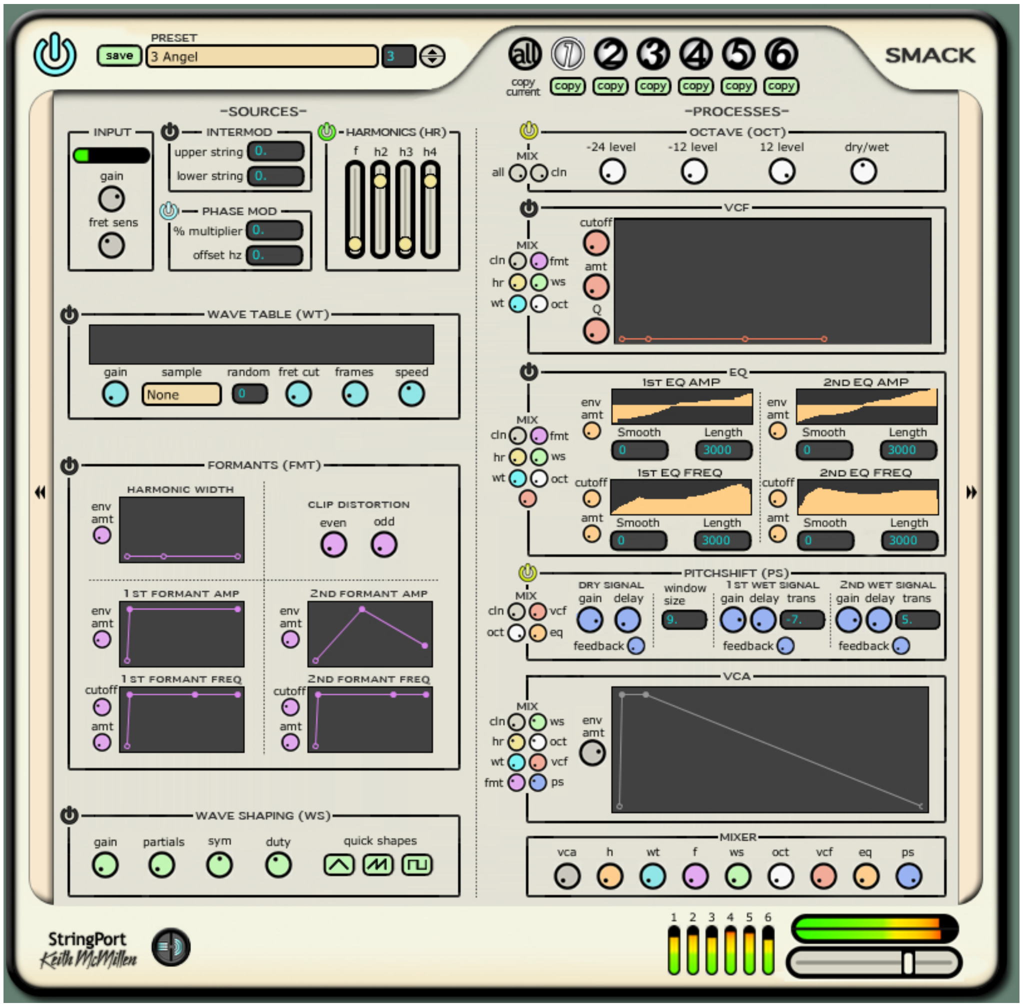
Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline. Also see the **String Select** section on page 22 for a more in depth explanation of the string select and copy functions.)

SMACK

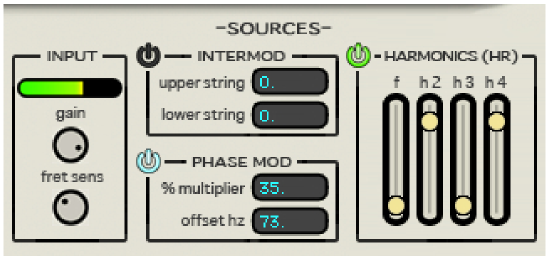
Smack is like having a voltage-controlled, phase-driven, modular synthesizer integrated into your performance rig. Smack works with String Port's Analysis app in order to allow you to trigger envelopes with your playing. In Smack you can modulate the sound of each string of your instrument using any or all of the following types of synthesis: Inter-string

Modulation, Phase Modulation, Harmonic-Summation, Wavetable Synthesis, Formant Generation, Wave Shaping, Octave Generation, Voltage-Controlled Filtering, EQ envelopes, Pitch Shifting, and a Voltage-Controlled Amplitude envelope to finish it off. The capabilities of each synthesis and processing module are as versatile and powerful working individually as they are in unison.

The left half of the window categorizes all of the effects on that side as "Sources" and the right side categorizes the effects there as "Processes". Phase information that is taken from your string is used to drive the synthesis on the "Sources" side. After that, the sources can be further processed on the "Processes" side through Octave Generation, VCF, EQ, Pitch-shifter, and/or VCA.



First let's take a look at the "**Sources**" side, starting with the top:



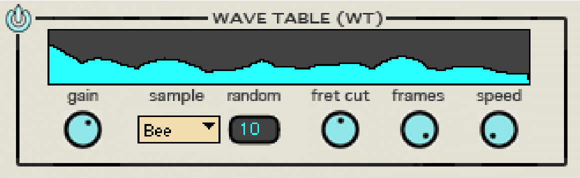
The input is where the clean sound comes in and here you can set the gain. At the input is a low-pass filter whose base-frequency is shifted according to the open-string tuning of your chosen instrument (chosen in the String Port Input section). You can then control this base-frequency further using "fret sens" to alter the color of your string's input. You can turn on any of the effects with the power button next to the name of the effect.

Intermod:
This effect allows you to add the input of consecutive strings together which causes dramatic modulation effects in the phase-driven synthesis sections, also known as "Sources". You can set the level you're bringing in from a neighboring string.

Phase Mod:
This is where the signal of the string gets analyzed for its phase information. From here, the phase information is used to drive synthesis in the "Harmonics", "Wave Table", "Formants", and "Wave Shaping" sections. You can add a certain amount of modulation to this phase information by changing "offset hz" for an offset-frequency at which the modulation should occur, and "% multiplier" for the amount of modulation (in percentages). You will hear the effects of this modulation appear at the output of the phase-driven synthesis "Sources" (as long as you turn them on and mix them to the output).

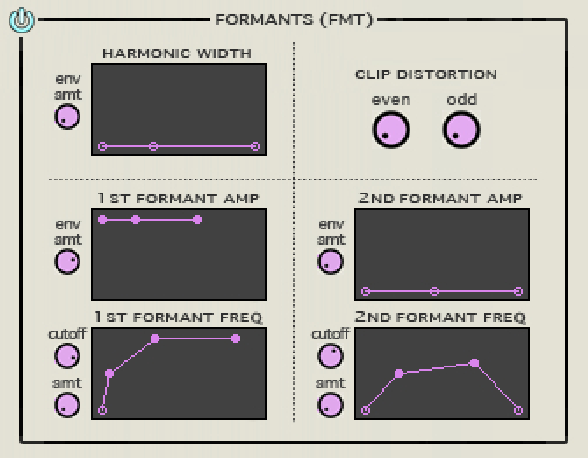
Harmonics (HR):
This allows you to alter the harmonic makeup of each string. You can take out or lower any of the first 4 harmonics.

Wave Table (WT):
With the wave table effect you are able to combine a short sample with the sound of the guitar string. The phase of the string's signal drives you through the location of the sample. The "gain" dial sets the gain of the wave table (the sample). Choose which syllable to use as the sample with the drop down menu and it will show up in the display as spectral information (as opposed to the waveform in a timeline):

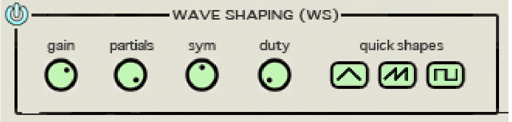


Choosing a "random" value allows you to set a range of samples from which to choose randomly each time the string registers an amplitude trigger creating a "scat" type of effect. The "fret cut" dial indicates the fret location at which the timbre comes out "natural". Playing on higher frets gives the chipmunk effect. The "frames" dial indicates the number of 11-millisecond frames in the sound file to sweep over during a guitar note. Each note starts a new sweep from the beginning of the sound file. The "speed" dial indicates the relative time over which the sweep takes place.

Formants (FMT):
A formant is a spectral bump that has a specifiable gain, center frequency, and harmonic width. The harmonic width is shared between the two formant generators but the gains and center frequencies are specified separately using envelopes. Formants often mimic the vowel-producing effects of the human vocal tract by shifting peaks and troughs throughout the string's normal spectral makeup, allowing you to keep a fundamental steady while only certain harmonics are brought out more at different times (according to your envelopes). Adjusting the "env amt" or the "amt" will change the range of amplitude or frequency that the envelope covers. The "cutoff" dial in the frequency envelopes will offset the range. Clip distortion allows you to distort the even and odd harmonics individually by clipping their amplitude (the effect is a subtle change in color of the overall sound).



Wave Shaping (WS):
The Wave Shaper allows you to shape the soundwaves that are coming from your guitar string. Adding partials adds harmonics to your sound and you can choose basic waveforms around which to shape the partials (triangle, sawtooth, and rectangle waves).



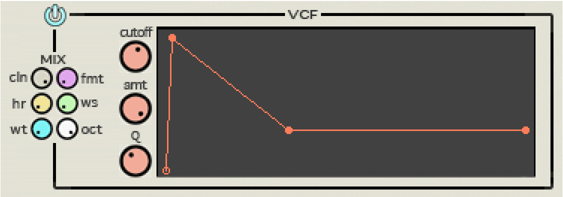
Use 'duty' and 'sym' to condense, stretch, and shift the phase-cycle of the emulated waveform.

Now let's take a look at the "**Processes**" section on the right side of the window.

Octave (OCT):
This section allows you to add in or shift to different octaves. You can use the "MIX" or the "cln" dial to either use the sources or the clean sound of the string as your input into the octave generator. There are dials that allow you to control the level of 2 octaves lower, one octave lower, and/or one octave higher. Then you can set the dry/wet to control how much the octaves you've added in mix with the source.

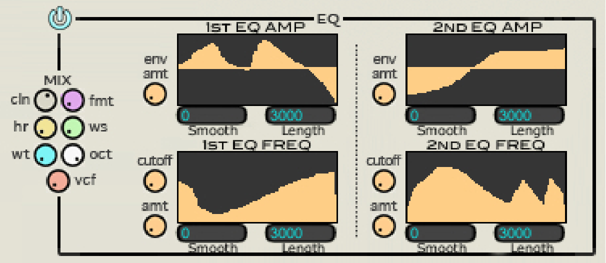
VCF:
This is a resonant, lowpass filter, as in a wahwah pedal. The center (resonant) frequency is

controlled by an envelope generator. The MIX controls here allow you to mix in the clean sound, the sound from the octave generator, and all of the source modules separately (harmonics, wave table, formants, and wave shaping). The "amt" dial allows you to set the range that the envelope table uses. The "cutoff" dial offsets the frequency for the envelope. Set the resonance (how thin the bandwidth is) for the table with "Q". There are 4 points in the table that represent the frequencies of the filter over time. The table is reset on each note.



EQ:

This module is for equalizing (peaking) filters: each one gets a boost in decibels (positive or negative; 0 means flat response) at its own center frequency and bandwidth.



There are 2 envelope tables for each filter, one for the amplitude and the other for the frequency. The envelope tables allow you to draw in your envelope. You can increase the "smooth" value if you're not perfectly satisfied with your ability to make smooth lines using this type of envelope table. You can also change the length of the table (in milliseconds). Use the "env amt" dial to choose the range of the envelope to use and use the "cutoff" dial in the frequency envelope to set the offset frequency for that range.

