

# BLUE



## User Guide

Powered by RPCX

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Concept by	Rob Papen and Jon Ayres
Instrument by	Jon Ayres
Apple programming by	Jacek Kusmierczyk, Adrian Pflugshaupt
Graphics by	Shaun Ellwood
Sounds by	Rob Papen
Manual by	Jon Ayres, Rob Papen and Patrick Anglard

Thanks to (in alphabetical order) TONAL Axis, Joel Heatly, Sinus, Zia McKie, Mandy Rayment, KvR Forum, and all beta testers!

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## Registering and 2<sup>nd</sup> activation request:

For the second activation code, say for use on a second computer, please create an account on the **www.robpapen.com** website, there you can obtain a 2nd activation code.

To request the second activation you will need to add your BLUE product in the section "Software registration".

Use the BLUE 'activation code' which you can find on the cardboard sleeve in your packaging (box version) or inside the ShareIt registration e-mail to add BLUE inside your product list.

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## Welcome

Thank you for purchasing the Rob Papen **BLUE**.



BLUE is a professional, easy-to-use, cross-fusion virtual synthesizer by sound designer Rob Papen and music software developer Jon Ayres.

This new cross-fusion synthesis delivers FM Synthesis, Phase Distortion Synthesis, Wave Shaping Synthesis and Subtractive Synthesis in one creative combination!

BLUE has six oscillators which can be connected in various ways, two analogue style modelled stereo filters, an enormous range of processing and modulation options and an incredibly powerful sequencer and arpeggiator, all brought together with the inspirational Rob Papen presets for a wide range of musical styles.

Despite these extensive features, BLUE is easy-to-use thanks to its user interface and the innovative 'easy edit' page for quick sound changes!

BLUE promises to exceed your expectations!

Rob Papen and the RPCX team, August 2006

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## Installation on PC (VST)

### **Software box version:**

BLUE comes with an installer "**BLUE\_1\_8\_Installer.exe**", which can be found on the installation CD-ROM. Double-click on this program starts the installation process. The Installer will guide you through the installation process.

**Please note: In order to authorize BLUE you will need to be connected to the internet.**

The installer will then request you to enter your personal 'activation code' which can be found on the cardboard sleeve which contains the CD-ROM. Read now 'Next steps' below.

### **Software online version:**

If you have purchased the online version of BLUE, the installer program can be found on the **www.robpapen.com** download page.

To get access to the download page, first create an account at the **www.robpapen.com**

To create an account look for the login box which can be found at the left side of the homepage.

Next step is adding your BLUE product inside the section 'Software registration'.

Use the BLUE 'activation code' which you can find in the ShareIt registration e-mail to add BLUE into your product list. Once added, the product will show up in your product list and also the link to the download page will show up. Click at the download page link and it will open. The installer "**BLUE\_1\_8\_Installer.exe**", can be found inside and please download it.

### **Next steps:**

When the installer runs, first select the language for the 'Quick manual'.

Next choose the directory to install. Make sure you choose the right directory, so your host software is able to find the BLUE VSTi. Refer to your host software's manual if you are unsure about where the host software plug-in directory is located.

The instrument file 'BLUE.DLL' together with the preset banks can be found in the 'Rob Papen' directory. The next time you start your host software BLUE will be listed in the VST Instrument list.

During installing the software, Syncrosoft License Control Center will be installed and then run.

When the Syncrosoft License Control Center runs, it will open the License Download Wizard page.

In the 'Enter Activation Code' please enter your BLUE's 'activation code' printed on the cardboard sleeve containing the CD-ROM or the 'activation code' inside your ShareIt registration e-mail.

After activation it should show 'Rob Papen BLUE' in the License download screen.

Whilst on the 'License Download' Page, click on Start and the license for BLUE will be downloaded. You will need to be connected to the internet to download a license.

After this BLUE should be licensed and usable in your host.

### **Options:**

#### **1. Syncrosoft dongle**

If you own a Syncrosoft dongle you can transfer the BLUE license onto it by using the 'License Transfer' wizard in Syncrosoft License Control Center software.

Syncrosoft dongles can be also purchased at [www.timespace.com](http://www.timespace.com)

#### **2. Registration, updates and additional installation on a second computer**

For registration, updates or a second activation code to install for example on a second computer, please create an account on the **www.robpapen.com** website and there you can obtain a 2nd activation code.

To request the second activation you will need to add your BLUE product inside the section 'Software registration'. Use the BLUE 'activation code' which you can find on the cardboard sleeve containing the CD-ROM or the 'activation code' inside your ShareIt registration e-mail.

If you have any questions regarding the installation of BLUE please look at FAQ or contact our support team at **www.robpapen.com**

## Installation on PC (RTAS)

### **Software box version:**

BLUE comes with an installer "**BLUE\_RTAS\_1\_8\_Installer.exe**", which can be found on the installation CD-ROM. Double-clicking on this program starts the installation process and the Installer will guide you through the installation process.

**Please note: In order to authorize BLUE you will need to be connected to the internet.**

The installer will then request you to enter your personal 'activation code' which can be found on the cardboard sleeve which contains the CD-ROM. Read now 'Next steps' below.

### **Software online version:**

If you have purchased the online version of BLUE, the installer program can be found on the **www.robpapen.com** download page.

To get access to the download page, first create an account at the **www.robpapen.com**

To create an account look for the login box which can be found at the left side of the homepage.

Next step is adding BLUE inside the section 'Software registration'.

Use the BLUE 'activation code' which you can find in the ShareIt registration e-mail to add BLUE into your product list. Once added, the product will show up in your product list and also the link to the download page will show up. Click at the download page link and it will open. The installer "**BLUE\_RTAS\_1\_8\_Setup.exe**", can be found inside and please download it.

### **Next steps :**

When the installer runs, first select the language for the 'Quick manual'.

Next choose the directory C:\Program Files\Common Files\Digidesign\DAE\Plug-Ins, so your host software is able to find the BLUE instrument.

The instrument file 'BLUE.dpm' together with the preset banks can be found in the 'Rob Papen' directory.

The next time you start your host software BLUE will be listed in the RTAS Instrument.

During the installation process, Syncrosoft License Control Center will be installed and then run. When the Syncrosoft License Control Center runs, it will open the License Download Wizard page.

In the 'Enter Activation Code' box please enter your BLUE 'activation code' into the 'Enter Activation Code' printed on the cardboard sleeve containing the CD-ROM or the 'activation code' inside your ShareIt registration e-mail. After activation it should show 'Rob Papen BLUE in the License download screen.

Whilst on the 'License Download' Page, click on Start and the license for BLUE will be downloaded. You will need to be connected to the internet to download a license. After this BLUE should be licensed and usable in your host.

### **Options:**

#### **1. Syncrosoft dongle**

If you own a Syncrosoft dongle you can transfer the BLUE license onto it by using the 'License Transfer' wizard in Syncrosoft License Control Center software.

Syncrosoft dongles can be also purchased at [www.timespace.com](http://www.timespace.com)

#### **2. Registration, updates and additional installation on a second computer**

For registration, updates or a second activation code to install for example on a second computer, please create an account on the **www.robpapen.com** website and there you can obtain a 2nd activation code.

To request the second activation you will need to add your BLUE product inside the section 'Software registration'. Use the BLUE 'activation code' which you can find on the cardboard sleeve containing the CD-ROM or the 'activation code' inside your ShareIt registration e-mail.

If you have any questions regarding the installation of BLUE please look at FAQ or contact our support team at **www.robpapen.com**

## Installation on Mac

### **Software box version:**

BLUE comes as a disc image "**BLUE\_1\_8\_Installer.dmg**", which can be found on the installation CD-ROM. Double-click this file to decompress and mount this image. Double click the installer program to begin the installation process. You will then be guided through the installation process.

**Please note: In order to authorize BLUE you will need to be connected to the internet.**

The installer will ask you for you to enter your personal 'activation code' which can be found on the cardboard sleeve containing the CD-ROM. Read now 'Next steps' below.

### **Software online version:**

If you have purchased the online version of BLUE, the installer program can be found on the **www.robpapen.com** download page.

To get access to the download page, first create an account at the **www.robpapen.com**

To create an account look for the login box which can be found at the left side of the homepage.

Next step is adding your BLUE product inside the section 'Software registration'.

Use the BLUE 'activation code' which you can find in the ShareIt registration e-mail to add BLUE into your product list.

Once added, the product will show up in your product list, and also the link to the download page will show up. Click at the download page link and it will open. The installer '**BLUE\_1\_8\_Installer.dmg**', can be found and please download it.

### **Next steps:**

During installing the software, Syncrosoft License Control Center will be installed and will appear on your screen or it will be shown in the dock.

When the Syncrosoft License Control Center runs, click on the Wizards menu and select the 'Wizards License Download' menu item.

In the 'Enter Activation Code' please enter BLUE's 'activation code' printed on the cardboard sleeve containing the CD-ROM or the 'activation code' inside your ShareIt registration e-mail.

After activation it should show 'Rob Papen BLUE' in the download License screen.

Whilst in the 'License Download' page, click on Start and the license for BLUE will be downloaded. You will need to be connected to the internet to download a license.

Then 'Quit' the 'Syncrosoft License Control Center' after you have finished downloading the license and the installer will then finish the installation process. After this BLUE should be licensed and usable in your host, so next time you start your host software, BLUE will be listed in the VST / AU / RTAS instrument list.

### **Notes:**

#### **1. If you run the installer and do have the 'Rob Papen BLUE' already on a 'Syncrosoft dongle'.**

Run the installer and the Syncrosoft License Control Center and select the Syncrosoft License Control Center from the dock if it does not appear on the screen. Then click on 'refresh' and the license will appear. Then please 'quit' the Syncrosoft License Control Center. The installer will then finish the installation process. After this BLUE should be licensed and usable in your host as long as the 'Syncrosoft dongle' is connected. So next time you start your host software, BLUE will be listed in the VST / AU / RTAS instrument list.

#### **2. Running an installer to update BLUE.**

If you have BLUE installed, follow through the installation process and the Syncrosoft License Control Center will be installed. Select the Syncrosoft License Control Center from the dock if it does not appear on the screen and select 'Quit' from the menu. The installer will then finish the installation process. The next time you start your host software, the updated BLUE will be listed in the VST / AU / RTAS instrument list.

## **Options:**

### **1. Syncrosoft dongle**

If you own a Syncrosoft dongle you can transfer the BLUE license onto it by using the "License Transfer" wizard in Syncrosoft's License Control Center software.

Syncrosoft dongles can be also purchased at [www.timespace.com](http://www.timespace.com)

### **2. Registration, updates and additional installation on a second computer**

For registration, updates or a second activation code to install for example on a second computer, please create an account on the **[www.robpapen.com](http://www.robpapen.com)** website where you can obtain a 2nd activation code.

To request the second activation you will need to add your BLUE product inside the section 'Software registration'. Use the BLUE 'activation code' which you can find on the cardboard sleeve containing the CD-ROM or the 'activation code' inside your ShareIt registration e-mail.

