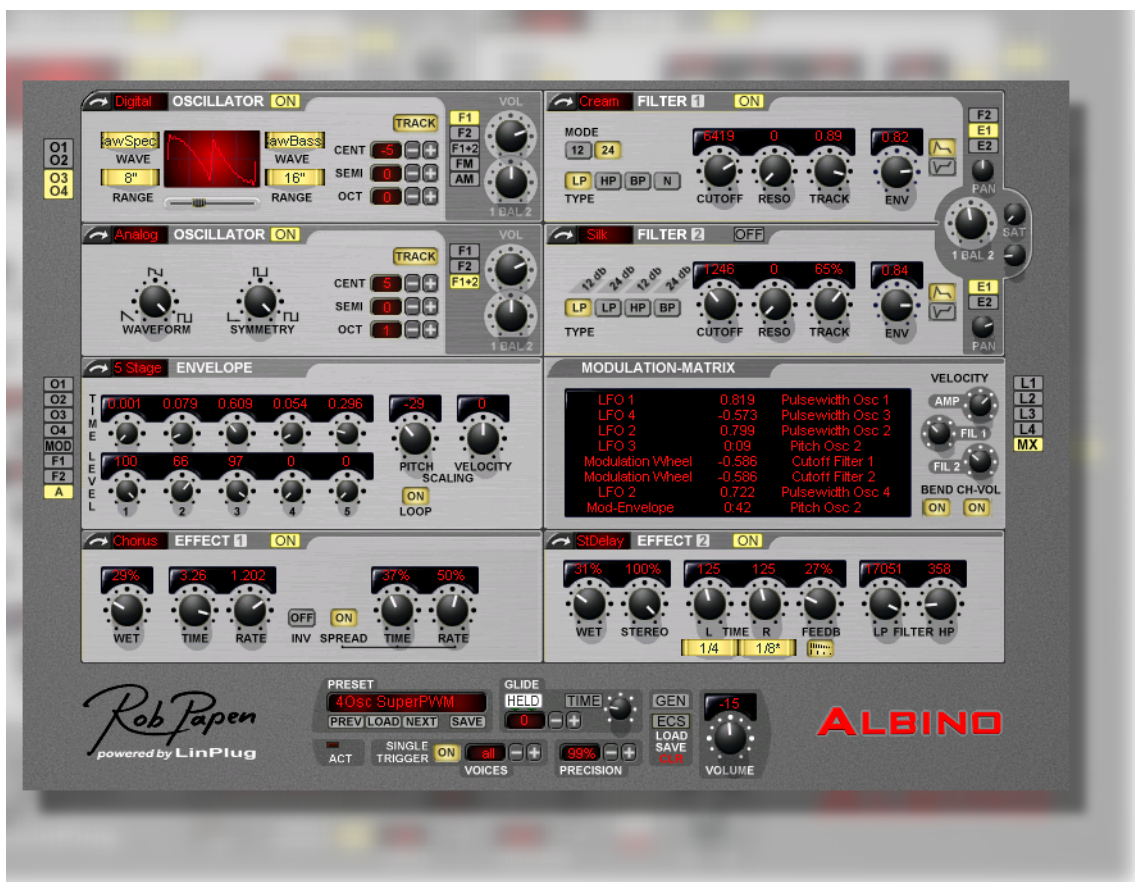


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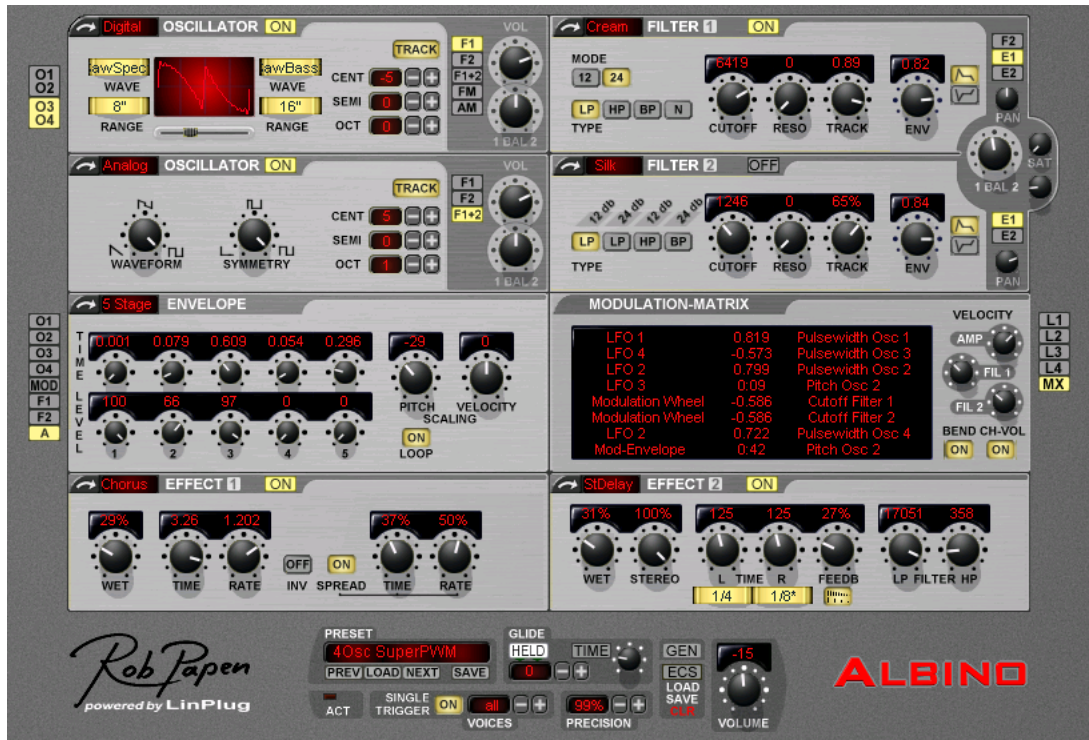
RP VSTI SYNTHESIZER



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# ALBINO

RP VSTI SYNTHESIZER



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Concept by Rob Papen and Peter Linsener  
 Instrument by Peter Linsener  
 Sounds by Rob Papen  
 Manual by Chris Share

Thanks to (in alphabetical order) Dutch Synth Forum, Ivan Willems, Kelvin Russell, Patrick Anglard, Scot Solida and all beta testers!

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# Welcome

Thank you for buying the Rob Papen Albino.

The Albino is a fully professional, highly-flexible, easy-to-use, third-generation VST (Virtual Studio Technology) instrument designed for creating music on your personal computer.

The Albino is the unique result of a collaboration between VST Instrument designer Peter Linsener and Dutch sound designer Rob Papen.

The Albino's key features include high quality presets in a wide range of styles, an easy-to-use interface, highly flexible oscillators, two types of stereo filters and an enormous range of processing and modulation options.