Pitchshift (PS):

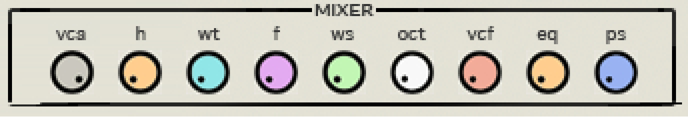
Using pitch shifters you can make chords relative to the note you are playing or set up very interesting phasing effects by using smaller intervals. Set the dry signal's gain and delay as well as the gain and delay of 2 other pitch-shifted notes to add in. The delay dials allow you to set the dry tone and the pitch shifted tones to come in at different times in case you want to arpeggiate the pitches. If you do add on delay you can take advantage of the "feedback" dial which adds an exciting feedback effect. You can change the "windowsize" for the wet pitch shifters. Using the "trans" number boxes you can set the transposition of the pitch shifters in CENTS.

VCA:

At the very end is a Voltage Controlled Amplitude envelope (VCA) to control the attack, decay, and release of your notes. Using the "env amt" dial to set the range of the envelope.

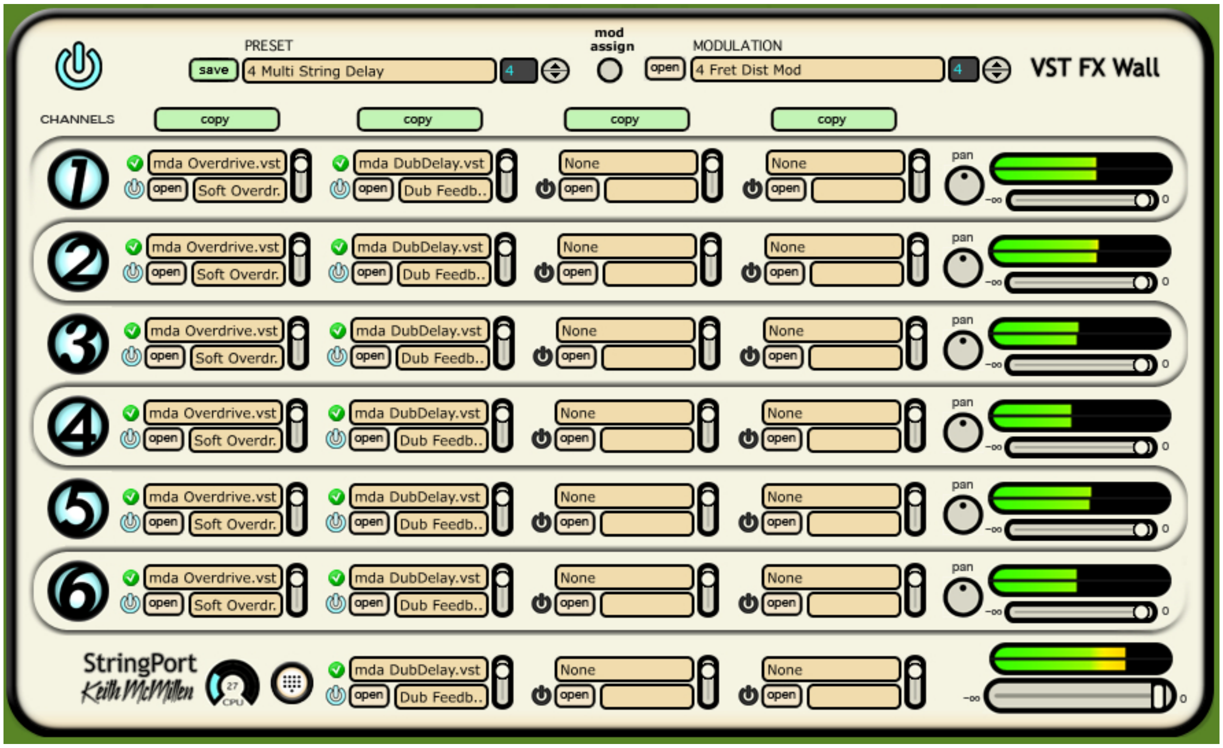
Mixer:

One of the most versatile parts of Smack is the way that you can mix all of the modules together. Smack includes a very sophisticated mixing system which allows you to use each module individually or use them together in various interesting combinations. All of the Processes have little mixers on the left side so that you can choose what previous module you use as the input of the current one. One way to go would be to turn all of the modules on and as you progress through the signal chain add each previous module into the next one and create a long string of progressively altering sound ending at the final mixer by turning up just the "vca" dial in the Mixer.



Or you could mix several modules into one later down the line and have multiple modules turned up in the final mixer. So many combinations are possible that it would be difficult to number.

VST Wall



PRESET: 4 Multi String Delay

MODULATION: 4 Fret Dist Mod

Strings 1–6: mda Overdrive.vst (Soft Overdr.) / mda DubDelay.vst (Dub Feedb..) / None / None

Master: mda DubDelay.vst (Dub Feedb..) / None / None

VST Plugins are common industry standard audio processing units. The VST Wall allows up to 4 different VSTs to be assigned to each string. When a VST is loaded a green circle with a check mark will appear if that VST is a properly written and responsive VST.

You can turn processing on and off for each string by clicking on the corresponding string number. You can also copy the plugin and settings from string one down each column to strings 2-6 by pressing the Copy button at the top of the column. The Copy button will only copy plugins to strings with processing enabled, so make sure the lights beside the strings you want to copy plugins to are enabled. This feature allows you to treat VST Wall like a standard pedal board, with the same FX chain on each string. This can also be a point of departure - once you have a solid overall sound you can edit each string's settings individually.

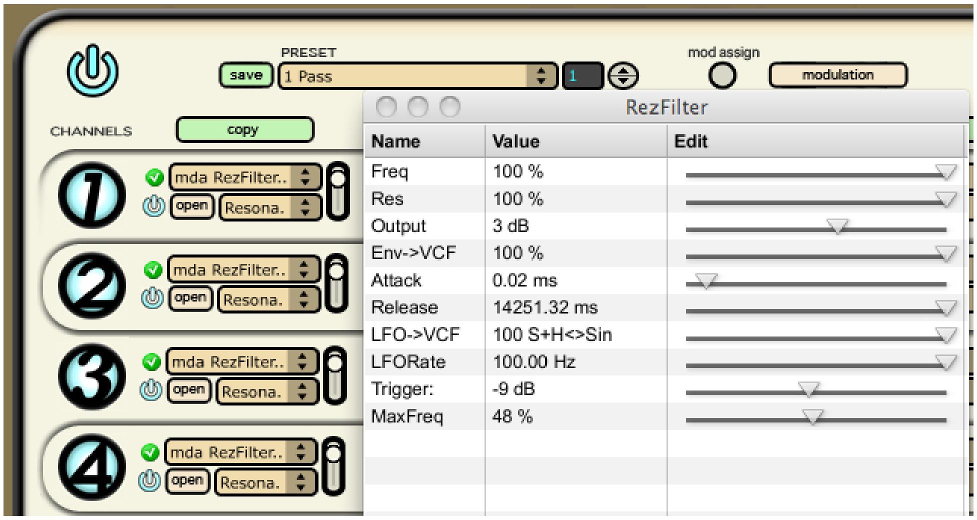
A panning knob and output level fader are also assigned to each string, and similar to PolyFuzz, there is also a master processing section where three VST's can be applied to all strings at once.

We have included a few VST plugins in the StringPort Package to get you started:

- SoundHack Delay Trio
- SoundHack Freesound Bundle
- SoundHack Spectral Shapers (Trial version)
- mda-vst (VST bundle from Smartelectronix)
- Frohmage (Ohmforce)

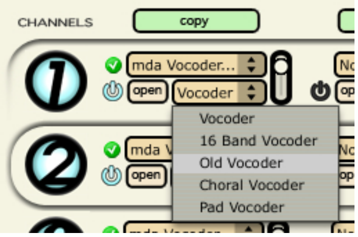
Inside your StringPort folder, you will find these VST plugins in a folder called "vstfx". Once you have successfully installed the VST plugins, they will become available to you in the drop-down menu on each signal slot (string) upon starting the VST Wall. These plugins have been thoroughly bench-tested by our software engineers. However, many VST plugins are built to very different specifications and it is impossible for us to anticipate exactly how all plugins will interact with this software. During loading time, VST Wall does a series of tests on each plugin in that folder to see if there are any initialization errors, or if there are any VST instruments (Since these do not process incoming sound they are not useful in VST Wall.) A plugin's functionality is further confirmed by a green check mark which appears to the left of the selection menu when a VST is loaded. You may add your own plugins to the "vstfx" folder, but only plugins that pass these tests will be available in the plugin selection menus. We also highly recommend that for best results you add your VST's to this folder ONE AT A TIME to see how they perform within this new environment.

Select the plugin you want to work with and click on the 'open' button.

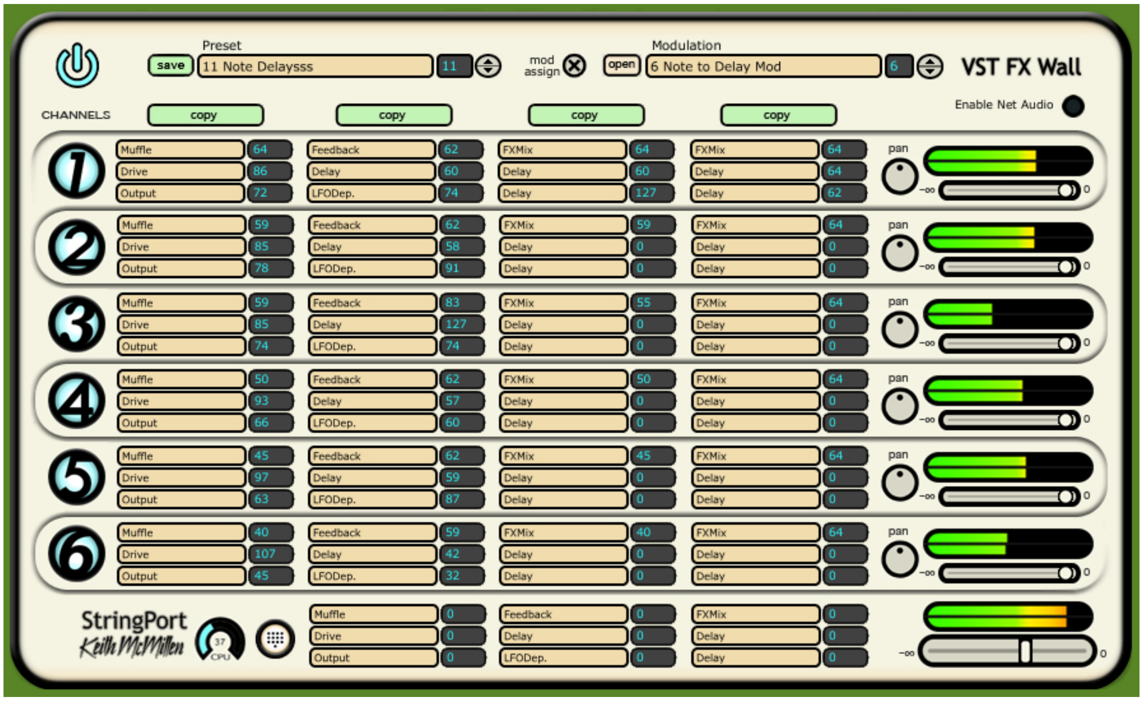


Name	Value	Edit
Freq	100 %	
Res	100 %	
Output	3 dB	
Env->VCF	100 %	
Attack	0.02 ms	
Release	14251.32 ms	
LFO->VCF	100 S+H<>Sin	
LFORate	100.00 Hz	
Trigger:	-9 dB	
MaxFreq	48 %	

The plugin's editing window will open. Here, you can adjust the parameters of the plugin selected. If the plugin comes with pre-saved presets, you will be able to select these from the drop-down menu to the right of the 'open' button.