If you have any questions regarding the installation of BLUE please look at FAQ or contact our support team at **[www.robpapen.com](http://www.robpapen.com)**

## Features

- VST2.4, AU and RTAS plug-in synthesizer for PC and Mac (IntelMac).
- Six oscillators modules which include Analogue, Additive and Spectral type waveforms.  
Osc A and B offer PWM modulation and symmetry control. Oscillators can be combined in several ways using 32 different modulation routings in the Algorithm screen.  
Oscillators can be FM or Ring modulated and can be oscillator hard synced.  
Each oscillator can be output to the filters, the effects or output as dry.  
Dedicated screens available in the LCD screen section for Algorithm selection, Phase distortion / Wave shaping settings and Oscillator Envelopes.
- Two analogue modelled stereo Multimode filters, offering 6dB LowPass/HighPass, 12dB / 24dB LowPass/HighPass/BandPass/Notch, Ring, Comb and Vox (formant).  
Filters with panning modulation options and pre-filtering distortion. Easy filter control by pre-defined modulation controllers like Envelope, Velocity, Keytrack and Modulation Wheel.
- Nine Envelopes, AHDSFR type. Direct connection to the Oscillators volume, Filters frequency and main Volume amp to make sound editing fast and easy. Graphic and fader-control of Envelopes in one go.  
Dynamic curves and midi tempo based features like delay and envelope retrigger.
- Four Multi-Envelopes, These free highly sophisticated envelopes can be built up using up to 16 sections.  
Full graphic control and additional menus with presets, load and save functions. Dynamic curves and midi tempo based functions.
- Ten LFOs with various waveforms and are midi-syncable. Directly connected to main targets to make sound editing easy and fast. Directly connected LFO's for PWM A/B, Filter Frequency A/B, Tremolo (amp), Vibrato (main pitch) and Three Free LFOs. LFO have adjustable, free/poly/mono modes, keytracking, symmetry, smoothing, attack, decay and humanize functions.
- Three modulation Step-sequencers with sequence loop start/end, poly/mono/free play modes, speed controls and step smooth function. Copy/paste/clear functions.
- Modulation Matrix with 2 pages of 10 slots. 13 synth sources & 23 midi sources and 91 synth destinations.
- 32 step mono sequencer, with sequencer length, speed adjust, slide amount, swing amount, volume smoothing. Each step has On/off, Reset, -32/+32 Semitone, Volume, Slide on/off, Filter A, Filter B and Free modulation settings. Clear, load and save functions to exchange sequences in between presets.
- 32 step arpeggiator, with sequencer, seq length, speed adjust, slide amount, swing amount and step length control. Each step has On/off, Slide on/off, Reset, -32/+32 Semitone, Step length, Velocity, and Free modulation. Clear, load and save functions to exchange arpeggiators in between presets.
- Poly/Mono/Legato/Seq synthesizer play modes. Portmento featuring legato, switch-able constant time/constant rate. Mono unison mode.
- Adjustable Precision setting per oscillator to simulate the instability of vintage analogue synthesizers.
- 16-voice polyphony. Voice amount control.
- Global settings save with each individual preset like: keyboard velocity response curve, over-sampling settings and filter control smoothing, unison and chord memory with strum effect.
- Easy Edit page for fast new sound results or for easy access tempo changes.
- External controller hardware (fader-box or synth) settings can be saved and restored.
- Two effects-blocks with serial and parallel mode. Nine stereo effects available including Mono Delay, Stereo Delay, Chorus, Flanger, Phaser, Distortion, Low Fi, Stereo Widener and Reverb. Midi tempo based settings in Delays, Phaser, Flanger, Comb Filter, Gator, Speaker Simulator, Wah/Delay, Chorus/Delay, Waveshaper, Ensemble and Compressor
- Equalizer for total overall sound.
- Sound banks of 32 presets inside build in browser. Preset handling with copy, paste, clear and compare function. Preset banks are sorted into style-maps for easy search.
- 'Fast preset browser' launched by right clicking on the 'Preset' button
- All settings including the global settings are stored inside each individual preset.
- Presets in clear categories by Rob Papen. Included are also DnB session presets

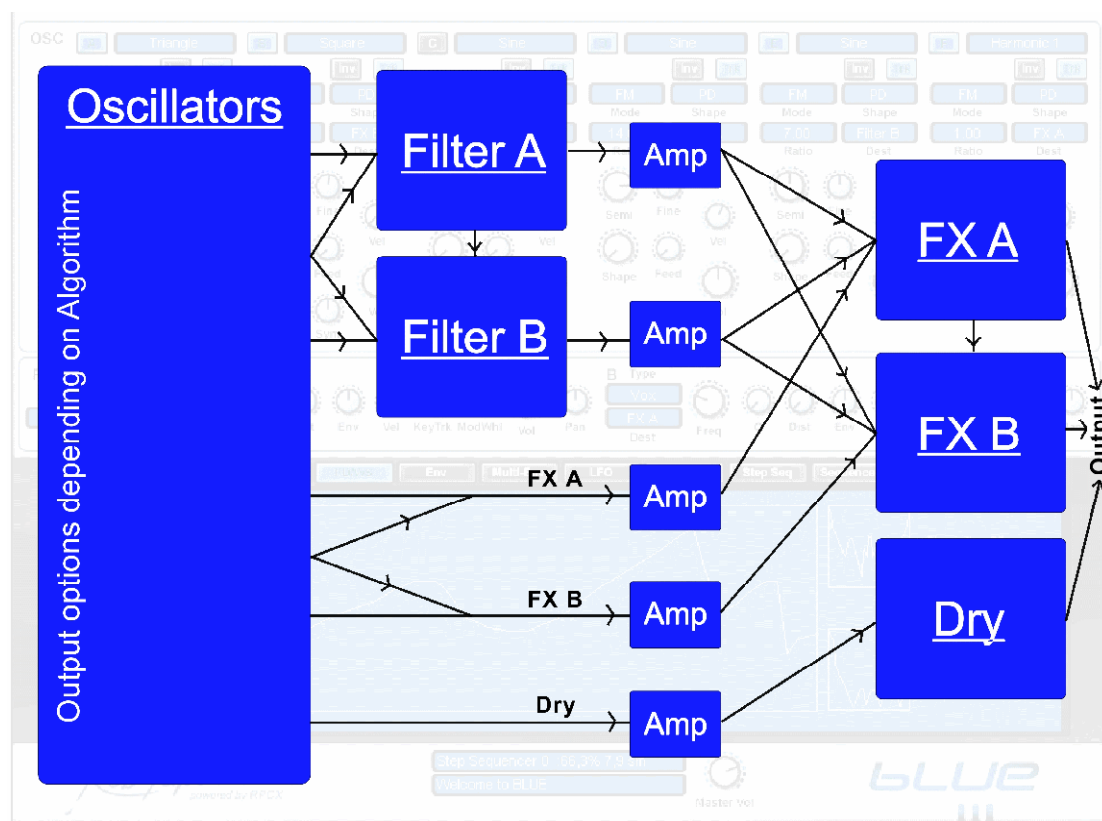
## Introduction into BLUE

BLUE is a cross-fusion virtual synthesis synthesizer with 16 note polyphony, including some extraordinary new ideas and features. The synthesizer is designed so that it makes use of subtractive, FM, PD and WS synthesis methods. To make it easy to use and understand it follows the classic subtractive synthesis audio route and control.

### Audio signal flow

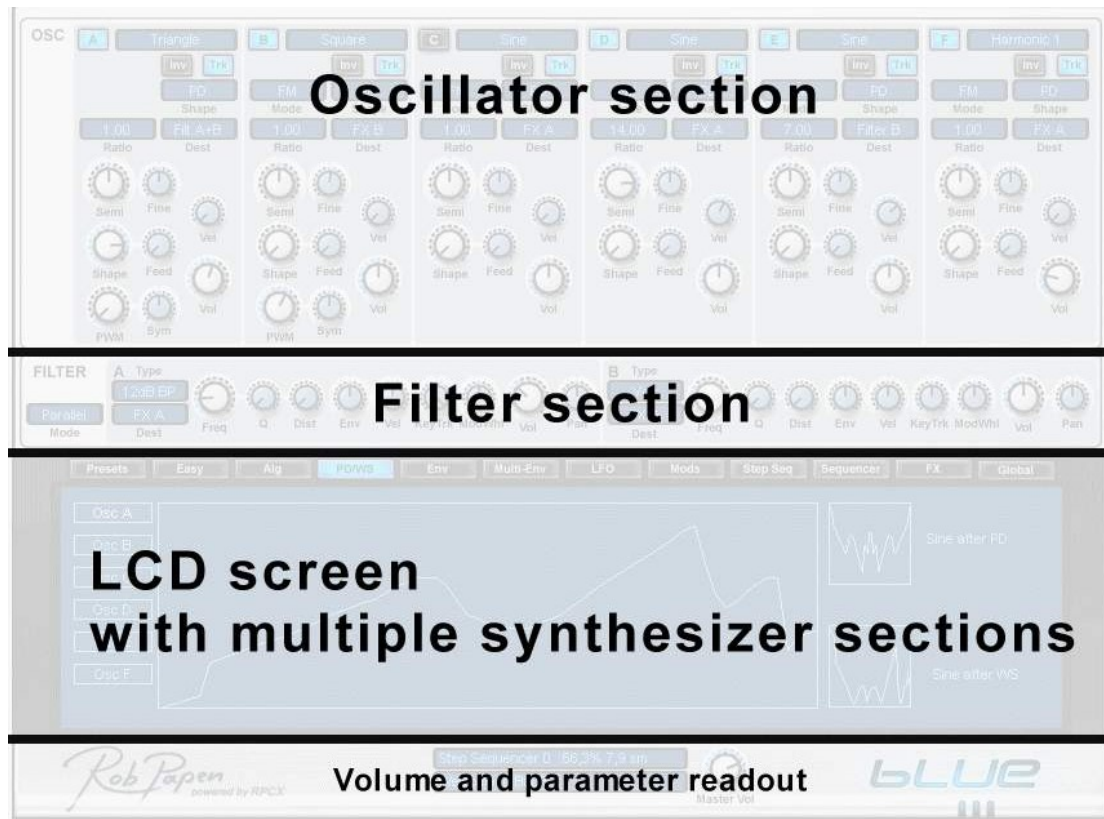
The block diagram below shows the audio signal flow within BLUE.

The five Amp-modules, shown below, are not visible in the user screen of BLUE, but are centrally controlled by the Volume Envelope, which you can find in the LCD screen section. The six oscillators inside BLUE have several audio routes; these routes depend on the chosen algorithm.



## GUI design / user interface

The GUI design of BLUE can be divided into three main sections: Oscillator, Filter and LCD screen. Below these section is the central volume control and the parameter readout field.



At the oscillator section many parameters can be found for fast access. Also the filter section has a comfortable layout with knobs for main functions.

The LCD screen offers multiple synthesizer sections. From the Preset page, Easy edit page to the Algorithm selection, the main envelopes, modulation tools, Sequencer, the FX section and the Global page.

Below the LCD screen, you will find the parameters readout; this shows the value of current control, which is very handy and precise. Also the selected preset is displayed in the preset display.

## Cross-fusion synthesis

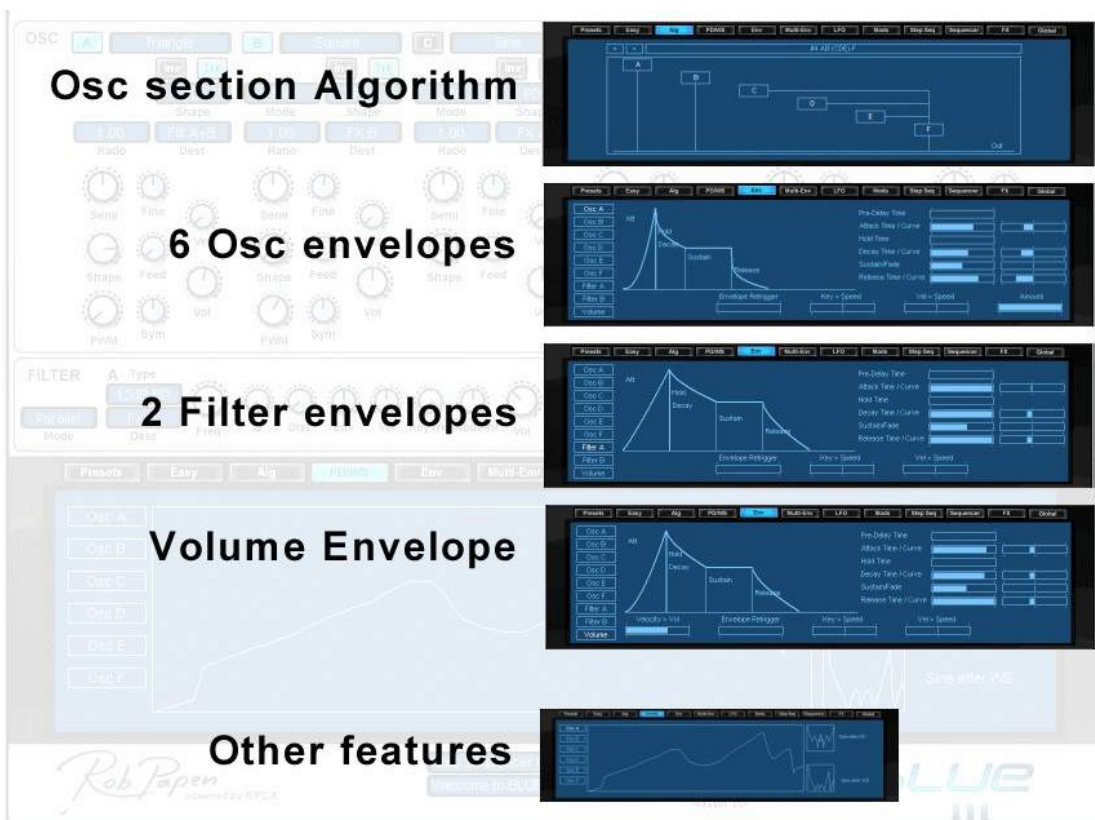
To understand cross-fusion synthesis look at this picture below. You can see that at the right-hand side are shown the most important sections of the LCD screen.