This manual describes all aspects of the Albino synthesizer and is designed so that your use of this software is as efficient and as painless as possible.

We feel that the Albino is exceptional because of its audio quality, its features and especially because of the presets programmed by Dutch sound designer Rob Papen. We hope you get a lot of pleasure using the Albino Synthesizer and that it becomes an integral part of your music-making.

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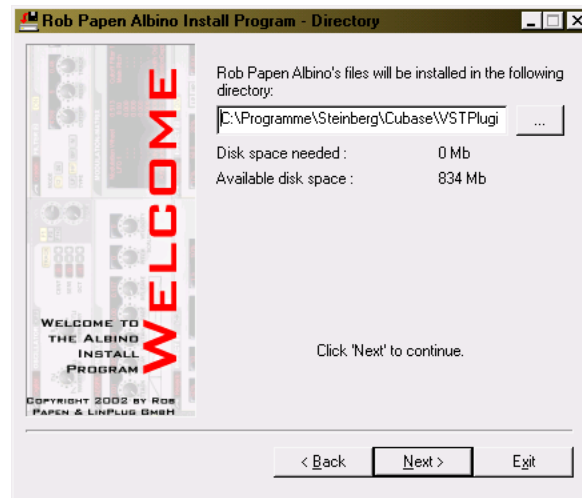
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# PC Installation

The Albino comes with its own Installer. After downloading the Albino you will find a file named "Albino.exe" located in your download folder. Double-click on this program to begin the installation process.

Once installation commences you will see the window shown below:



By clicking the three dots on the right of the "Extract to" textbox you can choose the plug-in directory to which all files will be copied. Refer to your host software's manual if you are unsure about where the host software plug-in directory is located.