Once you have chosen which VST plugins you'd like to use you can choose which parameters you might like to control (if any). To do this, click the little circle below "mod assign" and you'll be taken to a different view of the app.

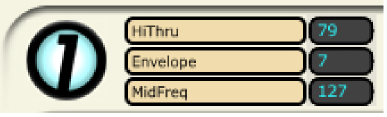


Preset: 11 Note Delaysss 11

Modulation: 6 Note to Delay Mod 6

1	Muffle	64	Feedback	62	FXMix	64	FXMix	64
	Drive	86	Delay	60	Delay	60	Delay	64
	Output	72	LFODep.	74	Delay	127	Delay	62
2	Muffle	59	Feedback	62	FXMix	59	FXMix	64
	Drive	85	Delay	58	Delay	0	Delay	0
	Output	78	LFODep.	91	Delay	0	Delay	0
3	Muffle	59	Feedback	83	FXMix	55	FXMix	64
	Drive	85	Delay	127	Delay	0	Delay	0
	Output	74	LFODep.	74	Delay	0	Delay	0
4	Muffle	50	Feedback	62	FXMix	50	FXMix	64
	Drive	93	Delay	57	Delay	0	Delay	0
	Output	66	LFODep.	60	Delay	0	Delay	0
5	Muffle	45	Feedback	62	FXMix	45	FXMix	64
	Drive	97	Delay	59	Delay	0	Delay	0
	Output	63	LFODep.	87	Delay	0	Delay	0
6	Muffle	40	Feedback	59	FXMix	40	FXMix	64
	Drive	107	Delay	42	Delay	0	Delay	0
	Output	45	LFODep.	32	Delay	0	Delay	0
			Muffle	0	Feedback	0	FXMix	0
			Drive	0	Delay	0	Delay	0
			Output	0	LFODep.	0	Delay	0

In this view you can choose 3 parameters for each plugin that correspond with parameters in that plugin's window.



1	HiThru	79
	Envelope	7
	MidFreq	127

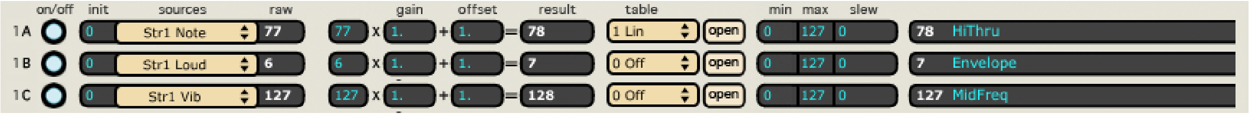
The number boxes next to the chosen parameters allow you to control that parameter from the VST Wall window or from the Modulation screen instead of the plugin window.

Note: some plugins display their parameters in a different way. For Example: Guitar Rig parameters will come up as "P001-P128" in the Mod Assign window. The next step is to determine which parameter number applies to the knob/slider/dial you want to control. To do this, go to the Guitar Rig editor window and ctrl-click on the knob/slider/dial there. This will allow you to assign the parameter number locally, but then you must also select that parameter number in the Mod Assign window. This sets up a simple send and receive so that you can control this parameter from the modulation screen as normal.

You can access the modulation window for VST Wall with the "open" button up by where you save the presets. Next to that you can also view and change which modulation setting you are using.

Modulation

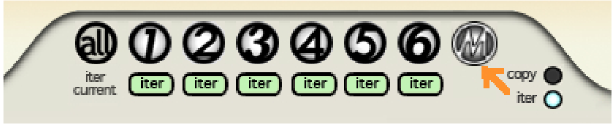
Due to the myriad of differences between VSTs and their parameters, the Modulation window in VST Wall is a bit different from the other apps. Any parameters that you choose in the "mod assign" screen automatically pop up in the Modulation window for VST Wall.



	on/off	init	sources	raw			gain		offset		result	table		min	max	slew		
1A	○	0	Str1 Note	77	77	x	1.	+	1.	=	78	1 Lin	open	0	127	0	78	HiThru
1B	○	0	Str1 Loud	6	6	x	1.	+	1.	=	7	0 Off	open	0	127	0	7	Envelope
1C	○	0	Str1 Vib	127	127	x	1.	+	1.	=	128	0 Off	open	0	127	0	127	MidFreq

As you can see from the above picture you no longer choose from a dropdown menu which parameter is your destination because you have already chosen which parameters you want to modulate in the "mod assign" screen in the VST Wall window. Each line is labeled indicating which effect it is for (1st, 2nd, 3rd, or 4th) and which of the 3 parameters within that effect (A, B, or C) that line controls.

There is also a screen labeled "M":



This screen controls the Master effects that apply to all the strings at once. There are 9 modlines in this screen because there are 3 Master effect slots and 3 possible parameters to control for each effect.

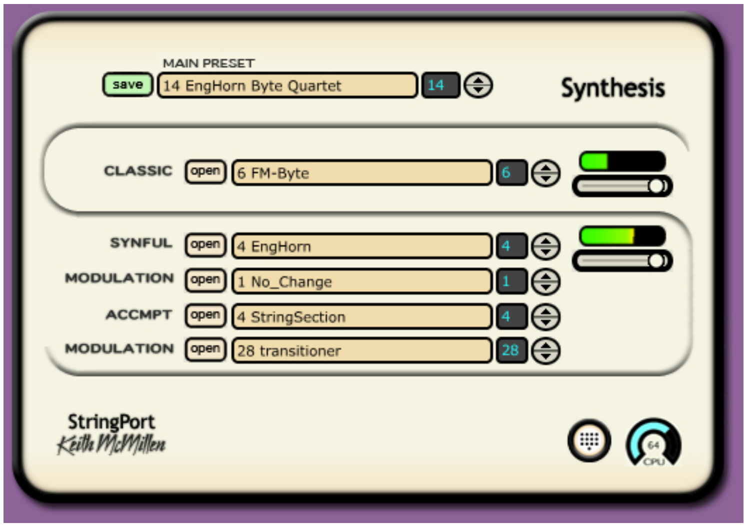
Once you assign a source for the parameters you have chosen you will now see the numbers jump around in 3 different places when you play your instrument: in the modline, in the mod assign mode number boxes, and in the plugin window.

To save a preset, you must keep in mind that the master preset display in the VST Wall window controls the preset display in the modulation window – not the other way around. The most standard order of operations is to select your plugins first, then save this in the VST Wall window in case you wish to return to this base setup. Next, pick which parameters on which strings you would like to modulate, and you may wish to save this state too. This allows you to start from either of these steps and create multiple modulation setups for different songs or sections of a longer composition. Or, you may just wish to compare different modulation sources for the same parameters side by side. Then, switch to the modulation screen and assign sources to your destinations. Save the modulation preset, and then go back to VST Wall and save a master preset. This will recall all plugins and assigned parameters in the main VST Wall window, and also your current modulation preset. However, if you then go and tweak a couple modulation parameters, you must re-save the modulation preset AND then the master preset (in that order) for your changes to be recalled.

Remember, the power of VST Wall is not in the size of your plugin library, it is in all the new ways to use VSTs to create a custom pedal board on each of your guitar strings that changes in real time without you ever having to reach for a knob.

Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline math. Also see the **String Select** section on page 22 for a more in depth explanation of the string select and copy functions.)

Synthesis



MAIN PRESET 14 EngHorn Byte Quartet 14

CLASSIC 6 FM-Byte 6

SYNFUL 4 EngHorn 4

MODULATION 1 No_Change 1

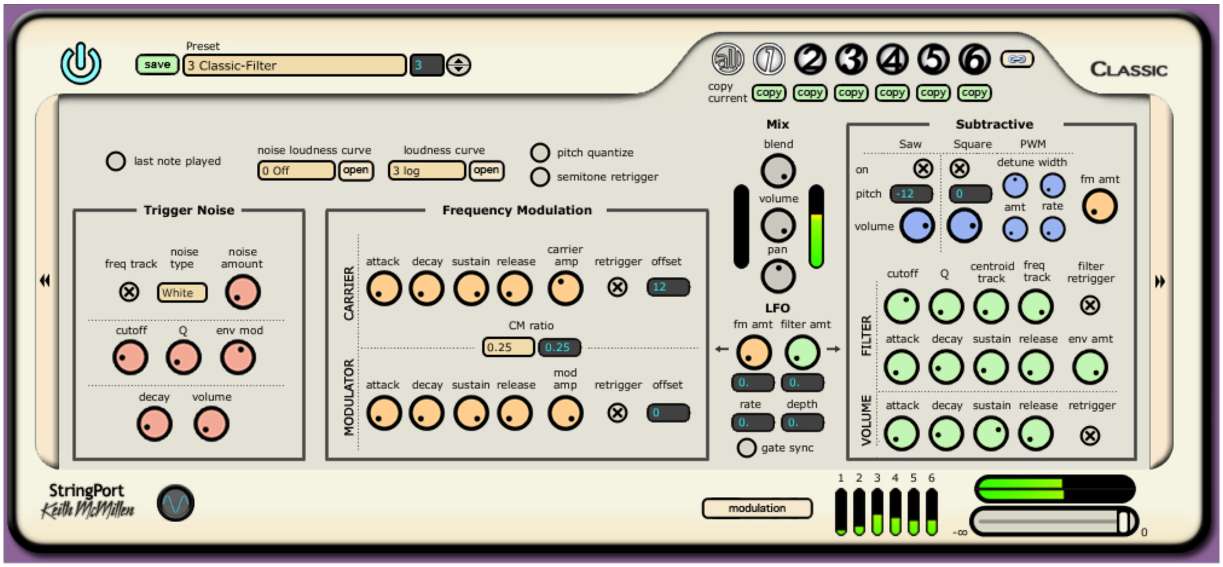
ACCMPT 4 StringSection 4

MODULATION 28 transitioner 28

The synthesis window contains apps that pertain to audio synthesis. You can use your instrument to drive and control synthesis in Classic. Also our Synful app is accessible from the Synthesis window allows you to use Synful Orchestra within the StringPort software. Synful Orchestra provides incredibly realistic sounding instrument simulations.

Classic

Open up the Classic window and take a look at the Frequency Modulation app. StringPort's Classic app uses Analysis to allow you to drive audio synthesis with every note you play.



Preset 3 Classic-Filter 3

noise loudness curve 0 Off

loudness curve 3 log

noise type White

Carrier offset 12

CM ratio 0.25 0.25

Modulator offset 0

LFO fm amt 0. filter amt 0.

rate 0. depth 0.

Saw pitch -12

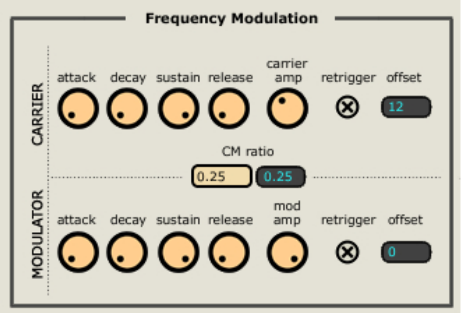
Square pitch 0

Trigger Noise

In this section you can use the Analysis of your instrument to affect noise. With the "loudness curve" drop down menu you can set the amplitude envelope shape for each note you play. Turning "key track" on will track the pitch of your notes so that the noise plays using your notes as a base frequency. You can choose between pink noise and white noise with "noise type" and "noise amount" lets you set the volume of the noise going into the filter below. "cutoff", "Q", and "env mod" let you set a filter on the noise to limit the bandwidth. You can set how short or long each note is by setting the "decay" time.