The first one is the "Algo" section this you determines which algorithm the oscillators uses. The oscillators can be modulate by another oscillator, either using FM or Ring Modulation, by having an input from another oscillator.

For FM synthesis or Ring modulation sounds an Envelope is needed to control the volume of each oscillator however, if you keep the volume at full the oscillator behaves as subtractive synthesis oscillator, it's up to you to decide if you want an oscillator with envelope volume control or without.

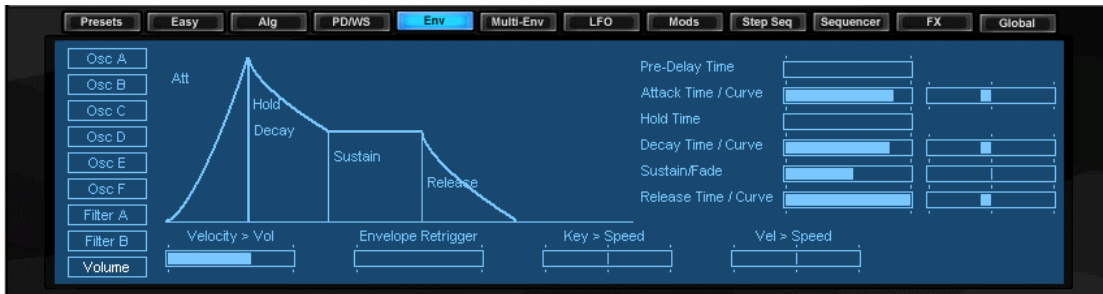
Next you can send the oscillators that are output (depending on the algorithm) into either Filter A, Filter B or both. Both have their own envelopes.

The last stage before going into the FX section or Dry output is the Volume Envelope, this alters the volume of the whole of the sound.



Of course there are many other features that are inside the LCD screen, like LFOs, step sequencers... and so on.

As was said before, BLUE follows the basic subtractive signal route. Therefore all major Envelopes are set together, this is shown in the displayed below.



The Volume envelope always has global control of the volume. Above it you can see the Filter envelopes (if you use the filters) and above them Oscillator envelopes.

One example of how flexible BLUE is, is preset "Conviction".

You can find this preset in bank "01\_Diverse 02".

- Osc A goes into Filter A and is not controlled by a volume envelope (Osc A Envelope amount is zero)
- Osc C and D FM modulate Osc F and each uses its own oscillator volume envelope.
- Osc F which is modulated by Osc C & D, has no volume envelope, so the global volume is set by the main volume envelope

BLUE offers you a lot of interesting combinations. You can combine FM type sounds with classic subtractive synthesis and on top of that also phase distortion and wave shaping...

Hopefully, this chapter has given you a brief overview of how BLUE works. More detailed information can be found in the following chapters.

## Controls

### Dials

Moving the mouse up increases the position of the dial and moving the mouse down decreases the position of the dial. Pressing shift and moving the mouse up or down changes the value by a small amount. Pressing ctrl + left mouse returns the dial to its default value. Mac uses "command-click" to return the dial to its default value.

### Sliders

Moving the mouse right increases the value of the slider and moving the mouse left decreases the value of the slider. Pressing shift and moving the mouse left/right changes the value by a small amount. Pressing ctrl + left mouse returns the slider to its default value. Mac uses "command-click" to return the dial to its default value.

### Right Controls (or control-click on Mac)

Pressing the right mouse button on sliders and dials allows you to reset the controller / parameter to its default setting or to midi-latch / midi-unlatch a controller.

When you press "latch to midi", BLUE waits for a midi event and latches the last controller to that midi control, so for instance if you right click on "Volume", select "Latch to midi", and then move the modulation wheel, this latches the volume controller to the modulation wheel. So moving the modulation wheel alters the volume. Select "Unlatch all midi" to clear all midi controller settings for the preset.

In the GLOBAL section of the BLUE LCD screen part you can save your midi control setup as a file.

### Menu's LCD display

Clicking the right mouse button (or control-click on Mac) in the Alg, PD/WS, Env, Multi-Env, Step-Sequencer or Sequencer pages brings up a menu with additional functions appropriate to that section

### On/ Off Buttons

Clicking on these turns the control on or off

### Selection Buttons

Clicking on these allows you to select between different selections, an example is the envelope selector or the main LCD selector

### Menu Buttons

Clicking on the main part of the button brings up a menu, from which you can select an option.

## [ Display of parameter values ]



At the bottom is shown the display output, this shows the currently altered control and its value.

Below this is the preset, this shows the current preset and clicking here allows you to select a different preset.

The master volume sets the global volume for BLUE and is stored in each preset.

Click on the BLUE logo to display the rear panel of BLUE with additional info and credits.

## [ Presets ]



The first LCD sub-screen is the Preset Screen, this allows you to select presets and banks.

The left-hand section of the preset screen is where you can select presets from the currently loaded bank. Clicking on a preset loads that preset in. If you edit a preset, the <<< symbols are added to the preset name to show that it has been altered.

You can use the up/down arrow keys on your computer keyboard to scroll through the presets.

Below the preset screen, is the Info Label. Clicking here allows you to set a description for the current preset.

Below this is the preset control buttons

**Rename** Renames the current preset.

**Copy** Copies the current preset.

**Paste** Pastes the last copied preset over the current preset.

**Clear** Resets the current preset to the default settings.

**Load** Loads in a saved preset. (.fxp file)

**Save** Saves the current preset to disk. (.fxp file)

**Compare** Returns the preset into the state before editing.

**Info/label** Below the preset selector is the info/label field in which you can add additional info about the preset. Click on this field to enter a description for the preset

### Fast Preset Browser

If you right click on the Preset button it will bring up a menu which allows you to quickly select any preset in any of the banks.

Note: the current bank holds all of your edited presets. In order to keep the original presets, as soon as you change a preset (and it is one you want to keep), either save it as a different preset or as a different bank.

To the right hand side is the bank screen part.  
Here you can load in banks of presets, just by clicking on them.

### Bank Controls



Scrolls up and down in the bank windows.



This returns you to the top entry in the bank window.



Clicking here allows you to move one folder upwards or returns you to the original folder from a subfolder.

The topmost level is drive selection.

By default the directory is set to the "Blue\_Banks" folder. If you want to go back to this directory, simply press Go Def.

**Go Def** Goes to the default bank directory.

**Set Def** Sets the current directory to be the default directory.  
Be careful in using this button.

**Load** Loads in a bank of presets.

**Save** Saves the current presets as a bank.

## [ Oscillators ]



BLUE can use up to 6 oscillators to create sounds. The oscillators can be arranged in many different ways to create or combine different styles of synthesis, you can select this arrangement in the [Algorithm](#), section of the LCD screen.

Also you can select how oscillators combine together using the FM / Ring and Sync functions of oscillators A to F. Look for the Algorithm explanation at chapter "algorithm".

A good example of the combination of several different type of synthesis is the preset "Fritz Groove". It can be found in bank "01\_Diverse 02". In this preset Osc A and B, in combination with Filter A, are used in a subtractive synthesis set-up. Osc D modulates Osc F using FM modulation and is fed directly into FX A (bypassing the filter).

Below are defined the controls for oscillator A, these are the same for the other oscillators; any differences will be pointed out.

### On / Off

Pressing the buttons A to F turns on / off that oscillator.

To cut down on CPU usage, if you are not using an oscillator, it's best to turn it off.

### Type

Pressing the button next to the on / off, brings up a menu which allows you to set the wave-type used by the oscillator. There are many different types, subdivided into [Analogue](#), [Additive](#) and [Spectral](#).

You can scroll thru the waves by either clicking on the left or right hand of the wave selector button. The - and + symbol will pop up at each side if you move the mouse in this section of the button.

### Inv

This button inverts the phase of the oscillator output.

### Free

When Free is turned off, the oscillator is reset to zero phase position each time you play a note. When Free is turned on, the oscillator is free-running, i.e. it is not reset when you play a note

### Tracking

This controls whether the pitch of the oscillator is altered by the note played.

## Modulation Mode

For oscillators B to F, you can set how the oscillator is modulated by an input oscillator(s), the various modes are

<b>FM</b>	Input oscillators frequency modulates the oscillator. Which one depends on the chosen algorithm.
<b>Ring</b>	Input oscillator ring modulates the oscillator. Which one depends on the chosen algorithm.
<b>Sync &gt; A</b>	The oscillator is synced to oscillator A.

## Shaping Mode

BLUE has two different waveform shaping modes, **phase distortion (PD)** and **wave shaping (WS)**

In phase distortion, the phase of the oscillator is altered over time to create a different shaped waveform. In wave shaping the output of the oscillator is altered to create a differently shaped waveform. You alter the phase distortion / waveshaper amount in the LCD screen section PD / WS.

The shaping mode button allows you to toggle between these two different modes. (PD for phase distortion and WS for waveshaping)

Note: Note: phase distortion and waveshaping do not affect the waveforms "white noise" and "pink noise".

## Ratio

Clicking on this button allows you to set the oscillator frequency ratio multiplier, so for instance selecting 2.00 in the ratio button means the oscillator's frequency is doubled. Ratio is used for setting up musically useful frequency modulation ratios between oscillators and so it is useful for frequency and ring modulation sounds.

## Coarse Tuning

Semi controls the coarse tuning of the oscillator in semitones from – 48 semitones (-4 octaves) to +48 semitones (+4 octaves)

Tip: while making FM style sounds, the coarse tuning can be very handy if you use it in combination with the ratio parameter.

## Fine Tuning

Fine controls the fine-tuning of the oscillator in cents, from -100 cent to 100 cents, with 0 cents meaning the tuning is as standard.

## Shape

The amount of phase distortion or waveshaping applied to the oscillator. To hear the effect of phase distortion or waveshaping, you need to alter the phase / wave shaping display, in the LCD screen section PD/WS.

## Feedback

The amount of self-feedback for the oscillator. For instance for sine waves it can change the wave from a sine wave to a saw wave.

### PWM Amount - For oscillator A & B only.

Pulse width modulation controls the pulse width of the Square and other waveforms. You need to use this in tandem with the pulse width modulation LFO to set up pulse width modulation sounds. This is all explained in more detail in the LFO chapter.

Note: in case you do not hear any changes you need to open the PWM amount and the LFO speed parameter. If either is zero this means that the LFO is shut down and that you need to open the speed and/or amount of the PWM A or PWM B LFO.

### Symmetry - For oscillator A&B only.

This controls the symmetry of the oscillator waveform. This is most commonly used with the Square waveform where it alters the pulse width. Other waveforms except White Noise and Pink Noise have their sound changed as well by using symmetry.

### Vel > Volume

Controls how much the oscillator volume is altered by the velocity of the note played.

For traditional subtractive synthesizer you can keep this parameter at zero. If you are using frequency or ring modulation, this parameter is important because it changes the amount of modulation the input oscillator will cause.

### Volume

Volume of the oscillator in decibels. When the oscillator is used as the modulator for frequency or ring modulation, this controls the amounts of modulation.

### Destination

Destination of the oscillators. Only used for those oscillators which are output as sound, the setting is ignored if the oscillator is used as a modulator. The oscillators output depends on the chosen algorithm in the Algorithm section of the LCD screen

These are

<b>Dry</b>	Bypasses Filter A and B and FX A and B (effect's)
<b>Filter A</b>	Goes into Filter A
<b>Filter B</b>	Goes into Filter B
<b>Filter A+B</b>	Goes into Filter A and B
<b>FX A</b>	Bypasses the Filters and goes to FX A
<b>FX B</b>	Bypasses the Filters and goes to FX B
<b>FX A+B</b>	Bypasses the Filters and goes to FX A and FX B

Note: The dry volume setting can be found in the Global section of the LCD screen.