The following is a list of plug-in directories that are present in commonly used sequencing programs:

- C:/Programs/Steinberg/Cubase/VstPlugIns
- C:/Programs/Emagic/Logic.../VstPlugIns
- C:/Programs/FruityLoops3/PlugIns/VST
- C:/Programs/OrionPro/VstInstruments
- C:/Programs/n-Track Studio/Vstplugins

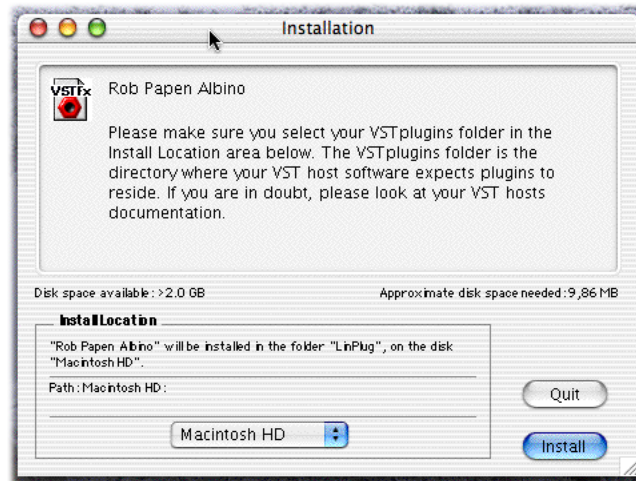
After selecting the desired directory click the "Start" button. The instrument file "Albino.DLL" and the Albino manual and presets will now be placed in the chosen directory. The next time you start your host software the Albino will be listed in the VST Instrument list.

If you have any questions regarding the installation of the Albino please contact [support@linplug.com](mailto:support@linplug.com)

# Mac Installation

The Albino comes with its own Installer. After downloading the Albino you will find a file named "Albino.sit" located in your download folder. Double-click this file to decompress it, then double-click the installer program to begin the installation process.

Once installation commences you will see the window shown below:



You can choose the plug-in directory to which all files will be copied by clicking the "Macintosh HD" button on the lower part of the installer's window. This opens a popup menu from which you can use the "Select Folder" option to set the folder to which all files will be copied.

If you are using Mac OS-9 the plugin directory is normally found in the following location:

MacintoshHD:Programs:Cubase:VstPlugIns

Refer to your host software's manual if you use a host other than Cubase or if you are unsure about where the host software plug-in directory is located.

If you are using Mac OS-X you should install the plug-in into the following location:

MacintoshHD:Library:Audio:Plug-Ins:VST

After selecting the desired directory click the "Install" button. The instrument file "Albino" and the Albino presets will now be placed in the chosen directory. The next time you start your host software the Albino will be listed in the VST Instrument list.

If you have any questions regarding the installation of the Albino please contact [support@linplug.com](mailto:support@linplug.com)

# Features

The Albino contains a range of features designed to make your music-making more efficient and enjoyable. These features are described below:

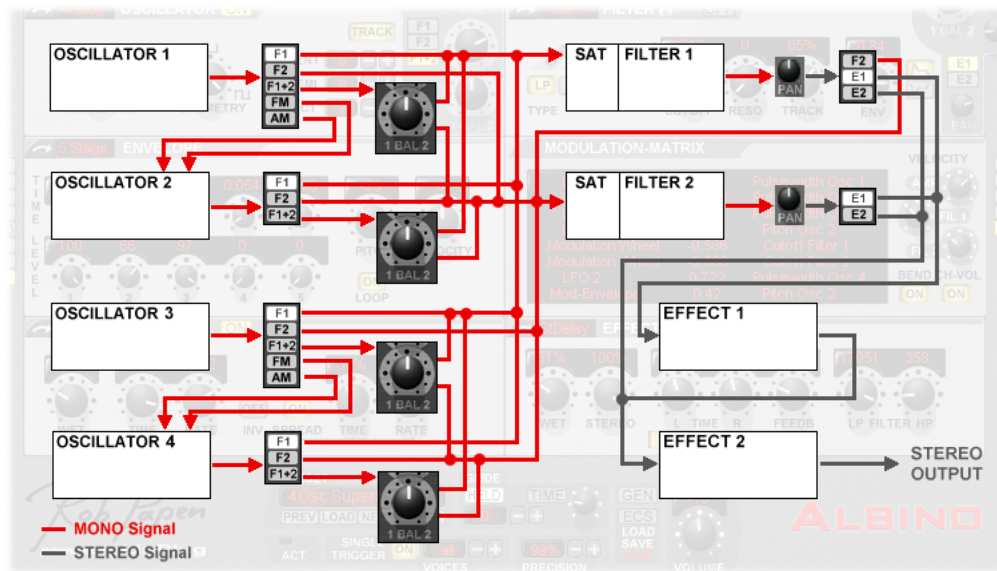
- 4 oscillators, 3 types. Oscillator modules include Analogue-type, Digital-type and Noise-type. FM modulation and AM modulation. Various filter routing options.
- Stereo Filters, 2 types. Filter modules include Silk-type and Cream-type. All are multimode filters, each with a different basic design thus producing different sounding filters. Filters are stereo with panning and panning modulation options. Saturation knob precedes each filter for filtering of overdriven sounds.
- 8 envelopes, 2 types. ADSFR type and 5-stage envelope type with loop function. Each oscillator has its own volume envelope.
- 4 LFOs with various waveforms and midi-syncable. LFO Waves have adjustable start-phase and waveform-symmetry. LFOs can also be set to mono mode.
- Modulation Matrix which includes 8 routings with 23 sources and 34 destinations. Seperate control section for Velocity to: AMP, Filter 1 and Filter 2.
- 2 effects blocks containing 6 stereo effect including Chorus, Delay, Filter, Phaser, Reverb and Stereo Delay.
- Mono/Polyphonic Portamento/Glide featuring Fingered mode, switchable constant Time/constant Rate and Auto-Bend Modes.
- Sound programs are stored directly on hard disk so providing a virtually unlimited number of storage locations. Sounds are sorted into style-maps for easy search.
- Adjustable Precision setting for recreating the warmth of true analogue synthesizers.
- Gen (randomize) function for experimentation and fun!
- 32-voice polyphony.
- Adjustable voice limit (mono, 1...8, all).
- MIDI activity display (also triggers a C3 when clicked)
- Several parameters are located on the "rear panel" so they are not changed accidentally during use.
- Controller hardware (faderbox or synth) settings can be staved and restored.
- Dial operation is switchable between circular and linear modes.



# Overview

The Albino is a 32 note-polyphonic VST analogue-style synthesizer with some extraordinary features. The synthesizer has a modular design that includes various oscillator modules, filter modules, envelope modules and effects modules.

The block diagram below shows the signal flow within the Albino VSTi synthesizer:



The design of the Albino can be divided into 6 sections: Oscillator, Filter, Effects, Envelope, Modulation Matrix/LFO and Master.

Audio signals are generated by an oscillator that gets pitch information from the synthesizer's MIDI input. The MIDI input is automatically connected to MIDI output of the host software. Albino receives MIDI on all Channels simultaneously.

The Albino has four oscillators. Each oscillator has its own amplitude envelope. Each oscillator's pitch can be controlled using the Modulation Matrix, with all four oscillators being controlled by a single modulation envelope. The modulation intensity of each oscillator also has its own control.

The output of any or all of the oscillators can be routed to either Filter 1, Filter 2 or both in series or parallel as shown above. The filter modifies the harmonic spectrum of the oscillator's output. Both filters are stereo and completely independent, and each has an envelope for controlling its cutoff parameter.

Oscillators one and three have a further routing option. Their output can be used to crossmodulate the frequency and amplitude of oscillators two and four respectively. This option increases the harmonic spectrum of the modulated oscillators producing very interesting, harmonically-rich results.

The output of the Filter section is then sent to the Effects section which contains two independent stereo effects modules, each of which contains a Mono Delay, a Chorus, a Phaser, a Filter, a Reverb and a Stereo Delay. Each effects processor is described in detail later in this manual. Module 2 comes after Module 1 in the signal chain. By sending the filters' output to Module 1 you can use both effects modules simultaneously.

The audio outputs of the Albino are automatically connected to the input of your host software's mixer. Here you can set the pan position of the Albino's output.

At various points throughout the signal path you can modulate the signal using either envelopes, LFOs or MIDI Controllers. The Albino contains 8 independent envelopes. The first 4 control each oscillator's amplitude. Envelopes 6 and 7 can be used to control Filter 1 and Filter 2, while Envelope 8 controls the overall audio amplitude. Envelope 5 is a general purpose envelope designed for use with the Modulation Matrix and so can control any available modulation destination.