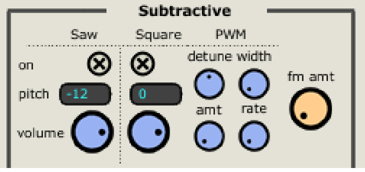
Frequency Modulation

Frequency Modulation uses a carrier soundwave as the base and a modulation soundwave to modulate the carrier wave. You can set the "attack", "decay", "sustain", and "release" times for the amplitudes of both the carrier and the modulation waves separately. The frequencies relative to the notes you are playing are set using the "offset" for both the carrier and the modulator.

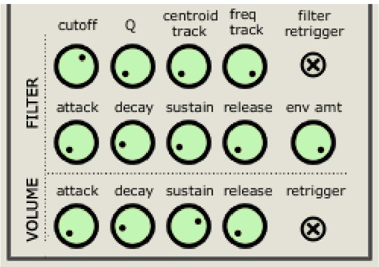


Subtractive

Use Subtractive synthesis to make the notes you play trigger a Sawtooth or Square wave (or both). You can offset the pitch with the "pitch" number boxes. The Square wave allows you to use a PWM (Pulse Width Modulator) to further alter the notes by detuning and changing the width, rate, and amount.

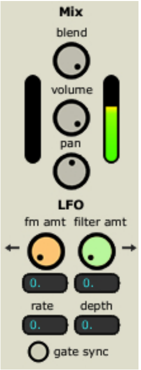


After that you can use the filter and volume envelope shaper to further alter the soundwave.



LFO

The LFO (Low Frequency Oscillator) adds one more modulation to the frequencies of either the Frequency Modulation module or the Subtractive synthesis module just before it is put into the blender. You can control the amount for each with the "amount" dials that are colored corresponding to the module they go to.



Use the "blend" and "volume" dials to control the mix between the Frequency Modulation and the Subtractive modules. Set the amplitude envelopes for the frequency modulated notes with the "loudness curve" dropdown menu.

Modulation

There are 4 modlines in Classic's modulation window. The first 2 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.

The Classic Modulation window gives you access to the same modulation sources as the rest of the modulation windows (the sources that come from Analysis). However, the parameter destinations listed are only relevant to the Classic application. Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline. Also see the **String Select** section on page 22 for a more in depth explanation of the string select and copy functions.)

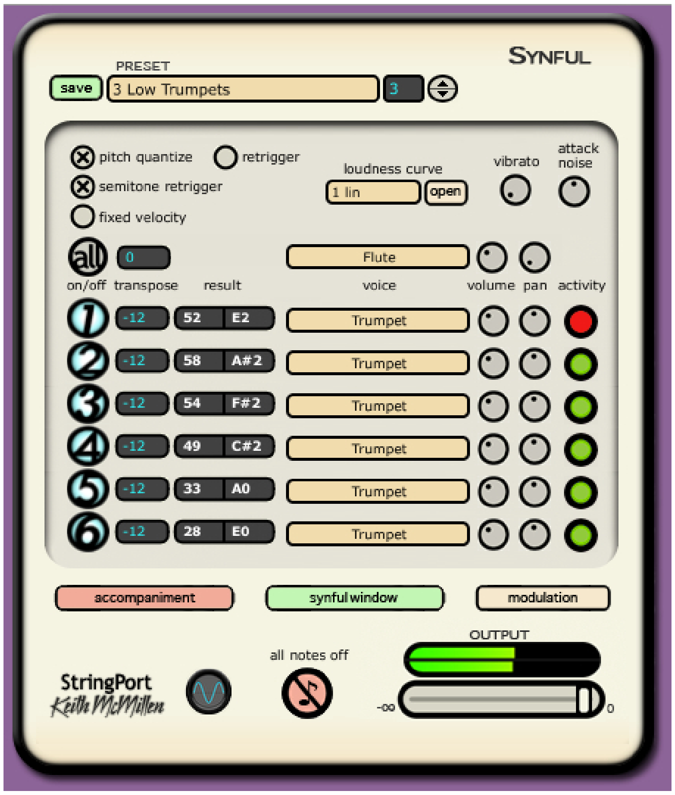
Synful

Synful Orchestra is an amazing software synthesizer designed and sold by Eric Lindemann. Normal price is $479. A 15 day trial version is available. You may purchase a special StringPort-only version for the special price of $199 at our store:

http://www.stringport.com/store/

The StringPort-only version will not work with any third-party host, but you can upgrade to the full version for full functionality. Check out more about this amazing synthesis technology at http://www.synful.com/ .

The Synful app in StringPort allows you to use Synful Orchestra within the StringPort software. Synful Orchestra provides incredibly realistic sounding instrument simulations. Using Synful through StringPort allows you to use your instrument to play other simulated instruments in Synful. Play a guitar and make it sound like a flute, or play a violin and make it sound like a trumpet! You can even make each string a different instrument and play a whole orchestra with just one instrument!



At the top of the Synful window you can enable pitch quantize, semitone retrigger, retrigger, or fixed velocity. Choose the "loudness curve" (in other words the amplitude envelope) for each note. You can also turn up the "vibrato" and the "attack noise".

pitch quantize - if this is set to on your notes will always be quantized to the nearest semitone. having this on does not allow you to bend the pitch of your notes.

semitone retrigger - if this is set to on then a new trigger (note on message) will occur when you reach a new note if you are sliding a note up or down.

retrigger - if this is on and you are playing one note multiple times consecutively on the same string it will retrigger that note even if the gate doesn't go off between notes in analysis.

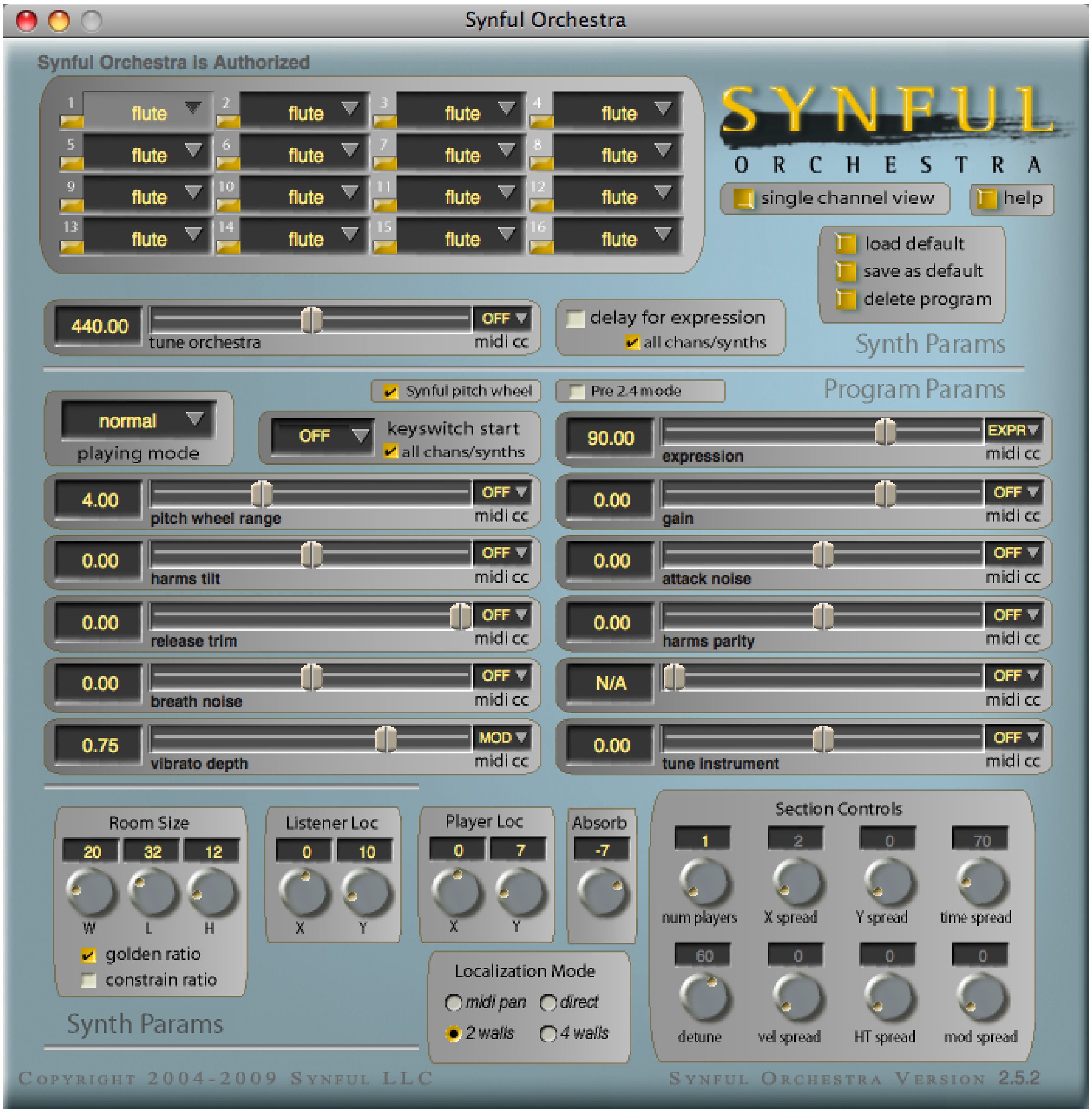
fixed velocity - with this on each note will sound at full velocity.

loudness curve - set the amplitude envelope for each note. If it's set to off the amplitude will track the loudness of your actual playing.

vibrato - here you can turn up the vibrato of your notes

attack noise -

Now enable the strings you want to pass through Synful by clicking the string numbers. The string number should glow blue when on and be plain black when off. Then you can also transpose the notes if you'd like (positive values transpose the note up that many semitones, negative values transpose the notes down that many semitones). Next choose which instrument to emulate and set the volume and panning for the string.



1 flute, 2 flute, 3 flute, 4 flute
5 flute, 6 flute, 7 flute, 8 flute
9 flute, 10 flute, 11 flute, 12 flute
13 flute, 14 flute, 15 flute, 16 flute

440.00 tune orchestra — midi cc OFF
☐ delay for expression
☑ all chans/synths
☑ Synful pitch wheel
☐ Pre 2.4 mode
normal playing mode
OFF keyswitch start ☑ all chans/synths
90.00 expression — midi cc EXPR
4.00 pitch wheel range — midi cc OFF
0.00 gain — midi cc OFF
0.00 harms tilt — midi cc OFF
0.00 attack noise — midi cc OFF
0.00 release trim — midi cc OFF
0.00 harms parity — midi cc OFF
0.00 breath noise — midi cc OFF
N/A — midi cc OFF
0.75 vibrato depth — midi cc MOD
0.00 tune instrument — midi cc OFF

Room Size: W 20, L 32, H 12
☑ golden ratio
☐ constrain ratio
Listener Loc: X 0, Y 10
Player Loc: X 0, Y 7
Absorb: -7
Localization Mode: ○ midi pan ○ direct ● 2 walls ○ 4 walls
Section Controls: num players 1, X spread 2, Y spread 0, time spread 70, detune 60, vel spread 0, HT spread 0, mod spread 0

If you open up the "Synful Window" you will see the Synful Orchestra interface. As you move some of the dials and change the voices in the StringPort window you will see things changing in the Synful Orchestra window.

Clicking the accompaniment button will take you to the Accompaniment window for Synful. Click the modulation button to go to the modulation window for this app.

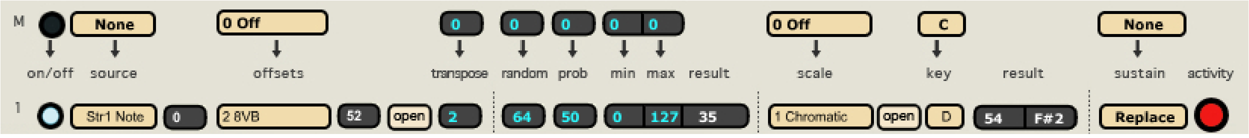
Modulation

There are four modlines in Synful's modulation window. The first 2 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.