If you want to use the dry output, you need to set Dry Volume to a non-zero amount in the Global section. If you set the dry volume to "off" then it reduces CPU usage.

## [ Filters ]



BLUE offers two HQ analogue modelled filters for subtractive alteration of the sound. Cross-fusion synthesis also allows you to use these filters in FM type sounds offering you new directions and possibilities. These filters have the most important modulation parameters pre-defined, such as Envelope, Velocity and Modulation Wheel. This makes sound editing easier and faster.

In the following we will describe the controls for Filter A and Filter B. Controls are for both filters the same.

### Parallel / Serial

In parallel mode Filter A & B are both running separately, in serial mode the output of Filter A is then passed into Filter B.

### Type

Type of filter available, these are

- 6dB Low / High pass filters
- 12dB Low / High / Bandpass and Notch filters
- 24dB Low / High / Bandpass and Notch filters
- Ring modulator
- Comb Filter
- Vox formant filter

### Destination

Controls where the filter output goes to next, these are

<b>Dry</b>	Bypasses the effects
<b>FX A</b>	Goes to FX A
<b>FX B</b>	Goes to FX B
<b>FX A + B</b>	Goes to FX A and B

**Note:** in case you route the filter to Dry and do not hear any sound, make sure that the dry volume in the GLOBAL screen is not set to off

### Frequency

Cutoff frequency of the filter.

### Q

Resonance of the filter. Sounds at the filter cutoff frequency is emphasised by the resonance. For the 6dB filters types it has no effect, for the Ring filter it controls the amount of ring modulation, for the Comb Filter it controls the amount of feedback and for the Vox filter the bandwidth of the formant filters

### Distortion

Controls the pre-filtering saturation distortion. For the Vox filter this controls the vowel of the filter.

### Envelope to Filter

Controls how much the filter envelope alters the filter frequency. For positive values the filter frequency goes up when the envelope increases and for negative values the filter frequency goes down when the envelope increases.

### Velocity to Filter

Controls how much the filter frequency changes with the velocity of the note. At positive values lower velocities give lower filter frequencies and for negative values lower velocities give higher filter frequencies.

### Keytracking

Controls how much the filter frequency changes with the key pressed. For positive values, higher notes have higher filter frequencies than lower notes. For negative values lower notes have higher filter frequencies than lower notes.

### ModWhl to Filter

Controls how much the modulation wheel controls the filter frequency. For positive values, higher modulation settings cause higher filter frequencies, for negative values higher modulation settings cause low filter frequencies.

### Filter Volume

Output volume of the filter.

### Filter Pan

Pan position of the filter.

Tip: you can set a filter to Bypass and use the panning to pan different the output of the oscillators without filtering them, or you can use it for panning modulation effects

## [ Easy ]



You can find the Easy Control page in the LCD screen section. Here you can quickly and easily change the parameters of BLUE. You can increase or decrease parameters of the preset without going deep into BLUE. Try it out yourself! Take a preset and change parameters. You will find out that you can very easily create new exciting presets. All the changes you make in this easy page are held in the preset. Of course you need to save this changed preset or the bank to load it in again the next time.

Note: It depends on the algorithms used and other settings if certain controls change the sound!

### Global Transpose

The global tuning of BLUE, from -48 to +48 semitones.

### Global FM

The global amount of frequency, from 0 to 100%.

### Global Feedback

The global amount of feedback, from -100% to 100%. This amount is added to the individual feedback amounts.

### Global Symmetry

The global amount of symmetry, from -100% to 100%. This amount is added to the individual symmetry amounts of Osc A and Osc B.

### Global PWM

The global amount of pulse width modulation, from -100% to 100%. This amount is added to the individual pulse width modulation amounts of Osc A and Osc B. Note that the PWM must be active in the current preset for this to have any effect.

### Global Shaping

The global amount of shaping, from -100% to 100%. This amount is added to the individual shaping amounts. Note that the PD/WS must have changed shape for it to have any effect. See the PD/WS chapter in this manual.

### Global Filter Frequency

The global amount of filter frequency, from -100% to 100%. This amount is added to the individual filter frequency amount.

### Global Filter Q

The global amount of filter Q, from -100% to 100%. This amount is added to the individual filter Q amount.

#### Global Filter Distortion

The global amount of filter distortion, from -100% to 100%. This amount is added to the individual filter distortion amount.

#### Global Envelope Speed

The global amount of envelope speed, from -100% to 100%. This amount is added to the individual envelope speeds.

#### Global Envelope Attack

The global amount of envelope attack, from -100% to 100%. This amount is added to the individual envelope attacks.

#### Global Envelope Release

The global amount of envelope release, from -100% to 100%. This amount is added to the individual envelope releases.

#### Global LFO Speed

The global amount of LFO speed, from -100% to 100%. This amount is added to the individual LFO speeds.

#### Global LFO Amount

The global amount of LFO amount, from -100% to 100%. This amount is added to the individual LFO amounts.

#### Global Step Speed

The global amount of step sequencer speed, from -100% to 100%. This amount is added to the individual step sequencer speeds.

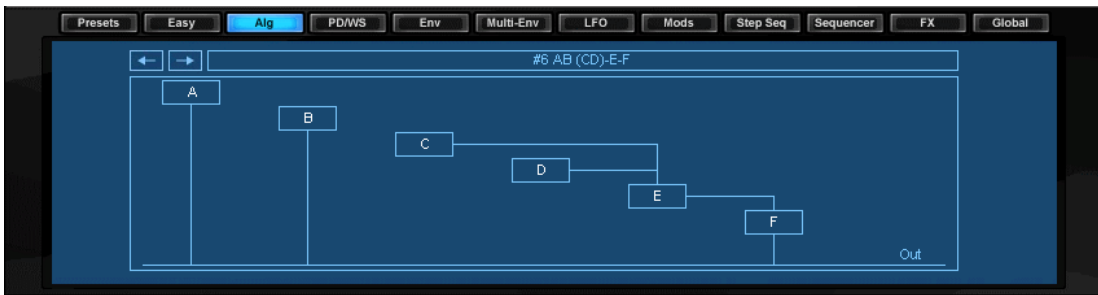
#### Global Sequencer Speed

The global amount of sequencer speed, from -100% to 100%. This amount is added to the sequencer speed amount.

#### FX A / B Mix

The global amount of FX A / B , from -100% to 100%. This amount is added to the FX A or B mix amount.

## [ Algorithm ]



The algorithm screen allows you to select how the six oscillators are connected. This screen is one of the most important part of the cross-fusion synthesis system that BLUE offers.

For instance in the preset "Cjung's Dream" , which you can find in bank 01\_Diverse 04. Here algorithm 4 is used. Oscillator A is used in a subtractive manner with PWM modulation and this routed into Filter A using a 12dB BandPass filter. Osc C, D & E modulate Osc F using FM modulation and Oscillator F output is then routed into FX A.

In the screen, at the top is shown the current algorithm, the buttons ◀ ▶ allows you to scroll through the different path algorithms.

Alternatively in the algorithm screen, right clicking (or control-click on Mac) on the screen brings up the algorithm selection menu.

In the screen itself are shown the 6 oscillators A to F, and how they connect. If there is a line from one oscillator to another then the first oscillator modulates the second one. If there is a line from an oscillator to the output line, then that oscillator is output, i.e. you can hear it.

For instance in algorithm 2, the setup is AB C-F DE, this means that A, B, D & E are output, C modulates F and then F is output as sound.

If you select another algorithm in the oscillator section its "destination" boxes are automatically updated.

## [ Phase Distortion / Wave-shaping (PD / WS) ]



Here you can setup up the phase distortion / waveshaping. This is the shape the phase distortion / waveshaping uses to alter the basic waveform sound.

A good example of what you can do with phase distortion / wave shaping is shown in the preset "PD molate" in bank "01\_Diverse 03". In this preset the amount of phase distortion is controlled by a LFO.

Note: To hear the result you need to set the Shaper knob to a non-zero value in the particular oscillator and also in the oscillator section you need to select either Phase Distortion or Wave Shaping.

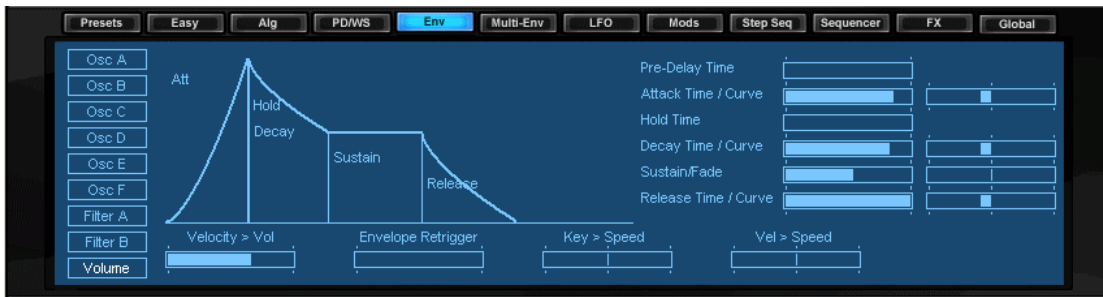
Clicking on the boxes A to F selects the phase distortion / wave shaping for oscillators A to F.

The big screen shows the current shaper. To start with the PW/WS screen shows a straight line, so the phase and wave shape are not changed at all by this. When you draw on the big screen the phase distortion / wave shaping changes. The small screens at the right hand screen show the current waveform after being phase distorted and wave shaped.

Right clicking (or control-click on Mac) on the screen allows you to copy & paste shapers setups and also clear the current shaper setups.

Tip: In the Modulation Matrix you can select the Shape amount for each oscillator as a modulation target. This way you can blend between unchanged waveforms and changed waveforms.

## [ Envelopes ]



In the Envelope screen you can setup the main envelopes used by BLUE.

Clicking on a button in the left-hand part of the screen allows you to select the various envelopes used. These are the volume envelopes for oscillators A to F, the filter envelopes for filter A & B, and the main volume envelope.

This envelope section is very powerful. BLUE follows the standard "subtractive synthesis" signal route. This means from Osc → Filter → Amp.

However because of the different Algorithms and the several oscillator output destinations you can combine several different types of synthesis in special ways.

For example, each oscillator can have its own envelope which is used for frequency and ring modulation style sounds. But if you do not need to use the oscillator envelope and want the oscillator to behave as a standard subtractive oscillator, you simply set the envelope amount within that oscillator envelope to zero.

Try the sound "NM Bass" in bank "01\_Diverse 04".

- Oscillator A does not use its Envelope (amount to zero) and the output goes into Filter A.
- Oscillator D does use its Envelope (amount open) and is used to frequency modulate Oscillator F.
- Oscillator F does not use its own Envelope which means that the main Volume Envelope controls it's volume.

This classic signal route makes it possible that you can do this: Using all oscillators for a classic FM sound and leave the "carrier" oscillator envelopes not active (amount setting of 0). This means that the main Volume envelope can be used to control the total volume. This is done in the example preset mention above "NM Bass".

For each of these envelopes, the same controls are used except for the Vol Envelope. In this the velocity response parameter is added, other velocity response parameters can be found in their own section such as each oscillator and the filter section.

### Pre-Delay Time

The time taken before the envelope starts.

### Attack time / Curve

The time taken for the envelope to reach its full value, the curve controls the shape of this section.

### Hold

How long the envelope stays at this maximum value.

### Decay time / Curve

How quickly the envelope takes to decay to its sustain level, and the decay shape.

### Sustain

Sustain level of the envelope.

### Fade

How the sustain value changes over time, for negative values the sustain level reduces over time, for positive values the sustain value increases over time.

### Release and Shape

Controls how much time the envelope reduces from the sustain level to zero after the key is released and the shape of this release stage.

### Key > Speed

Controls how much the speed of the envelope is altered by the key pressed. For positive values, higher keys produce faster envelopes, for negative values, higher keys produce slower envelopes.