The Albino also contains 4 independent LFOs. Each LFO has its own envelope controls as well as syncing and waveshaping options. LFOs can be routed to any available modulation destination.

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

# Controls

Users have the option of controlling all Albino dials in either a circular or a linear manner depending on the Dial Mode setting on the Albino's rear panel (see the "Main" section of this manual for more information about the Albino's rear panel).

Holding down the ALT key while clicking on a control changes the selected control's value a minimum step upwards (when clicking in the upper half of the control) or a minimum step downwards (when clicking in the lower half of the control).

Holding down the CTRL key while clicking on a control sets the control to its default value (e.g. for Volume controls it sets the control's value to -6 dB).

All Controls can be automated using external MIDI messages. To do this you need to use the Albino's ECS which is described in detail later in this manual.

# Oscillators

The Albino contains 4 oscillators grouped into 2 pairs ("O1/O2", "O3,O4"). Each oscillator pair is identical to the other. To change oscillator pairs click on the buttons on the left of the Oscillator section.



The Albino Matrix Synthesizer contains three types of oscillator module: "Analog", "Digital" and "Noise". Don't be confused by the use of the terms "digital" and "analog" here; all of the Albino's oscillators are digital (obviously!). In this case, we've used the term "digital" to describe oscillators that uses additive waveforms, while "analog" oscillators use waveforms that are created in real-time much as in true analog synthesizers.

As mentioned above, the Albino contains several types of oscillator module. To change the oscillator type click on the menu to the left of the Oscillator label. When you change oscillator type, the Albino's display changes accordingly. Each oscillator also has an "On/Off" switch to the right of the Oscillator label.

Each oscillator's controls differ slightly. These described in detail below.

## Digital Oscillator



The Albino's "Digital" oscillator outputs a waveform that is a combination of two basic waveforms. The Albino's Digital oscillator waveforms are constructed from harmonic sine waves using a unique additive process which ensures a smooth, high quality output signal.

The type of waveform is set by clicking on the Wave item on either side of the Waveform Display. This opens a menu that allows you to select from the available waveforms. See Appendix A for a complete list of all Digital oscillator waveforms. The combined output waveform is shown in the Waveform Display. The waveform's pitch range is set in a similar manner using the Range item.

Below the Waveform Display is a slider that allows you to interpolate between the two waveforms. When the slider is at its leftmost setting, the waveform consists of purely the leftmost waveform. Similarly, if the slider is moved all the way to the right the waveform consists of purely the rightmost waveform. When in an intermediate position, the waveform consists of a mixture of the two waveforms. It's probably easier to see this rather than explain it, so try it for yourself. Set one wave to Sine and the other to a different wave such as Sawtooth. As you move the slider from one end to the other you can see the wave "morph" from one waveshape to the other. The Waveform display shows a number of cycles corresponding to the lowest waveform range setting.

The Digital oscillator has a range of controls for oscillator tuning and output. These are: Track, Cent, Semi, Oct, F1, F2, F1+2, FM, AM, Vol and Bal.

The Track, Cent, Semi and Oct controls are used to set the oscillator's pitch. The Track button determines whether the oscillator tracks the pitch of incoming MIDI. Cent sets the oscillator pitch in cents (a semitone is equal to 100 cents). A range of -100 to +100 cents is available. Semi sets the oscillator pitch in semitones. A range of -11 to +11 semitones is available. Oct sets the oscillator pitch in octaves. A range of -2 to +7 octaves is available.

The F1, F2, F1+2, FM, AM buttons determine the oscillator output destination. F1 selects Filter 1, F2 selects Filter 2 while F1+2 selects both filters. In the latter case you can use the Bal dial to control how much of the signal each filter receives (see below).

In the case of Oscillator 1 and 3, two further routing options are available, both of which can be used to create complex, harmonically-rich waveforms. FM allows you to modulate the frequency of oscillators 2 and 4 using oscillators 1 and 3. This type of modulation, known as Frequency Modulation, is great for producing metallic, bell-like tones. AM allows you to modulate the amplitude of oscillators 2 and 4 using oscillators 1 and 3. This type of modulation, known as Amplitude Modulation can also be used to produce rich and complex waveforms.

Finally, the Vol dial is used to set the output volume of the oscillator while the Bal dial determines the proportion of the signal that is sent to Filter 1 and Filter 2. Turning the Bal dial all the way to the right sends all of the oscillator's output to Filter 2, while turning it all the way to the left sends all of the output to Filter 1.