Like in all the other modulation windows, the Synful Modulation window gives you access to the modulation sources available from Analysis and MIDI Input. However, the parameter destinations listed are relevant to the Synful application. Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline. Also see the **String Select** section on page 22 for a more in depth explanation of the string select and copy functions.)

Here you can map sources to the "offset" number boxes, the "voice" menu, "vibrato", "attack noise", "volume", "pan", etc...

Synful Accompaniment



Here you can set an accompaniment to play along with you and output through Synful Orchestra. First turn on one accompaniment line and set which string will be the source. Then you can transpose the note using pre-saved offset settings and/or the transpose number box next to it.

The "random" number box will allow you to set a range of half steps above and below your transposed note that your your accompaniment can randomly fall between. The "prob" number box let's you decide the probability in percentage for how often this note will play over time. So if you set the probability to 50 then the note will play 50% of the time. The "min" and "max" set a range that you want the pitches to be within.

If the note is out of range then it will transpose it to an octave that is within range while keeping it the same note. You can then set the notes to a specific scale and key. You can create your own scales by clicking "open" next to the scale table and saving your own preset. The result boxes will tell you which note will be going out to Synful. You can then set how you'd like the note to sustain:

Replace mode
Turn on sustain and it grabs any currently playing notes and any new ones and sustains the last note played.

When you turn off sustain, currently held notes continue and the other strings are able to pass notes through without sustaining them.

If you turn it back on again without clearing it then the current held notes continue until new ones are played.

Acquire mode
Turn on sustain and it grabs ONLY the first note that you play on each string - whether or not it is playing when sustain is turned on.

When you turn off sustain, currently held notes continue and the other strings are able to pass notes through without sustaining them.

If you turn it back on again without clearing it, the held notes continue without being replaced.

Hold mode
Turn on sustain and it grabs ONLY the notes currently playing. If no notes are sounding, all notes pass through without sustain. Once sustain is on, all strings that do not have held notes on them are able to pass notes through without sustaining them.

When you turn off sustain, currently held notes continue and the other strings are able to pass notes through without sustaining them. These continue if you turn it back on again until sustain has been cleared.

Use the box on the right side of the screen to choose the voice, volume, panning, players, etc... for the notes to be played in Synful.

Click the modulation button to go to the modulation window for this app.

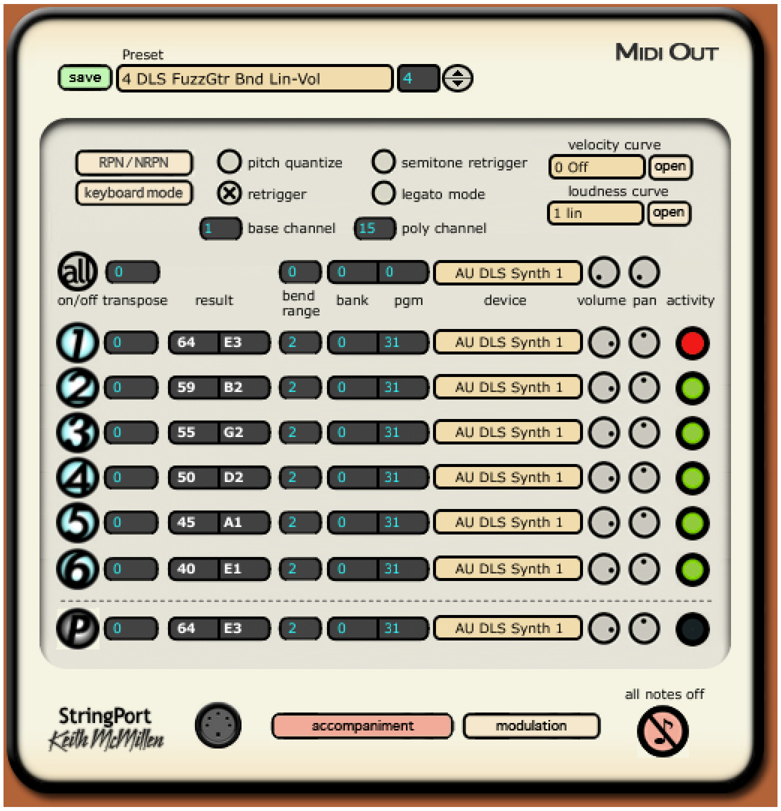
Modulation

There are six modlines in Synful's accompaniment modulation window. The first 4 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.

The Synful Accompaniment Modulation window gives you access to the sources available from Analysis in order to control parameters in the Synful Out Accompaniment window. Modulation for Accompaniment includes 8 pages (instead of the usual 6) one for each accompaniment line. Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline. Also see the **String Select** section (page 22) for a more in depth explanation of the string select and copy functions.) Using the modulation and accompaniment you can achieve incredibly interesting and complex accompaniments for your instrument in Synful Orchestra.

MIDI Out

The MIDI Out window uses data from Analysis and turns it into MIDI notes. This is where the notes you are playing on your instrument (if you're using the polyphonic input and you have Analysis running) are turned into MIDI notes and can be sent to other programs on your computer or out the MIDI output on the back of the StringPort.



Preset: 4 DLS FuzzGtr Bnd Lin-Vol 4

○ pitch quantize
☒ retrigger
○ semitone retrigger
○ legato mode

base channel: 1
poly channel: 15

velocity curve: 0 Off
loudness curve: 1 lin

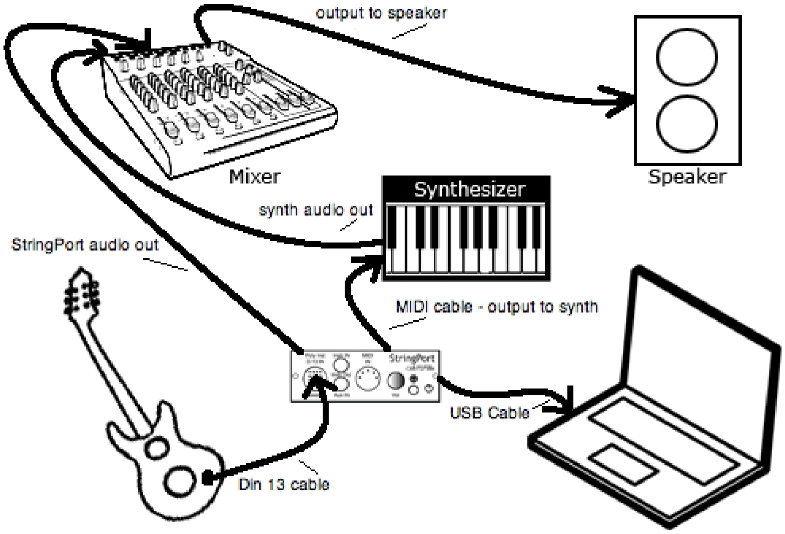
on/off	transpose	result		bend range	bank	pgm	device
all	0			0	0	0	AU DLS Synth 1
1	0	64	E3	2	0	31	AU DLS Synth 1
2	0	59	B2	2	0	31	AU DLS Synth 1
3	0	55	G2	2	0	31	AU DLS Synth 1
4	0	50	D2	2	0	31	AU DLS Synth 1
5	0	45	A1	2	0	31	AU DLS Synth 1
6	0	40	E1	2	0	31	AU DLS Synth 1
P	0	64	E3	2	0	31	AU DLS Synth 1

In MIDI Out you can set up a different MIDI channel for each string or just use the poly channel at the bottom to send all MIDI notes out to one channel. If using a separate channel for each string you can set your base channel which will put string 1 onto whatever channel you set to be your base channel and the rest of the five strings counting up from there. For example: if your base channel is set to 1, string 1 would come out of MIDI channel 1, string 2 would come out of MIDI channel 2, string 3 would come out of MIDI channel 3, etc.... If you're using the poly channel you can turn off the individual strings if you don't want them playing by clicking their number (the number glows blue if the string is on, plain black if the string is off) and set the poly channel to whatever MIDI channel you want it to come out from.

You can also transpose the MIDI Notes that you are playing (set it to a positive number and the note will be transposed up that many semitones, a negative number will transpose the note down that many semitones). Set the bend range, the bank, the program number, and the device you want it to output to. You can also have separate volume and panning for each string.

The device drop down menu is key for sending MIDI data. In the image above the "AU DLS Synth 1" is selected as the output device. This is Apple's basic MIDI device that is built into your computer. If you select this as your output device you'll just get general MIDI. This is an excellent way to test out your MIDI Out put before you attempt to send it to a different device because you can hear it right away.

If you connect an external synth to the MIDI Output on the back of the StringPort you can choose "KMI-StringPort" as your device and be able to send MIDI to that device. The diagram to the right shows how you would connect your setup to get MIDI into your synth and audio out of it.



You can also set up MIDI Out to be sent to MIDI Instruments in Digital Audio Workstations (like Ableton Live, Logic, Cubase, etc...). To do this make sure your device is set to "From MIDI Out... 1". Then just make sure your MIDI devices are set to the same thing within the DAW you are working with and add a MIDI track that will accept input from all MIDI channels from that device.

Other controls include:

pitch quantize - if this is set to on your notes will always be quantized to the nearest semitone. having this on does not allow you to bend the pitch of your notes.

semitone retrigger - if this is set to on then a new trigger (note on message) will occur when you reach a new note if you are sliding a note up or down.

retrigger - if this is on and you are playing one note multiple times consecutively on the same string it will retrigger that note even if the gate doesn't go off between notes in analysis.

legato mode - legato mode on gives you the effect of slurring your notes. note: only certain synths support this mode.

loudness curve - this applies a loudness curve table to your notes

velocity curve - this applies a velocity curve table to your notes

RPN/NRPNs - see the **Syth Pitch Bend** chapter immediately following this chapter.

Clicking on the accompaniment button at the bottom will take you to the MIDI Out accompaniment page. Click the modulation button to go to the modulation window for this app.

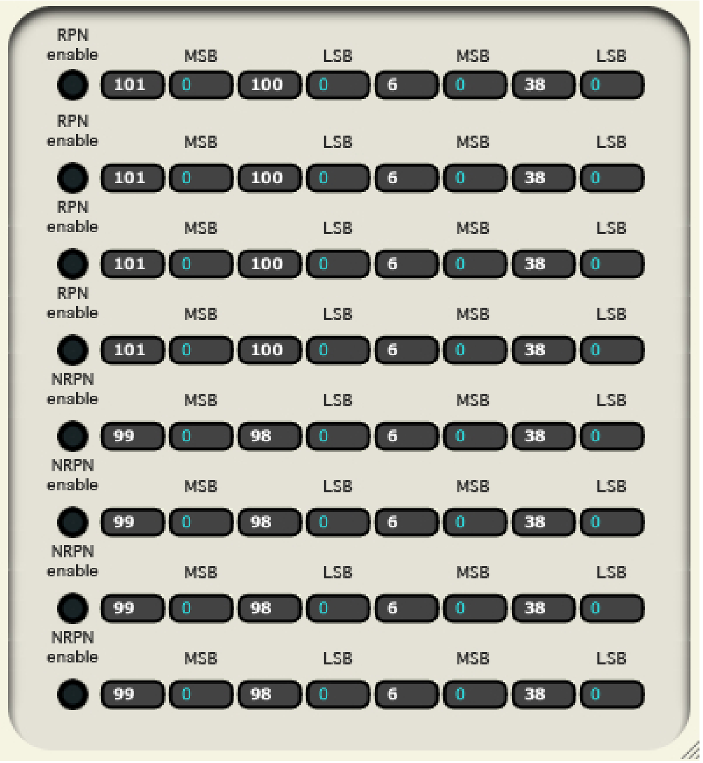
Synth Pitch Bend

If you click the "RPN/NRPN" button in MIDI Out, a new window will open containing several number boxes in a row that begins with either an "RPN enable" button or an "NRPN enable" button.