### Vel > Speed

Controls how much the speed of the envelope is altered by the velocity of the key pressed. For positive values, higher velocity produce faster envelopes, for negative values, higher velocity produce slower envelopes.

### Envelope Retrigger

Sets envelope retriggers over time. This is default to off so the envelope doesn't retrigger. At higher values the envelope retriggers quicker. Settings are synced to midi tempo values.

### Velocity > Vol (only Vol Envelope)

For the main volume envelope this controls how much the velocity of the key alters the volume of the note.

### Envelope screen

The envelope screen allows you to graphically alter the current envelope.

The first part of the screen alters the attack time and level, and pressing shift alters the attack curve shape.

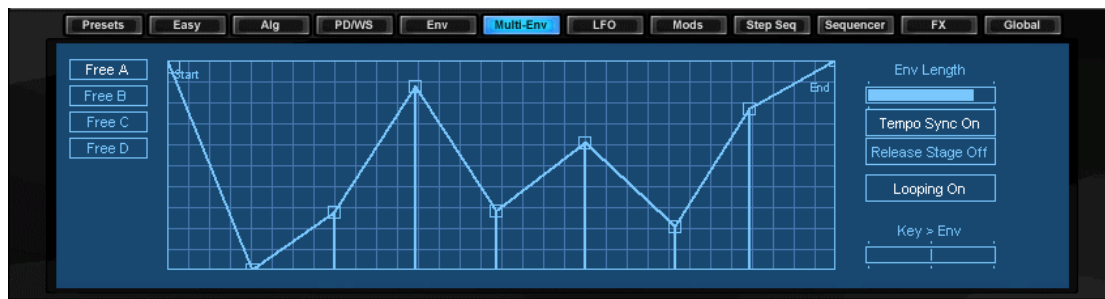
The second part alters the decay time and pressing shift alters the decay curve shape.

The third part alters the sustain level and pressing shift alters the fade level.

The final part alters the release time and pressing shift alters the release curve shape.

The right mouse button (or control-click on Mac) brings up a menu which gives you the option to copy/paste/clear the envelope settings.

## [ Multi-Envelopes ]



The multi-envelope screen allows you to alter BLUE's multi-envelopes. There are four of these Multi A to Multi D and they can only be connected to synthesizer elements using the [Modulation Matrix](#).

Multi-Envelopes in BLUE are made up of up to 16 different sections, and have loop start and loop finish positions.

Using loop points means that envelopes can have an attack phase, a sustain phase and a release phase. In the attack phase the envelope before the loop start point is used, in the sustain phase the envelope between the loop start and loop finish points is used & then looped and in the release phase either the region after the loop finish point is used or the looped area is used.

### Editing envelope points

Clicking on a point with the left mouse button selects that point (it has a larger square around that point now and the position indicator is latched to that point), moving the mouse now moves that point.

Clicking between points with the left mouse button allows you to alter the slope between points by moving the mouse up or down. Moving the mouse up means the line is curved more towards the start point and moving the mouse down means the line is curved more towards the end points, with the middle point meaning a linear line between the two points.

Pressing **shift + left mouse button** adds a point at the current mouse position. Alternatively double clicking adds a point at the current mouse position.

Pressing **ctrl + left mouse button (alt/option + left mouse button on Mac)** selects the currently selected point as the loop start point.

Pressing **alt + left mouse button (command + left mouse button on Mac)** selects the currently selected point as the loop end point.

Clicking the right mouse button (or control-click on Mac) brings up the multi-envelope pop up menu.

The commands here are

<b>Undo</b>	Undoes the last envelope edit
<b>Add Point</b>	Adds a point
<b>Del Point</b>	Deletes a point
<b>Copy</b>	Copies the current envelope
<b>Paste</b>	Pastes the last copied envelope
<b>Loop Start</b>	Sets the loop start position
<b>Loop End</b>	Sets the loop end position
<b>Loop Off</b>	Sets the looping off
<b>Loop All</b>	Loops between all the points
<b>Load</b>	Loads a pre-saved envelope
<b>Save</b>	Saves the envelope to disk
<b>Presets</b>	Envelope presets

### Envelope Length

The total length of the envelope. If the parameter Tempo Sync is set on settings are tempo based.

### Tempo Sync On/Off

Determines if the envelope length is tempo based or is set in milliseconds. Also section parts are then displayed in quarter beats or millisecond values, depending on if Tempo Sync is set to "on".

### Release stage

Sets the multi-envelope so that it has a release stage. When the release button is "on" the part after the loop end is used when a key is released. When it's "off" the loop area is used as release.

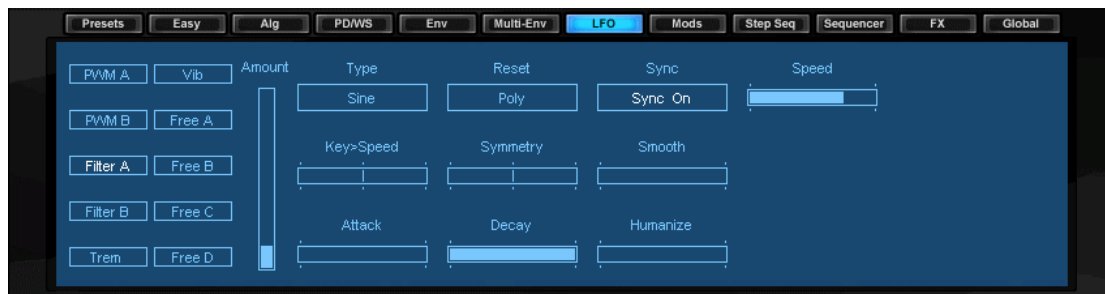
### Key > Env

Controls how much the speed of the multi-envelope is altered by the key pressed. For positive values, higher keys produce faster envelopes, for negative values, higher keys produce slower envelopes.

### Loop On / Off

When this is turned on the envelope loops between the set loop start and loop finish points. When it's turned off the loop points are ignored and the whole of the envelope is used.

## [ LFO ]



BLUE has ten LFOs (low frequency oscillators), six of which are predefined for faster access and easier editing. The remaining four Free LFOs can be routed using the Modulation Matrix. The LFOs available are

<b>PWM A / B</b>	Pulse Width Modulation LFO for Osc A and Osc B.
<b>Filter A / B</b>	Filter frequency LFOs for Filter A and Filter B.
<b>Trem</b>	Tremolo LFO (Main volume modulation)
<b>Vib</b>	Vibrato LFO (Main pitch modulation)
<b>Free A to D</b>	Free LFOs for use in the modulation matrix

The controls for each LFO are:

### Type

Waveform of the LFO, there are 6 types - Sine, Triangle, Saw Up / Down, Square and Sample and Hold

### Reset Type

LFO reset type, there are three different modes

<b>Poly</b>	In poly modes, each note played has its own LFO
<b>Free</b>	In free mode, all notes played share the same LFO which is running constantly
<b>Mono</b>	In mono mode, all notes played share the same LFO, and this LFO is reset when you press a key

### LFO Sync Off / On

When Sync is turned on then the LFO period is synced to the host's tempo.

### LFO Speed

Speed of the LFO either in hertz (cycles per second), or period in bars / beats. (if the sync parameter is set to on)

### LFO Amount

For the Filter A/B, tremolo and vibrato LFOs, this controls the amount by which these LFOs alters the sound. The Free LFO's also have an amount. Keep them at full amount unless you like to control the amount of a Free LFO's using the Modulation Matrix.

### Key > LFO Speed

This controls whether the LFO speed changes depending on the key pressed. For positive values, higher notes produce a faster LFO speed, and for negative values, higher notes have slower speed LFO.

### LFO Symmetry

This controls the LFO symmetry, basically how quickly the LFO reaches its middle point. It's useful to use with the square LFO because you can alter the pulse width with it.

### LFO Smooth

Smoothing of the LFO output. It's useful to use with the square LFO so to smooth out the abrupt changes in value.

### LFO Attack

How quickly the LFO reaches the maximum value.

### LFO Decay

How quickly the LFO decays away from its full value after the full value is reached.  
At the maximum setting the Decay is turned off so the LFO stays at the maximum amount.

### LFO Humanization

LFO humanization alters the period of the LFO randomly, to make the LFO sound more 'human'. The LFO humanization controls the maximum amount of this randomization.

## [ Modulation Matrix ]

Slot	Source	Amount	Destination
Slot 1	Mod Wheel	100 %	Volume D
Slot 2	Free LFO A	16 %	Fine D
Slot 3	None	0 %	None
Slot 4	None	0 %	None
Slot 5	None	0 %	None
Slot 6	None	0 %	None
Slot 7	None	0 %	None
Slot 8	None	0 %	None
Slot 9	None	0 %	None
Slot 10	None	0 %	None

The modulation matrix allows you to alter all the parameters of BLUE, using either internal controls such as envelopes, LFO etc or external midi control such as pitchbend, aftertouch and other controllers.

There are twenty different modulation matrix slots, and they are used in order until a blank modulation slot is reached, so you need to make sure that you don't have blank spaces between different modulation controls.

Pressing the Page 1 or Page 2 buttons toggles between the two modulation matrix pages in case you have run out of slots on page 1.

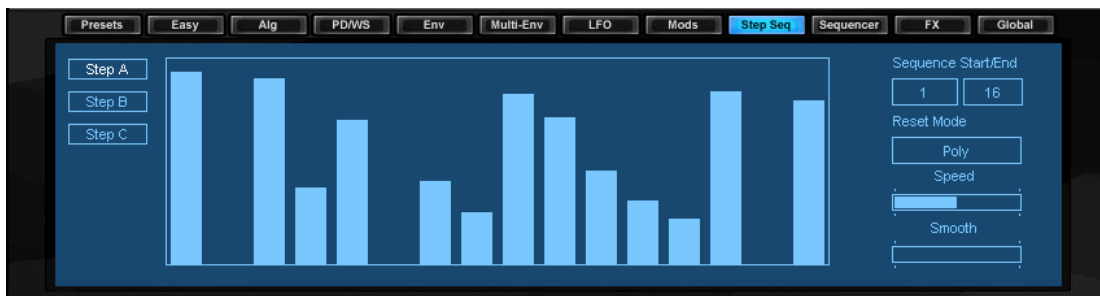
Clicking in the source column allows you to select one of the 33 modulation sources; these are divided into two sections synth and midi and should all be self explanatory.

Clicking in the amount column and moving up/down sets how much this modulation source will alter the modulation destination, the amount shown is dependent on the modulation destination.

For example if the destination is pitch, then the modulation amount is shown in semitones and if the modulation targets are time based like the Speed of an LFO the range goes from 25% up to 400%. This means that the speed goes from 25% of the original speed (i.e. ¼ as fast) to 400% of the original speed (i.e. 4 times as fast).

Clicking in the destination column selects which one of the 91 modulation destinations, and which parameter is to be altered by the modulation source.

## [ Step Sequencer ]



BLUE has three sixteen step sequencers for use with the modulation matrix.

In the step sequencer screen, clicking on the buttons Step A, Step B or Step C selects step sequencer A, B or C respectively.

Moving the mouse in the big screen alters the step sequencer values and right clicking here (or control-click on Mac) allows you to copy, paste and clear the step sequencer.

At the right hand side , the step sequencer start / end buttons allow you to set which steps are looped , for instance setting the start to 3 and the end to 6 means that when you press a key the steps 1,2,3,4,5,6 and then 3,4,5,6,3,4,5,6 are played.

### Reset Mode

The step sequencer can work in three different modes

- |             |  |
|-------------|--|
| <b>Poly</b> | In poly modes, each note played has its own step sequencer   |
| <b>Free</b> | In free mode, all notes played share the same step sequencer which is running constantly                           |
| <b>Mono</b> | In mono mode, all notes played share the same step sequencer and this step sequencer is reset when you press a key |

### Speed

Speed of the step sequencer in relation to the tempo of the sequencer

### Smooth

Smoothing applied between steps. It is useful for get rid of artefacts between different steps.

## [ Sequencer ]



The sequencer allows you to setup sequences of notes, these sequences can be up to 32 steps long. To use the sequencer you need to put BLUE into sequencer mode, by going into the global screen and select play mode to Seq.

The sequencer is monophonic, so if you press more than one key only the last one is played.

Each step in sequencer has several different properties; you can access these by clicking on Page 1 or 2.

### Page 1

**Step number /Mute** Clicking on a step number either mutes / un-mutes it

**Reset** Clicking by the step number sets reset on / off ( R ) .  
When reset is set to on then envelopes are reset on this step

**Tune** Tuning of the step from -36 to +36 semi tones

**Vol** Volume of the step as percentage of full volume

**Slide** Clicking here turns on/off sliding between steps, the slide speed is controlled by Slide Amount controller

### Page 2

**Filter A** Filter A frequency offset from -100% to 100%

**Filter B** Filter B frequency offset from -100% to 100%

**Free** This allows you to control other parameters using it in the modulation matrix as modulation source.

### The sequencer overall settings:

#### Length

The length of the sequencer, from 1 to 32 notes long.

#### Speed

The speed of the sequencer, this is set in relation to the host tempo, for instance 2 x tempo or ¼ x tempo.

#### Slide Amount

The amount of sliding used when the slide control is turned on, 0% means no sliding is used.

### Swing

Swing amount, this controls the difference in timing between consecutive notes, so giving a more human feel to the sequence.

### Vol Smoothing

Volume smoothing between different steps, useful for getting rid of clicks etc.

### Sequencer Syncing

This syncs the sequencer to the current host, so for better musical timing in a host sequencer set this function to on or automatically which is the best overall setting.

You have to select it only once, because the setting is stored "overall".

### Sequencer Load/Save/ Default /Keyboard Entry.

The right mouse button (or control-click on Mac) in the left part brings up a menu which gives you the option to load/save/set to default the sequencer settings or entry notes via the keyboard. When keyboard entry is turned on, played notes are entered into the sequencer

### Bypass

This bypasses the sequencer and put BLUE in poly play mode.

Turning bypass off returns it to the original sequencer play mode

Tip: for typical mono sequences set at the Global page "Voices" to 1.

## [ Arpeggiator ]



BLUE offers an unique and very powerful arpeggiator. An arpeggiator (arp) is when instead of playing all the pressed keys at the same time, it plays them one after another endlessly. Next to classic arp modes BLUE also offers a special mode called chord mode which triggers the played notes as a chord.

The arpeggiator has a build in sequencer for making rythmn patterns, but offers also tune, reset, slide, velocity, Free modulation and length per step/note!

To turn on the arpeggiator, in the global page click on the Play Mode button and select Arpeggiator. To see the arpeggiator controls click on the Arp selector, this will bring up the arp screen , which should look something like this.

Controls at the right pane side:

**Mode** This controls how any pressed keys are arpegged played

<b>Up</b>	the notes are played in the order they are pressed
<b>Down</b>	the notes are played in the reverse order to which they are pressed
<b>Up/Down</b>	the notes are played in the order they are pressed then in reverse order
<b>Down/Up</b>	the notes are played in reverse order then normal order
<b>Random</b>	from the pressed keys a random one is played
<b>Ordered</b>	the notes are ordered from lowest to highest and are played in that order
<b>Rev. Ordered</b>	the notes are ordered from highest to lowest and are played in that order
<b>Ordered Up/Down</b>	the notes are ordered and then played from the lowest to highest and then back to lowest
<b>Ordered Down/Up</b>	the notes are ordered and then played from the highest to lowest and then back to highest
<b>Chord</b>	chord is a special mode where all the press keys are played at the same time so producing a chord

Latch

When latching is turned on you don't need to keep a key pressed down for that note to be included in the arpeggiator. For instance if you have pressed C4 then released it and then pressed A4 and then released it when the latching is on then the arpeggiator will play C4 and then A4. Turning on / off the latching clears the arpeggiator of any notes .

Tip: you can use also the sustain pedal to Latch and Unlatch the arpeggiator.

Octave

Determines how many octaves the arpeggiator plays. For instance if you set octave to 2 , then it will play the pressed notes firstly in the original octave and then the pressed notes an octave higher. So pressing A4, C4 and E4 in the up mode with octave set to two plays A4, C4, E4 then A5, C5 and E5.

Speed

Speed of the arpeggiator in respect to the host tempo, from ¼ of the tempo up to 4 times the tempo.

### Length

This controls how long each arp note/step is. At the minimum value (as set) each arp step/note's length is controlled by the arpeggiator sequencer (more about that later on). At different settings, so above as set the arpeggiator notes/steps can be extended by anything from 1% of the note length to 100% of the note length. 100% is useful because it allows you to 'tie' arp notes together to create longer notes.

### Vel A/K (velocity Arpeggiator sequencer or Keyboard)

This controls whether the arp notes volume is controlled by the arpeggiator sequencer (at 0%) or the pressed key's velocity (at 100%) or some combination of the two values.

### Swing

This controls the swing of the arpeggiator, this is the difference in timing between consecutive notes and it gives a more human/swing feel to the arpeggiator.

### Slide

Controls the time taken for notes to slide from the previous note's pitch to the current one. This only applies to notes which have sliding on

### No of Step

Number of steps in the arpeggiator sequencer. This can be from 1 to 32.

### Sync

This turns on / off arpeggiator syncing to your host sequencer. Depending on your host and also what you are doing you may want this be on or off. Default is on.

### Controls at the left side pane Arpeggiator Sequencer:

The main part of the arp screen is taken up with the Arpeggiator sequencer screen. This sequencer allows you to have much more complex arpeggiator patterns than in most other synthesizers. The arp sequencer can have up to 32 steps. The number of steps is set using the No of Steps selector. Each step in the arp sequencer has different properties which alters how that arp note is played.

### Step Number (1..32) on / off

This shows the arp sequencer step number. Clicking on it turns on / off this step. If it is set to off then when an arpeggiator is played a 'rest' occurs rather than a new note at this step.

### Slide (S)

This controls whether the note slides from the previous note's pitch to the current note's pitch or not. The speed of sliding is controlled by the Slide controller. Clicking on the S turns on / off sliding.

Note: Sliding does not work in the 'Chord' mode.

### Reset (R)

This control whether the note is 'reset' at this step. You toggle resetting by clicking on the R. When a step is not reset the current arp note continues to play the step ahead. So it allows you to play notes which are twice or more as long as the normal arp notes. In other words, you can tie notes using this function.

Keep two options in mind using notes without R:

1. You have to have the arp main length control set to 100% to use steps without R to create these 'tied' notes.
2. You have to have the step ahead of step(s) without R set to 100% length if your main Length control is set to as is .

Note: if (R) is set to off, the tune, velocity and free values of that step/note have no influence

### Tune

Tuning offset of the arp note, from -36 semitones to +36 semitones.  
Not functional if the step is without R.

### Vel

Velocity of the arp sequencer step/note. This is used in combination with the Vel A/K control to control how the velocity of each arp sequencer step is controlled by the arp sequencer and how much by the velocity of the played note.  
Not functional if the step is without R.

### Free

Free control allows you to control other properties of BLUE (i.e. panning etc) using the arpeggiator. This is because you can use the Free control in the modulation matrix to modulate other controls by selecting the source to be Arp Free.  
Not functional if the step is without R.

### Length

You can set the length of each arp sequencer note here. For instance if you set the length to 50% then the note is played for 50% of the arp note length and it is then released so it is off for the remaining 50% of the arp note length.  
Individual lengths are only possible if the main control Arp Length is set to As Set. otherwise all the lengths are set to the global Arp Length controller's value.  
Also if you want to have 'tied' steps i.e. steps which are longer than normal, the length of the initial step and the 'tied' steps should all be set to 100%.  
Not functional if the step is without R.

### Bypass

This bypasses the arpeggiator and put BLUE in poly play mode.  
Turning bypass off returns it to the original arpeggiator play mode

### Right controls (or control-click on Mac)

If you move over the sequencer arpeggiator part and click the right mouse button, you have the option to default, load or save the arpeggiator or turn on keyboard entry.

All settings of the arpeggiator are saved and loaded using this function.  
When keyboard entry is turned on, played notes are entered into the arpeggiator

Tip: in bank 07\_Arp banks 04 you can find 16 examples of arpeggiator settings, which we hope helps you to understand better its features.

## [ Effects ]



BLUE has two sets of HQ effects, which can be used in parallel or serial mode (by clicking on the mode button). Each effect has a default preset, so can be used straight away and if you move between different effects the settings are remembered, so if you go back to that effect the settings are recalled.

For the following we will describe the controls for FX A, they are the same for FX B.

### Type

Type of effect, these are None (Bypass), Mono Delay , Stereo Delay , Chorus , Flanger, Phaser, Distort , Low-Fi , Stereo Widener, Reverb, Comb, Gator, Speaker Simulator, Wah/Delay, Autopan, Chorus/Delay, Waveshaper, Ensemble and Compressor.

### FX Mix (A/B)

Mix between the dry and the output after passing through the effect.

### FX Pan (A/B)

FX pan position, either from left only, to center to right only.

### FX Bypass (A/B)

This bypasses the current BLUE FX-A or FX-B effect. Turning bypass off returns it back into the original FX

### FX Commands

Allows you to load, save, copy, paste, clear, swap, randomize and undo fx presets.

## **Mono Delay**

<i>Length</i>	Length of the delay
<i>Feedback</i>	Feedback of the delay
<i>LP Filter</i>	Low pass filter frequency
<i>HP Filter</i>	High pass filter frequency
<i>Widen</i>	Stereo widening amount
<i>Mod Amount</i>	Delay modulation amount
<i>Mod Speed</i>	Delay modulation speed

## **Stereo Delay**

<i>Left Delay</i>	Left length of the delay
<i>Right Delay</i>	Right length of the delay
<i>Feedback</i>	Feedback of the delay
<i>CrossFeed</i>	Feedback between the left / right delay
<i>LP Filter</i>	Low pass filter frequency
<i>HP Filter</i>	High pass filter frequency
<i>Mod Amount</i>	Delay modulation amount

## Chorus

<i>Length</i>	Length of the chorus
<i>Width</i>	Maximum change to chorus length
<i>Speed</i>	Speed the chorus length changes
<i>Spread</i>	Difference in speed between the left and right hand channels
<i>LP Filter</i>	Low pass filter frequency
<i>Widen</i>	Stereo widening amount

## Flanger

<i>Length</i>	Length of the flanger
<i>Width</i>	Maximum change to flanger length
<i>Speed</i>	Speed the flanger length changes, this is midi tempo based
<i>Feedback</i>	Feedback of the flanger
<i>Pan Mod</i>	ads the flanger panning modulation
<i>LP Filter</i>	Low pass filter frequency
<i>HP Filter</i>	High pass filter frequency

## Phaser

<i>Stages</i>	Number of stages in the phaser
<i>Pitch</i>	Pitch of the phaser
<i>Feedback</i>	Feedback of the phaser
<i>Width</i>	Maximum change to phaser pitch
<i>Speed</i>	Speed the phaser length changes, this is midi tempo based
<i>Spread</i>	Amount the phaser stages are spread from the central pitch
<i>Pan Mode</i>	Speed the flanger pans from the left / right hand channels

## Distort (distortion)

<i>Limit</i>	Hard limiter threshold
<i>Rect</i>	Amount of rectification, from -100% (no change) ,0% half to 100% - full
<i>Distort</i>	Amount of Distortion
<i>Tone</i>	Frequency of the band pass filter
<i>Emphasis</i>	Bandwidth of the band pass filter
<i>Post-Boost</i>	Amount the filter signal is boosted
<i>M-Wheel&gt;Tone</i>	Amount the band pass filter frequency is changed by the modulation wheel

## Low-Fi

<i>Bits</i>	Bit level of the signal
<i>Sample Rate</i>	Sample rate of the signal
<i>LP Filter</i>	Frequency of the low pass filter
<i>M-Wheel&gt;Filter</i>	Amount the low pass filter frequency is changed by the modulation wheel

## Stereo Widener

<i>Widen</i>	Stereo widening amount
<i>Width</i>	Maximum change to stereo widening amount
<i>Speed</i>	Speed the stereo widening amount changes
<i>LP Filter</i>	Low pass filter frequency
<i>HP Filter</i>	High pass filter frequency

## Reverb

<i>Pre-Delay</i>	Pre-delay amount of the reverbed signal
<i>Size</i>	Reverb room size
<i>Damp</i>	Reverb damping amount
<i>LP Filter</i>	Low pass filter frequency
<i>HP Filter</i>	High pass filter frequency
<i>Spread</i>	Stereo spreading amount

## Comb

The Comb Filter effect uses two joined comb filters where the output of one is feed back into the other one. Comb filters are very short delay and have a frequency which determines the length of this delay.