- RPN: Registered Parameter Numbers
- NRPN: Non Registered Parameter Numbers

RPNs and NRPNs are a series of 8 numbers that can communicate various messages to a MIDI synthesizer. Our purposes are mainly focused towards Pitch Bend Sensitivity messages. In order for the synthesizer to understand these messages, the 8 numbers must be in a specific format. The format includes 4 Control Numbers (un-editable), each followed by their Control Change Messages (editable):

The first number (un-editable) is 101 for RPNs or 99 for NRPNs. These are Control Numbers that indicate the MSB (Most Significant Byte) for an RPN/NRPN. Some synths do not take RPNs to change parameter values such as pitch bend sensitivity. For such synths you can use the bottom 4 lines which are for NRPNs.



		MSB		LSB		MSB		LSB
RPN enable ●	101	0	100	0	6	0	38	0
RPN enable ●	101	0	100	0	6	0	38	0
RPN enable ●	101	0	100	0	6	0	38	0
RPN enable ●	101	0	100	0	6	0	38	0
NRPN enable ●	99	0	98	0	6	0	38	0
NRPN enable ●	99	0	98	0	6	0	38	0
NRPN enable ●	99	0	98	0	6	0	38	0
NRPN enable ●	99	0	98	0	6	0	38	0

The second number (editable) is the Control Change Message for the MSB of an RPN/NRPN.

The third number (un-editable) is 100 (RPN) or 98 (NRPN). These are the Control Numbers that indicate the LSB (Least Significant Byte) for an RPN/NRPN.

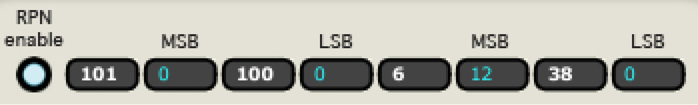
The fourth number (editable) is the LSB. For RPNs if you leave the MSB and LSB numbers at 0 then the remaining numbers will refer to the Pitch Bend Sensitivity of your Synth. If you are using the NRPN messages, the parameter numbers and values input as MSB & LSB should be located in the manual of the synth you are using. Note that these numbers are not universal and vary from synth to synth. To edit other types of RPN or NRPN messages consult the manual for the synth you are using.

The fifth number (un-editable) is 6 and indicates the Data Entry Value for the MSB of the RPN/NRPN.

The sixth number (editable) is the data entry value for the MSB. If you are sending a Pitch Bend Sensitivity message, this is where you can indicate the pitch bend range in semitones.

The seventh number (un-editable) is 38 and indicates the Data Entry Value for the LSB of the RPN/NRPN.

The eighth number (editable) is the data entry value for the LSB. For Pitch Bend Sensitivity, this is where you indicate the pitch bend range in cents.



In the example above I started by enabling the relevant type of message to send. I kept the first MSB and LSB messages at 0 to indicate that I want to alter the Pitch Bend Sensitivity. I wanted the pitch bend range to be an octave so changed the MSB value to 12. I left the LSB at 0 because I don't want to change the pitch bend range in cents.

For an additional resource in RPNs and NRPNs here is a really good website to check out:

http://www.midi.org/techspecs/midimessages.php

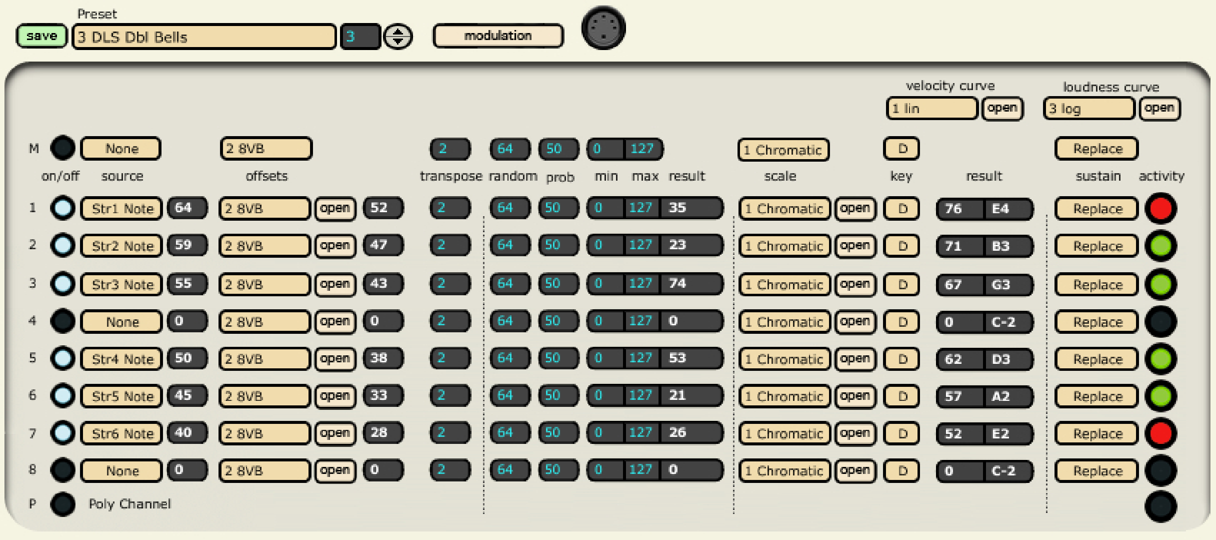
Modulation

There are four modlines in MIDI Out's modulation window. The first 2 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.

The MIDI Out Modulation window gives you access to the same modulation sources as the Preset Modulation window. However, the parameter destinations listed are relevant to the MIDI Out application. Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline. Also see the **String Select** section on page 22 for a more in depth explanation of the string select and copy functions.)

Here you can map the data coming in from Analysis to the settings in MIDI Out (including settings in the "synth pitch bend" window.)

MIDI Out Accompaniment



Preset
save | 3 DLS Dbl Bells | 3 | modulation

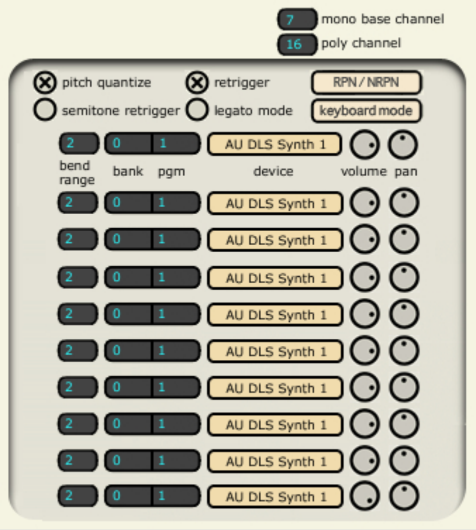
velocity curve: 1 lin (open)
loudness curve: 3 log (open)

	on/off	source		offsets			transpose	random	prob	min	max	result	scale		key	result		sustain	activity
M	●	None		2 8VB			2	64	50	0	127		1 Chromatic		D			Replace	
1	○	Str1 Note	64	2 8VB	open	52	2	64	50	0	127	35	1 Chromatic	open	D	76	E4	Replace	🔴
2	○	Str2 Note	59	2 8VB	open	47	2	64	50	0	127	23	1 Chromatic	open	D	71	B3	Replace	🟢
3	○	Str3 Note	55	2 8VB	open	43	2	64	50	0	127	74	1 Chromatic	open	D	67	G3	Replace	🟢
4	●	None	0	2 8VB	open	0	2	64	50	0	127	0	1 Chromatic	open	D	0	C-2	Replace	●
5	○	Str4 Note	50	2 8VB	open	38	2	64	50	0	127	53	1 Chromatic	open	D	62	D3	Replace	🟢
6	○	Str5 Note	45	2 8VB	open	33	2	64	50	0	127	21	1 Chromatic	open	D	57	A2	Replace	🟢
7	○	Str6 Note	40	2 8VB	open	28	2	64	50	0	127	26	1 Chromatic	open	D	52	E2	Replace	🔴
8	●	None	0	2 8VB	open	0	2	64	50	0	127	0	1 Chromatic	open	D	0	C-2	Replace	●
P	●	Poly Channel																	●

Here you can set an accompaniment to play along with you and go out via the MIDI Output. You can enable the poly channel at the bottom and it will add together all of your accompaniment lines and send them out one MIDI channel. If you are using the poly channel the rest of the lines should not be enabled. They will come out of the MIDI poly channel as long as the source is set to something other than "None".

(see **Synful Accompaniment** on page 39 for a more specific explanation of the individual parameters on each accompaniment line)

Use the box on the right side of the screen to send the MIDI notes to an output.



7 mono base channel
16 poly channel

☒ pitch quantize ☒ retrigger RPN/NRPN
○ semitone retrigger ○ legato mode keyboard mode

bend range	bank	pgm	device	volume	pan
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		
2	0	1	AU DLS Synth 1		

If you wish to send the straight MIDI Out notes with the MIDI Accompaniment notes be sure you set your base channel and/or poly channel properly. When outputting each string individually, set the base channel for MIDI Out to 1 and the base channel for MIDI Out Acc to 7 in order to avoid confusion between channels (because MIDI Out uses 1-6 and MIDI Out Acc will use 7-14). If using the poly line make sure MIDI Out Acc's poly channel is set to a different poly channel from MIDI Out.

Click the modulation button to go to the modulation window for this app.

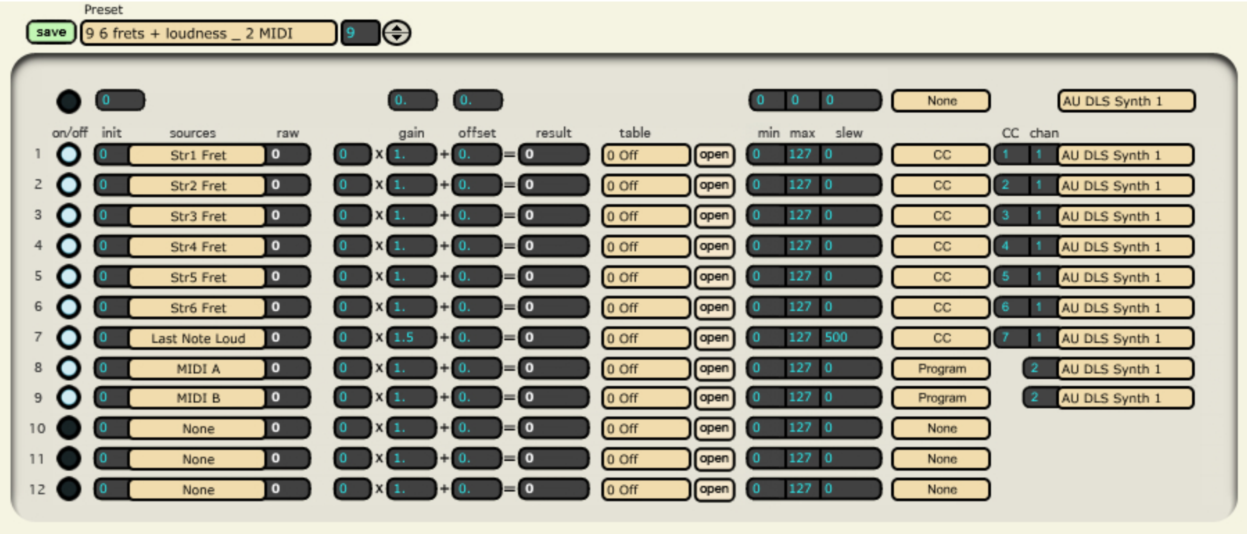
Modulation

There are six modlines in MIDI Out's accompaniment modulation window. The first 4 allow you to send your values through a table. The last 2 give you the option of using a toggle instead of a table.