<i>Comb 1 Freq</i>	Comb Filter 1 Frequency
<i>Comb 1 Feed</i>	Comb Filter 1 Feedback amount
<i>Comb 1 Mod</i>	Comb Filter 1 Feedback modulation amount
<i>Comb 2 Freq</i>	Comb Filter 2 Frequency
<i>Comb 2 Feed</i>	Comb Filter 2 Feedback amount
<i>Comb 2 Mod</i>	Comb Filter 2 Feedback modulation amount
<i>Mod Speed</i>	Feedback tempo based modulation speed

## Gator

The gator uses a 16 step sequencer to alter the volume of the sound to give a 'trancegate' type effect. Basically it is a sequencer controlled audio gate.

<i>Speed</i>	The speed of the gator. Speed is time based from 16/1 up to 1/32T speed. If for example the speed is set to 1/1 each step is 1/16 note. If for example the speed is set to 2/1 each step is 1/8 note.
<i>Smooth</i>	How much the volume changes are smoothed. Helps to avoid clicks.
<i>Mode</i>	Whether the gator affects the left & right channels, the left channel only or the right channel only or both.
<i>Left</i>	Left channel sequencer. Clicking here turns on / off that step in the gator. When a step is on (light colour) the gate is open and you can hear the audio. When a step is off (dark colour) the audio is muted
<i>Right</i>	Right channel sequencer. Clicking here turns on / off that step in the gator. When a step is on (light colour) the gate is open and you can hear the audio. When a step is off (dark colour) the audio is muted
<i>Sync</i>	Turns on / off the host syncing. If you do not hear a gator FX for example in standalone host, do switch to "off". Inside a host sequencer program the best setting is "auto" or "sync". The default setting in most presets is "auto". So only in case of problems, try "off".

Note: FX A/B Mix sets how much the Gator FX is added. With the Gator FX it is wise to fully open the slider (wet).

## Amp Sim

This is amp simulator. Through DSP functions several speaker types are simulated. Great for creating edgy sounds.

<i>Type</i>	Type of amp simulation. Settings are None, 4x10" guitar speakers, 4x12" guitar speakers, Bass speaker, Combo speaker and Radio speaker. The "none" speaker is useful if you want to use only the distortion in the FX effect.
<i>Distort</i>	Amount of distortion added to the sound. Works also if "none" speaker is selected.
<i>Bass</i>	Bass EQ Volume. Adds or removes low end from the speaker simulator.
<i>Treble</i>	Treble EQ Volume. Adds or removes high frequencies from the speaker simulator.
<i>Volume</i>	Volume boost. Here you can correct the volume of the processed sound.

## Wah/Delay

This effects produces a wahwah type effect by running the sound from a low-filter who's frequency changes over time. There is a built in delay which adds delays to the sound.

<i>Low Range</i>	Lowest Frequency of the filter. Here you set how deep the LP filter goes. The more you move the slider to the left, the lower the filter goes.
<i>High Range</i>	Highest Frequency of the filter. Here you set how high the LP filter goes. The more you move the slider to the right, the higher the filter goes.
<i>Speed</i>	The rate the filter frequency changes over time. Tempo based.
<i>Resonance</i>	Controls the resonance of the used low-pass filter.
<i>Delay</i>	Length of the wahwah delay. This delay is behind the WahWah FX.
<i>Feedback</i>	Amount the wahwah delay feeds back into the sound
<i>Delay Vol</i>	Volume of the delay

## AutoPan

Autopan pans the sound between the left and right speakers.

<i>Amount</i>	Amount the autopan moves the sound in the stereo field. For maximal effect you also need to open the FX A/B mix slider to the fully right (wet)
<i>Speed</i>	The rate at which the autopan moves the sound. This is Tempo based so for example 1/1 does mean that the pan moves from left to right within 1bar.

## Chorus/Delay

This is a combined chorus / delay. Specially developed in case you want to use another effect in combination with Chorus without losing a delay function.

<i>Length</i>	Maximum length of the chorus in milliseconds.
<i>Width</i>	The amount how much the chorus length will change
<i>Speed</i>	The rate the chorus length changes
<i>Spread</i>	The amount the chorus length differs between left and right channels.
<i>Delay</i>	Length of the chorus delay. Delay is behind the chorus.
<i>Feedback</i>	Amount the chorus delay feeds back into the sound
<i>Delay Vol</i>	Volume of the delay

## WaveShaper

The waveshaper effect shapes the sound/audio going to give a kind of distorted version of it . It is then passed through a low pass filter who's frequency is changed over by a tempo based LFO.

<i>Top Amt</i>	The amount positive input is waveshaped.
<i>Bottom Amt</i>	The amount negative input is waveshaped.
<i>Rect</i>	The amount the sound is rectified, at -100% the sound goes through as normal , at 0% no negative output is heard and at 100% any negative output is made positive
<i>Filter</i>	Low pass filter frequency. This filter does not filter the high frequencies.
<i>LFO Amount</i>	The amount the low pass filter frequency can change
<i>LFO Speed</i>	The rate the low pass filter frequency can change

## Ensemble

This effect uses 6 choruses, each having its own setting, to give the effect of several copies of the sound playing at once.

<i>Length</i>	Length of the ensemble effect.
<i>Width</i>	Maximum change to ensemble length.
<i>Speed</i>	Speed the ensemble length changes.
<i>Feedback</i>	Feedback of the choruses.
<i>Ensemble</i>	Amount the choruses differ from each other
<i>Spread</i>	Amount the choruses are panned to the left or right.

## Compressor

The compressor is an audio effect that changes the dynamic range and response of a signal.

<i>Threshold</i>	This sets the threshold on which the compressor starts to work.
<i>Ratio</i>	This sets the amount of dB reduction. So with a ratio setting of 1:2, and the signal exceeds the threshold by 4dB then it is reduced by $4\text{db}/2 = 2\text{db}$ .
<i>Attack</i>	This sets how fast the compressor kicks in.
<i>Release</i>	This sets how long the compressor takes to react to a reduction in volume.
<i>Volume</i>	This allows you to correct the volume after the signal has been compressed.

Note: FX Mix sets how much of the Compressor FX is added. With the Compressor FX it is wise to fully open the Mix control knob (wet).

## [ Global ]



The global page controls the global properties of BLUE which are stored in each individual preset.

### Global Tuning

The global tuning of BLUE. By default it is set to 440 Hz

### Play Mode

<b>Poly</b>	more than one of note can be played at once, so you can play chords.
<b>Mono</b>	only a single note can be played at once, pressing another key stops previous note.
<b>Legato</b>	similar to mono but if you have a key pressed down and then press another key the note is not retriggered (i.e. envelopes don't restart and so on), and if you release this second key the pitch returns to the original note
<b>Sequencer</b>	sequencer is played (see the <a href="#">Sequencer</a> page)
<b>Arpeggiator</b>	arpeggiator is played (see the arpeggiator page)

**Unison** (off, 2, 4 or 6voice). In Unison Mode more than one voice is played when you press a key. The slider controls the detuning between these voices.

**Port Mode** Portamento mode (the amount of portamento is controlled by the **Port** control)

**Constant Rate** The portamento changes at a constant rate, greater keyboard note ranges take a longer time.

**Constant Time** Always takes the same time to portamento between any notes.

**Held Rate** Same as Constant Rate but portamento only appears if you are holding a note and then playing another.

**Held Time** Same as Constant Time but portamento only appears if you are holding a note and then playing another.

**Port Time** Time/rate for portamento.

### Bend Up

Amount the sound's up pitch is altered by the pitch bend midi controller.

### Bend Down

Amount the sound's down pitch is altered by the pitch bend midi controller.

First setting is as up which makes that it uses the same amount as the Bend Up setting.

### Chord

The Chord memory control enables you to record chords. Up to 8 notes can be memorised and it is also saved within the preset.

Clicking the chord gives you the options.

*Off* Chord memory is *Off* and has no effect.  
*Learn* Chord memory will store any 8 notes you play. First, play the root note and then the other notes of the chord.  
*Play* The chord memories will be played, so if you pressed C, E & G while in chord *learn* mode, then press D in chord *play* mode, it will play the chord D, F# & A.  
*Alt* The chords are played in normal order than in reverse order

The slider next to chord button controls the delay between the notes played, so you can create a strum type effect.

### Tempo Mode

Whether the tempo is synced to the host tempo or is free.

### Tempo

Tempo of BLUE either synced to the host tempo (1/4 x host tempo to 4 x host tempo) or the tempo in beats per minute

### Voices

The number of voices that can be played at one time, from 1 to 16. The lower you set this value, the lower the CPU usage. So if a sound needs only 8 voices you can set it to 8.  
 Note: voices setting is not active when arpeggiator is selected.

### Filter Smoothing

This is used to smooth out zipper type noise when you change the filter frequency by smoothing these changes in filter frequency over time.

### Velocity Curve

Velocity curve alters the shape of the velocity, with the velocity being biased to low values for negative values, biased towards high values for positive values, and normal for 0%.

### Over-sampling (off, 2x, 4x, 8x, 16x)

This sets the level of over-sampling. When it is off no over-sampling is performed. When it's at 2x the output is calculated at twice the host sample rate and when it's at 4x the output is calculated at four times the host sample rate. The higher you have over-sampling the more CPU is needed to calculate the sound.

### Anti-aliasing Filter / Frequency

When over-sampling is turned on the anti-aliasing filter is used to cut out additional unwanted aliasing noise at high frequencies. The button turns it on and the slider sets the filter frequency. It depends on the over-sampling / type of sound if you need this filter.

### Osc Vol. Knob

This setting determines the volume range of all oscillators volume knobs. It can be set to 10dB to -30dB or 10dB to -60dB.

### Osc Precision

Each oscillator can be set so they are not always in tune; they can vary in pitch over time. The Osc Precision controls sets the level of this detuning, with 100% meaning that no detuning occurs. The Prec Max / Min speeds are used to set the upper and lower period limits that the detuning occurs over.

### Equalizer

BLUE has a 2 band equalizer, which alters the total output sound, the button turns it on / off and the sliders control the low frequency / boost and the high frequency / boost.

Note: keep in mind that the Equalizer can be used in a preset. If you build a new sound, check if the Equalizer is turned off.

### Dry Volume / Pan

The volume and panning of the dry output. Default the Dry volume is turned to zero which saves CPU resources if the dry channel is not used in the current preset.

### External Controller Setup

Here you can load / save the external (midi latching) controller setup  
Each preset can have its own setup, but you can use also "Global midi".  
This you need to select at the "Back panel" of BLUE. See manual page 54.

Note: "per preset" or "global midi" have both their own file format

## [ Rear Panel ]



The "Rear Panel" of BLUE is accessed by clicking on the BLUE logo. Credits, control and serial info have been located here as well special settings.

### Global Midi

Turns *on* / *off* global midi control. When global is *on* every preset uses the same midi latching, when it is *off* each preset can have its own individual midi latching.

**Note:** see also *External Controller Setup* page 53 of this manual.

### Keyboard up / down button

Turns on / off keyboard changing of presets

### Bank Warning Message

Turns on / off bank change warning message.

## [ Optimizing CPU Usage ]

Software synthesizers are highly CPU-intensive. The real-time calculation of audio waveforms, filters, effects and modulators places a significant load on the host computer's CPU. As such, the main limiting factor in software synthesizer performance is CPU processing power. Each additional oscillator, filter, effect and modulation slot (mod matrix) that is included in an instrument adds to the CPU load. As a result, it's best to switch off any unused units within BLUE to conserve CPU resources. It may also be useful to use the send effects of your hosts mixer (like reverb and delay) instead of BLUE's effects as they are shared among all instruments.