The MIDI Out Accompaniment Modulation window gives you access to the sources available from Analysis in order to control parameters in the MIDI Out Accompaniment window. Modulation for Accompaniment includes 8 pages (instead of the usual 6) one for each accompaniment line. Click the destination button in the corner to go back to the window you are modulating. (See above in the **Preset Mod** section (page 14) for a more specific explanation of the modline. Also see the **String Select** section on page 22 for a more in depth explanation of the string select and copy functions.) Using the modulation and accompaniment you can achieve incredibly interesting and complex accompaniments to your playing.

Control Out

In MIDI Out there is a Control Out window that allows you to send AIM data out to other programs or MIDI devices. This window is similar to modulation windows. You can apply math to the data to change it's range and make it useful in the context you plan to use it in. You can also send data out via control changes or program changes.



9 6 frets + loudness _ 2 MIDI | 9

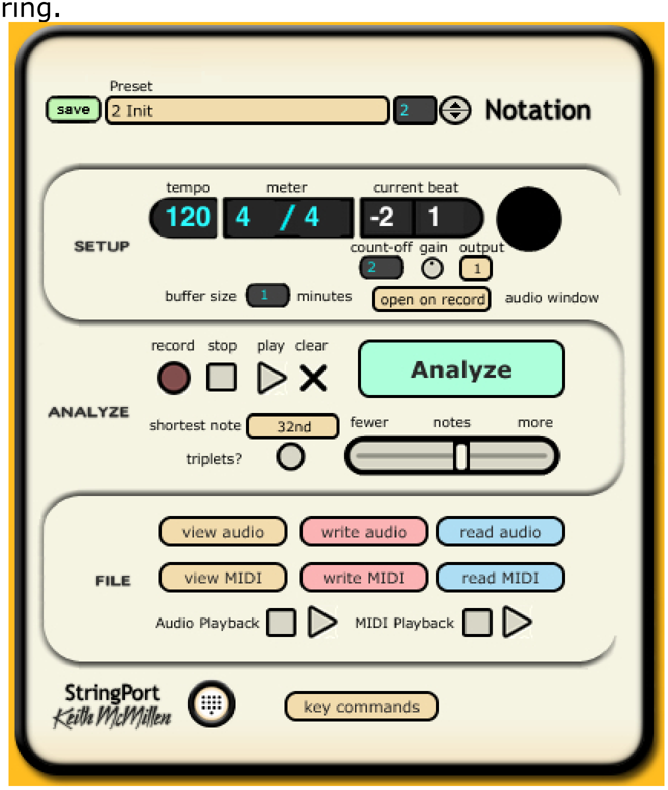
	on/off	init	sources	raw		gain	offset	result	table		min	max	slew		CC	chan	
	●	0				0.	0.				0	0	0	None			AU DLS Synth 1
1	○	0	Str1 Fret	0	0	1.	0.	0	0 Off	open	0	127	0	CC	1	1	AU DLS Synth 1
2	○	0	Str2 Fret	0	0	1.	0.	0	0 Off	open	0	127	0	CC	2	1	AU DLS Synth 1
3	○	0	Str3 Fret	0	0	1.	0.	0	0 Off	open	0	127	0	CC	3	1	AU DLS Synth 1
4	○	0	Str4 Fret	0	0	1.	0.	0	0 Off	open	0	127	0	CC	4	1	AU DLS Synth 1
5	○	0	Str5 Fret	0	0	1.	0.	0	0 Off	open	0	127	0	CC	5	1	AU DLS Synth 1
6	○	0	Str6 Fret	0	0	1.	0.	0	0 Off	open	0	127	0	CC	6	1	AU DLS Synth 1
7	○	0	Last Note Loud	0	0	1.5	0.	0	0 Off	open	0	127	500	CC	7	1	AU DLS Synth 1
8	○	0	MIDI A	0	0	1.	0.	0	0 Off	open	0	127	0	Program		2	AU DLS Synth 1
9	○	0	MIDI B	0	0	1.	0.	0	0 Off	open	0	127	0	Program		2	AU DLS Synth 1
10	●	0	None	0	0	1.	0.	0	0 Off	open	0	127	0	None			
11	●	0	None	0	0	1.	0.	0	0 Off	open	0	127	0	None			
12	●	0	None	0	0	1.	0.	0	0 Off	open	0	127	0	None			

In the example above the user is sending the fret numbers for strings 1-6 to the IAC Driver Bus on MIDI channel 1 using control changes 1-6. The 7th control change (volume) is receiving the last note played's loudness level. Note also that the loudness is being further transformed by being multiplied by 1.5. There is also a slew time of 500 ms being applied. You can also send the MIDI input through here as shown above on lines 8 and 9. MIDI A and B from the input window are going out through program changes on MIDI channel 2.

See the **Preset Mod** section (page 14) for a more specific explanation of the modline.

Notation

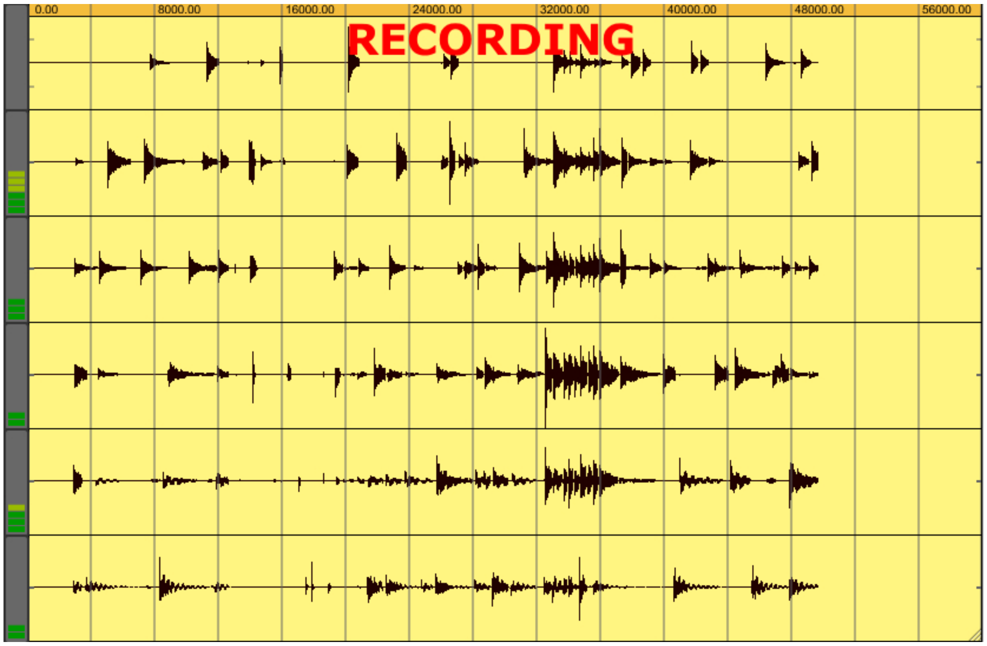
The Notation Application in StringPort records the Analysis data and then does a secondary analysis to determine note start and stops, dynamics and accurate pitch. Because this secondary analysis is done out of real time, Notation can get a contextual understanding of each note and make a very accurate file for use with MIDI sequencers and notation software (Cubase, Sibelius, Finale, etc...). It also allows you to save a recording of the 6 separate audio files for each string.



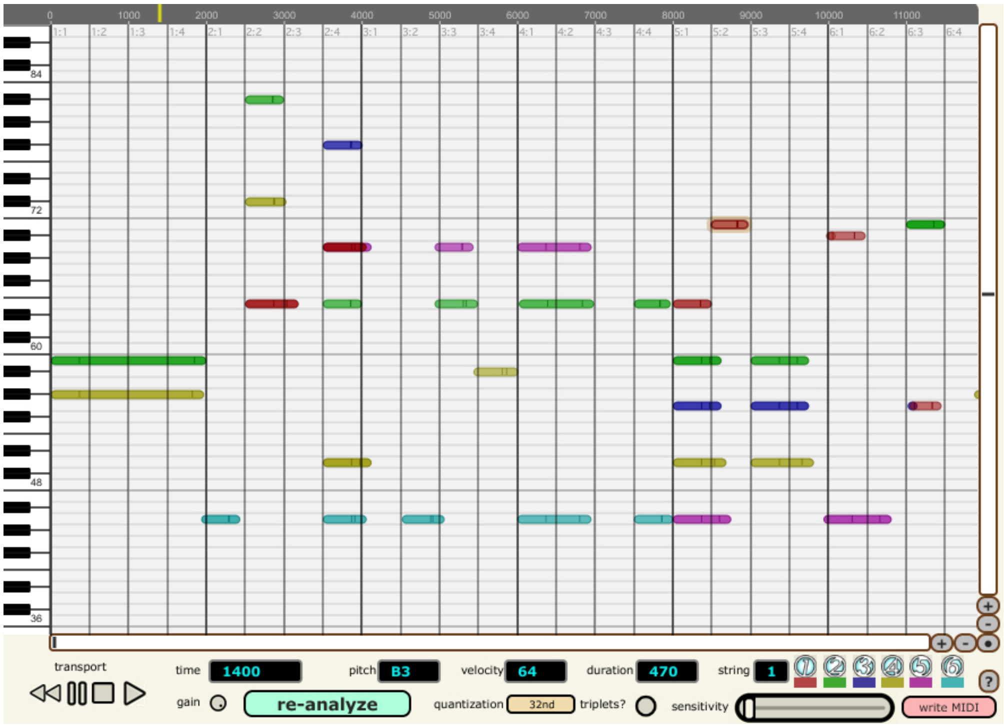
Notation has a metronome/click to play along with for more accurate rhythmic representation. Near the top of the Notation window is the setup box where you can set the tempo and meter of the metronome. Next to that field is where the current beat of the metronome is displayed. You will also need to set the buffer size for your recording in minutes. You can just estimate how long your recording will be (tip: round up because it's better to be safe than sorry). Next select how many measures you'd like the metronome to count off before it starts recording. Select the gain of the metronome and which channel the metronome will output through. Set which note gets the beat (quarter note, eighth note, half note, etc...) If you'd like you can also set the audio window to open automatically when you start or stop the recording.

In the middle box of the Notation window is the Analyze box. This is where you start and stop recording your instrument. For your convenience there is a modulation destination in the Preset Mod window which you can use to start and stop the recording in Notation. You can also preview it from here and start over by clicking the "clear" button if you need to. After you are satisfied with your recording click "Analyze" to convert the audio you just recorded into MIDI. You can also set how the notes quantize to the bars by selecting the shortest note you want it to express and whether or not you want it to look for triplets instead of evenly divided notes. The "sensitivity" slider sets how responsive the analyzer is to your playing. Set the sensitivity low for normal playing and higher for more delicate music with many quiet notes. The quantize controls should be set prior to clicking "Analyze" but if you are unsatisfied with the way they quantize the current audio buffer you can change the settings and then click "Analyze" again and Notation will re-analyze your recording.

At the bottom of the Notation window is where you can view and manage the files you create. Click "view audio" and another window will open up and show you the 6 tracks of your recording (one for each string). The waveforms will appear as you record into the buffers.



If you've analyzed your recording you can view the MIDI roll to preview and modify your Analyzed recording. You can perfect the MIDI notes using your mouse and key commands. Bar lines are indicated for your convenience. The commands are all listed on the right side of the Window.



time 1400

pitch B3

velocity 64

duration 470

string 1

quantization 32nd

Mouse Gestures

click in empty space : create a new event

click on the head of an event : select it for editing, and drag to move it in time or pitch.

click on the tail of an event : select it for editing, and drag to alter the event's duration.

click on the body of an event : select it for editing, and drag vertically to alter the event's velocity.

command-click and drag to move the pianoroll canvas (like a "hand-tool" in some applications).

scroll (using a mousewheel, or trackpad scroll gesture) to move the piano roll up, down, left, or right.

alt-scroll (or option-scroll) to zoom in or out vertically or horizontally.

holding the shift key while performing scroll-gestures puts the editing into high-resolution mode.

Key Presses

delete : deletes the selected event

up : moves the selected event up one pitch

down : moves the event down one pitch

left : moves the event onset earlier by 250 milliseconds

right : moves the event onset later by 250 milliseconds

- : shorten the event duration by 250 milliseconds

+ : lengthen the event duration by 250 milliseconds

Selection

holding the shift key while clicking on events in the pianoroll allows selection of multiple events to edit as a group.

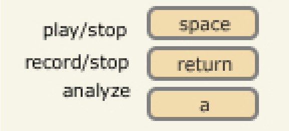
holding the shift key while clicking an empty spot on the canvas, and then dragging, will select all events in a region.

When you're all done and ready to export the file, click "write MIDI" and save your MIDI file. You can also save your 6 tracks of audio. You can open the MIDI files you create in any Notation software and make sheet music from your recording. You can also import other MIDI files to preview and perfect later.

With your MIDI file all saved and ready to go you can then import it into other notation software and make guitar tableture and/or sheetmusic. A good one to try out is TablEdit:

http://www.tabledit.com/

At the very bottom of the Notation window is where you can open a little pop up box for assigning your own key commands for play/stop, record/stop, and analyze.



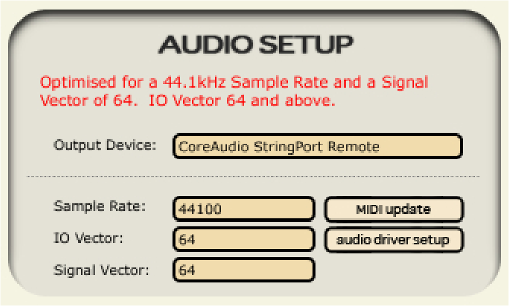
play/stop space
record/stop return
analyze a

Integration With Digital Audio Workstations

StringPort does have the ability to integrate with sequencing software. Without the StringPort software the hardware can be plugged in and used as an audio input device. You will get 6 channels of audio from the "Poly Inst D-13 IN" (one for each string), 2 more audio channels from the "Instr IN" and the "Aux IN", and MIDI Input from the "MIDI In".

By using the StringPort hardware and software together with a DAW you can also get audio in from the StringPort software and you can get MIDI from StringPort to drive Software Instruments.

To get audio into the DAW from the StringPort software you need to set up your sound in StringPort how you want it and then open the Audio Setup window from the Mainframe.



AUDIO SETUP

Optimised for a 44.1kHz Sample Rate and a Signal Vector of 64. IO Vector 64 and above.

Output Device: CoreAudio StringPort Remote

Sample Rate: 44100

IO Vector: 64

Signal Vector: 64

Select "CoreAudio StringPort Remote" as your output device. The StringPort Remote driver gets installed along with the hardware driver so make sure you have the current version of the StringPort driver installed on your computer.

In whatever DAW you are using you must set up "CoreAudio StringPort Remote" as your input device. The 16 channels represent the different applications within the StringPort software suite. If you select 1-2 as your input in the DAW you will get the output from the MainFrame's master fader. The rest are as follows:

3-4 - Processing: WaveGuide
5-6 - Processing: PolyFuzz
7-8 - Processing: PhaseVocoder
9-10 - Processing: SMACK
11-12 - VST Wall
13-14 - Synthesis: Classic
15-16 - Synthesis: Synful

When you are done setting all of this up you should be receiving audio into your DAW from the StringPort software. If you are having problems with latency try pushing the resync button in the Mainframe. If you are about to record, for best results push the resync button right before you start recording

Appendix

StringPort Sources

The following StringPort sources are available in every modulation line:

Str1 Note - the pitch of the note you are playing on this string
Str1 Trig Note - the pitch of the note at the moment it is triggered
Str1 Vel - the velocity of the note you are playing on this string
Str1 Vel Peak - this holds the highest velocity of the notes from this string
Str1 Loud - this shows the loudness of the notes coming from this string
Str1 Gliss - pitch bend amount scaled so that if you slide up an octave the result will slide up to 127
Str1 Vib - same as gliss only it's more sensitive so that if you go up a Major 2nd the result will slide up to 127
Str1 Fret - this shows which fret you are playing on the first string of a guitar

Str2 Note
Str2 Trig Note
Str2 Vel
Str2 Vel Peak
Str2 Loud
Str2 Gliss
Str2 Vib
Str2 Fret

Str3 Note
Str3 Trig Note
Str3 Vel
Str3 Vel Peak
Str3 Loud
Str3 Gliss
Str3 Vib
Str3 Fret

Str4 Note
Str4 Trig Note
Str4 Vel
Str4 Vel Peak
Str4 Loud
Str4 Gliss
Str4 Vib
Str4 Fret

Str5 Note
Str5 Trig Note
Str5 Vel
Str5 Vel Peak
Str5 Loud
Str5 Gliss

Str5 Vib
Str5 Fret

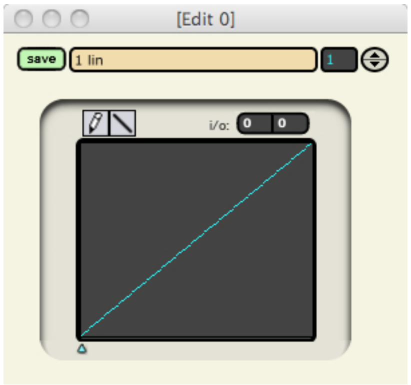
Str6 Note
Str6 Trig Note
Str6 Vel
Str6 Vel Peak
Str6 Loud
Str6 Gliss
Str6 Vib
Str6 Fret

Last Note
Last Note Trig
Last Note Vel
Last Note Vel Peak
Last Note Loud
Last Note Bend
Last Note Fret

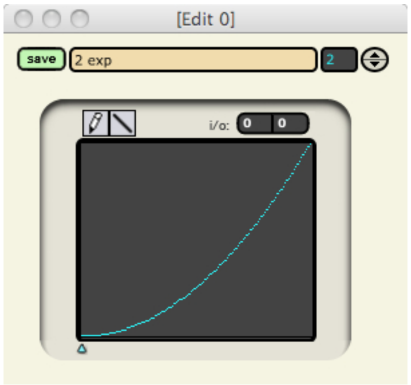
MIDI A through MIDI J

Loudness Curves

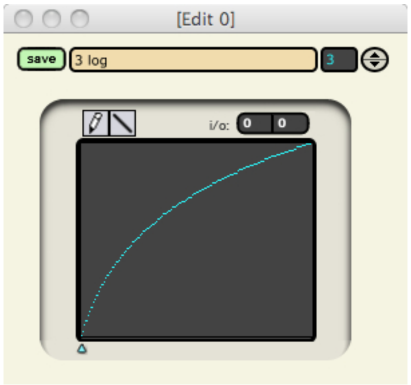
The following are diagrams and descriptions of the StringPort loudness curves. The x-axis represents the played loudness and the y-axis represents the result loudness.



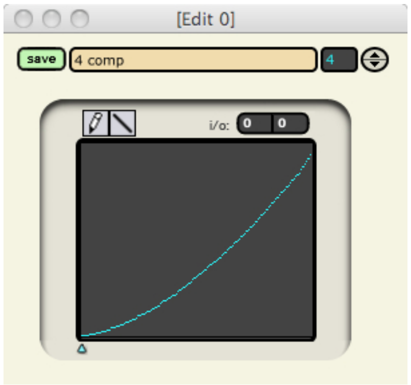
Linear, no change to loudness.



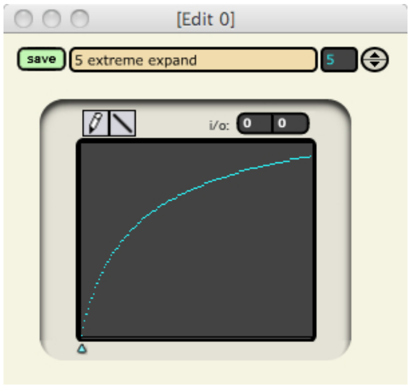
Compresses loudness range using an exponential curve.



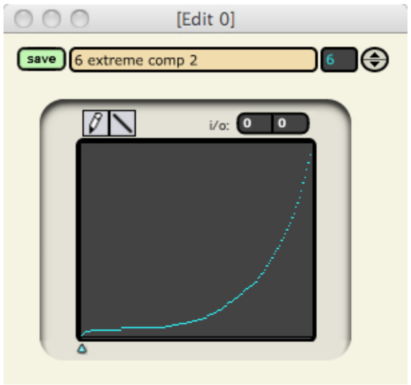
Expands the loudness range.



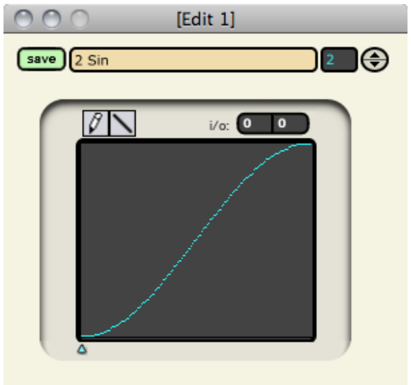
Compresses loudness range.



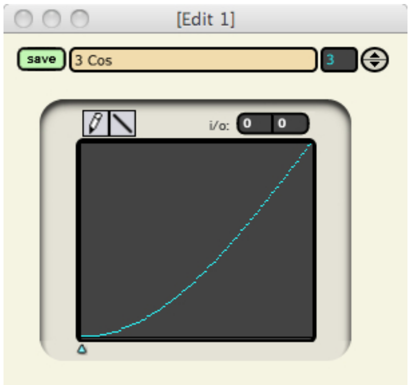
Extreme expansion of loudness range.



Extreme dynamic range compression. Outputs low values.



Sinusoidal loudness range.



Compresses loudness range using a cosine curve.

Troubleshooting

If the audio setup window causes the program to crash, delete the "StringPort Preferences" folder in /Users/__User__/Library/Preferences

Below are a list of common solutions to try that may solve your problem:

- Check online to make sure you have the latest version of StringPort software
- If you are getting the warning message when you start up the mainframe even though your StringPort is connected and on: "StringPort not connected; Audio is disabled..." Make sure you've installed the driver properly. (see **StringPort Audio/MIDI Driver** topic above for installation instructions.)
- If you are hearing a lot of noise or the sound quality sounds "clicky" try going to the Audio Setup and increasing the I/O vector size. Increasing this will add a tiny bit of latency but for this slight sacrifice in speed you will get higher quality sound.
- If you are having problems with the audio sounding glitchy and you've already tried increasing the I/O vector size you might try changing the sample rate up to 48000 and then back down to 44100. Or if the sample rate is already at 480000 you should try turning it down to 44100 because the StringPort software is optimized for use at 44100.
- If you are having trouble with CPU you can try closing some windows that you aren't using to free up CPU cycles caused by graphics.
- hitting the resync button in MainFrame can fix problems in latency and problems with audio clicks should they arise.

If you are having trouble getting the StringPort hardware to show up in the Audio/MIDI Setup:

- turn the StringPort off, re-install the driver then reboot the computer and turn the StringPort back on
- or reboot the computer with the StringPort connected and on
- delete the "StringPort Preferences" folder in /Users/__User__/Library/Preferences
- create a separate user on your computer and install the driver as that user
- try using a different USB 2.0 cable
- one thing we have noticed is that if you have ProTools drivers on your computer they often prevent the StringPort driver from working properly. The fix for that is to uninstall the ProTools drivers and then install the StringPort driver and get it working, then you can re-install the ProTools drivers.

If you continue to have problems you can contact us at **support@keithmcmillen.com**