## [ Glossary ]

Amplifier:	A signal processing device that changes the amplitude and hence the volume, of a signal. In BLUE the main output Amplifier is not visible but controlled by the main Volume Envelope.
Effect:	An audio signal processing device that changes some aspect of the input signal. An enormous number of different effect types are available. These include Chorus (which produces a thickening of the signal), Delay (adding echoes to the signal), Distortion (which changes the shape of the waveform usually adding overtones) and Reverb which adds acoustic room information to a signal.
Envelope:	A time-varying signal used to control the development of another signal after it has been triggered. Envelopes are most often used for controlling a signal's amplitude, for instance in BLUE's oscillator volume, but also for filter frequency or special modulation issues like changing the oscillator pitch over time. The shape of the envelope is determined by a number of control parameters.
Filter:	A signal processing device that suppresses or "filters" out specific parts of a signal's frequency spectrum that is generated by the oscillators. Numerous types of filter are used in audio synthesis. The classic ones include Low Pass, High Pass, BandPass and Notch. More special are the Ring filter, Comb filter and Vox (vowel) filter.
FM:	FM or "Frequency Modulation" is a process where the frequency of one oscillator (the carrier) is controlled by another (the modulator). When the frequency of the modulator is periodic and below the audio range (less than 20 Hz) vibrato is produced. When the modulation frequency is within the audio range additional harmonics are produced.
LFO:	An LFO or "Low Frequency Oscillator" is a periodic signal source (usually below audio frequency range) used to modulate another signal parameter. An LFO can be used for a variety of effects including vibrato (by modulating the pitch) and tremolo (by modulating the volume).
Modulation Matrix:	A signal "junction" where a source signal can be patched so that it controls a destination signal. The BLUE Modulation Matrix is used for tasks such as modulating a Filter by a step sequencer or a multi-envelope.
Oscillator:	A signal source that generates a periodic waveform at a given frequency.
Oscillator Sync:	Syncing oscillators means that the slave oscillator starts a new cycle of its waveform whenever the master starts a new cycle. This can produce impressive sounds, especially when the slave is pitch modulated (as in this case actually the pitch is not changed but the waveform of the slave).
Phase Distortion:	In phase distortion, the phase of the oscillator over time is altered to create a different shaped waveform.
Pink Noise:	A signal which contains equal energy per octave. This means that the volume decreases logarithmically with frequency. Pink noise sounds darker than white noise. Useful for thunder sounds and deep percussion.
Ring Modulation:	The process of combining two audio signals by multiplication. Ring Modulation produces sidebands but suppresses both the carrier and modulating frequencies.
Wave Shaping:	In wave shaping the output of the oscillator is altered to create a differently shaped waveform.
White Noise:	A signal which contains equal energy over its frequency range. That is, if you measure the amplitude of the sound from 100 to 200 Hz, that segment of the frequency spectrum will contain the same energy as a segment from 5000 to 5100 Hz or even 20,000 to 20,100 Hz. Compared to other types of noise, white noise has a "bright" sound.

## [ MIDI Implementation Chart ]

Product:	Rob Papen BLUE	Version 1.8	Date: 1 May 2008
Manufacturer	Rob Papen / RPCX		
Function	Transmitted	Recognized	Remarks
Basic Channel			
Default	no	no	
Changed	no	no	
Mode			
Default	no	Omni	
Changed	no	no	
Note Number			
True Voice	no	<b>yes</b>	
	no	no	
Velocity			
Note On	no	<b>yes</b>	
Note Off	no	<b>yes</b>	
Aftertouch			
Poly (Key)	no	<b>yes</b>	
Mono (Channel)	no	<b>yes</b>	
Pitch Bend	no	<b>yes</b>	
Control Change	no	<b>yes</b>	
Program Change	no	<b>yes</b>	
Bank Change	no	<b>yes</b>	
System Exclusive	no	no	
System Common			
Song Position	no	no	
Song Select	no	no	
Tune Request	no	no	
System Realtime			
Clock	no	<b>yes</b>	
Commands	no	<b>yes</b>	
Aux Messages			
Local On/Off	no	no	
All Notes Off	no	<b>yes</b>	
Active Sensing	no	no	
System Reset	no	<b>yes</b>	

## Appendix A: wave types

### Analog wave types:

Sine, Saw, Square, Triangle, Rez 1, Rez 2, Rez 3, SineSaw, SineSqr, SineRez, SawSqr, SawRez, SqrRez, White Noise, Pink Noise

### Additive wave types:

Harmonic 1, Harmonic 2, Harmonic 3, Harmonic 4, Saw 1, Saw 2, Saw 3, Saw 4, Sqr 1, Sqr 2, Sqr 3, Sqr 4, Triangle 1, Triangle 2, Hollow, Glass, Octave, Overtone, Rezo 1, Rezo 2, Digix, Organ 1, Organ 2, Organ 3, Church Organ, Whistle, Vocal A Vocal E , Vocal O, Vocal U, Vox 01, Vox 02, Vox 03, Vox 04, Vox 05, Vox 06, Vox 07, Vox 08, Vox 09.

### Spectral wave types:

Spectral 1 - Spectral 32

## Appendix B: LFO/Envelopes Sync Settings

Off, 16/1\*, 16/1, 16/1T, 8/1\*, 8/1, 8/1T, 4/1\*, 4/1, 4/1T, 2/1\*, 2/1, 2/1T, 1/1\*, 1/1, 1/1T, 1/2\*, 1/2, 1/2T, 1/4\*, 1/4, 1/4T, 1/8\*, 1/8, 1/8T, 1/16\*, 1/16, 1/16T, 1/32\*, 1/32, 1/32T.

Note: "T" stands for Triplet and "\*" stands for a dotted note. In the case of a dotted note, the note duration is equal to 1.5 times its original undotted value.

## Appendix C: Delay Sync Settings

Off, 1/2, 1/2T, 1/4\*, 1/4, 1/4T, 1/8\*, 1/8, 1/8T, 1/16\*, 1/16, 1/16T, 1/32\*, 1/32, 1/32T.

Note: "T" stands for Triplet and "\*" stands for a dotted note. In the case of a dotted note, the note duration is equal to 1.5 times its original undotted value.

## Appendix D: Modulation Sources and Destinations

### Modulation Synth Sources:

M-Env A, M-Env B, M-Env C, M-Env D, Free LFO A, Free LFO B, Free LFO C, Free LFO D, Step Seq A, Step Seq B, Step Seq C, Seq Free. Arp Free

### Modulation Midi Sources:

Velocity, Release Velocity, Channel Aftertouch, Poly Aftertouch, Pitchbend, Note, Modulation Wheel, Breath controller, Foot controller, Expression controller, CC16, CC17, CC18, CC19, CC20, CC21, CC84, CC85, CC86, CC87, CC88, CC89, CC90.

### Modulation Destinations:

#### *General:*

Global Volume, Global Pitch (-48 to +48 semitone) , Global Fine, Volume Env Speed (25% to 400%) , Tremelo Speed, (25% to 400%) Tremelo Amt, Vibrato Speed (25% to 400%), Vibrato Amount, Dry Volume, Dry Pan, Port Time.

#### *Osc A and B:*

Volume, Semi (-48 to +48 semitones), Fine, WS, Shape, Feed, Env Speed (25% to 400%) , PWM, Sym, PWM Speed (25% to 400%)

#### *Osc C till F:*

Volume, Semi (-48 to +48 semitones), Fine, WS, Shape, Feed, Env Speed, (25% to 400%)

#### *Filter A and B:*

Filt Freq, Filt Q, Filt Dist, Filt Pan, Filt Vol, Fil Env Speed (25% to 400%), Filt LFO Amt, Filt LFO Speed (25% to 400%).

#### *Multi Envelope A till D:*

Envelope speed (25% to 400%)

#### *Free LFO A till D:*

LFO Speed, (25% to 400%) LFO amount

#### *Step Sequencer and Sequencer:*

Speed. (25% to 400%)

## Modulation Sources Synth

M-Env A till D	Multi Envelope. Bipolar (positive and negative amount) modulation
Free LFO A till D	LFO especially for modulation matrix. Bipolar
Step Sequence A till C	Step-Sequencer especially for modulation matrix. Bipolar
Sequence Free	The Free row settings of the Sequencer. Bipolar
Arp Free	The Free row settings of the Arpeggiator. Bipolar

## Modulation Sources Midi

Velocity	The MIDI note-on velocity information. The harder the key is hit, the higher the modulation value (unipolar).
Release Velocity	The MIDI note-off velocity information. The faster the key is released, the higher the modulation value (unipolar).
Channel Aftertouch (mono)	One aftertouch value is used for the whole keyboard. All notes being played on a specific channel share the same monophonic aftertouch value. This is how most keyboards work (unipolar).
Poly Aftertouch	The Aftertouch value of each separate note is used as a modulation source. Your MIDI keyboard must support this. If this doesn't work it is likely that your keyboard has no polyphonic aftertouch (unipolar).
Pitch Bend	The value of the pitch-Wheel which is taken as modulation source. It is usually centred which produces no change in pitch, with top value producing maximum positive values and bottom value producing maximum negative values
Note	The note being played with a linear response. The modulation value follows the note number (bipolar).
Modulation Wheel	The MIDI modulation wheel (MIDI CC 1) (unipolar ).
Breath Controller	MIDI CC 2 (unipolar).
Foot Controller	MIDI CC 4 (unipolar).
Expression Contr.	MIDI CC 11 (unipolar).
CC16 Controller	MIDI CC 16 (bipolar).
CC17 Controller	MIDI CC 17 (bipolar).
CC18 Controller	MIDI CC 18 (bipolar).
CC19 Controller	MIDI CC 19 (bipolar).
CC20 Controller	MIDI CC 20 (bipolar).
CC21 Controller	MIDI CC 21 (bipolar).
CC84 Controller	MIDI CC 84 (bipolar).

CC85 Controller	MIDI CC 85 (bipolar).
CC86 Controller	MIDI CC 86 (bipolar).
CC87 Controller	MIDI CC 87 (bipolar).
CC88 Controller	MIDI CC 88 (bipolar).
CC89 Controller	MIDI CC 89 (bipolar).
CC90 Controller	MIDI CC 90 (bipolar).

## Modulation Destinations

### General:

Global Volume	Main Volume (Amp) control
Global Pitch	Main pitch control in semitone ranges
Global Fine	Main pitch control in cents
Volume Env Speed	Main Volume Envelope speed control
Tremolo Speed	Tremolo LFO speed control.
	Main Volume (Amp) modulation by LFO.
Tremolo Amt	Amount of Tremolo modulation by Tremolo LFO
Vibrato Speed	Main pitch LFO modulation speed control
Vibrato Amount	Main pitch LFO modulation amount control
Dry Volume	Dry output channel volume control
Dry Pan	Dry output channel panning control
Port Time	Portamento time control

### Osc A and B:

Volume	Volume control of oscillator
Semi	Pitch control of oscillator in semitones
Fine	Pitch control of oscillator in cents
WS	Amount of modulation by waveshaping (only if WS is used)
Shape	Amount of PD/WS shape
Feed	Amount of Feedback
Env Speed	Oscillator Envelope speed control
PWM	Amount of PWM modulation control
Sym	Symmetry control
PWM Speed	PWM LFO speed control

### Osc C to F:

Volume	Volume control of oscillator
Semi	Pitch control of oscillator in semitones
Fine	Pitch control of oscillator in cents
WS	Amount of modulation by waveshaping (only if WS is used)
Shape	Amount of PD/WS shape
Feed	Amount of Feedback
Env Speed	Oscillator Envelope speed control

### Filter A and B:

Filt Freq	Cutoff Frequency control.
Filt Q	Resonance control or amount of ring modulation in the Ring filter or the amount of feedback of the comb filter. No function at Vowel filter.
Filt Dist	Controls the pre-filtering saturation distortion. For the Vox filter it controls the vowel of the filter.
Filt Pan	Panning control

Filt Vol	Filter volume control
Filt Env Speed	Filter Envelope speed control
Filt LFO Amt	Filter LFO amount control
Filt LFO Speed	Filter LFO speed control
<u><i>Multi Envelope A till D:</i></u>	
Envelope speed	Speed of Multi-Envelope control
<u><i>Free LFO A till D:</i></u>	
LFO Speed	Free LFO speed control
LFO amount	Free LFO amount control
<u><i>Step Sequencer and Sequencer:</i></u>	
Speed	Speed control