## Analog Oscillator



The Analog oscillator module creates its waveforms in real-time and emulates the sound of an analog synthesizer's oscillator. It contains two controls: Waveform and Symmetry.

The Waveform dial sets the oscillator's waveform shape. When turned all the way to the right it outputs a pulse wave. When turned all the way to the left it outputs a sawtooth wave. In intermediate positions it outputs a waveform that is a combination of the two.

The Symmetry dial effects the waveform's shape, expanding and contracting it, as in the case of pulse width modulation. In this case however, the waveform reshaping can be applied to any available waveform.

The "Analog" oscillator module contains a range of controls for oscillator tuning and output. These include: Track, Cent, Semi, Oct, F1, F2, F1+2, FM, AM, Vol and Bal.

The Track, Cent, Semi and Oct controls set the oscillator's pitch. The Track button determines whether the oscillator tracks the pitch of incoming MIDI. Cent sets the oscillator pitch in cents (a semitone is equal to 100 cents). A range of -100 to +100 cents is available. Semi sets the oscillator pitch in semitones. A range of -11 to +11 semitones is available. Oct sets the oscillator pitch in octaves. A range of -2 to +7 octaves is available.

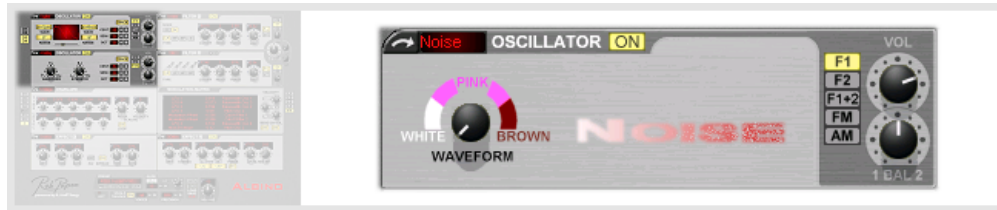
The F1, F2, F1+2, FM, AM buttons determine the oscillator output destination. F1 selects Filter 1, F2 selects Filter 2 while F1+2 selects both filters. In the latter case you can use the Bal dial to control how much of the signal each filter receives (see below).

In the case of Oscillator 1 and 3, two further routing options are available, both of which can be used to create complex, harmonically-rich waveforms. FM allows you to modulate the frequency of oscillators 2 and 4 using oscillators 1 and 3. This type of modulation, known as Frequency Modulation, is great for producing metallic, bell-like tones. AM allows you to modulate the amplitude of oscillators 2 and 4 using oscillators 1 and 3. This type of modulation, known as Amplitude Modulation can also be used to produce rich and complex waveforms.

Finally, the Vol dial is used to set the output volume of the oscillator while the Bal dial determines the proportion of the signal that is sent to Filter 1 and Filter 2. Turning the Bal dial all the way to the right sends all of the oscillator's output to Filter 2, while turning it all the way to the left sends all of the output to Filter 1.



## Noise Oscillator



The Albino's "Noise" oscillator module offers three types of noise waveform: White, Pink and Brown. The type of waveform is set by rotating the waveform dial. For more information about these waveforms please see the Glossary section of this manual.

The "Noise" oscillator module contains a range of controls for oscillator output. These include: F1, F2, F1+2, FM, AM, Vol and Bal.

The F1, F2, F1+2, FM, AM buttons determine the oscillator output destination. F1 selects Filter 1, F2 selects Filter 2 while F1+2 selects both filters. In the latter case you can use the Bal dial to control how much of the signal each filter receives (see below).

In the case of Oscillator 1 and 3, two further routing options are available. FM allows you to modulate the frequency of oscillators 2 and 4 using oscillators 1 and 3. This type of modulation is known as Frequency Modulation. AM allows you to modulate the amplitude of oscillators 2 and 4 using oscillators 1 and 3. This type of modulation, known as Amplitude Modulation.

Finally, the Vol dial is used to set the output volume of the oscillator while the Bal dial determines the proportion of the signal that is sent to Filter 1 and Filter 2. Turning the Bal dial all the way to the right sends all of the oscillator's output to Filter 2, while turning it all the way to the left sends all of the output to Filter 1.

# Filters

The Albino contains two types of filter: "Silk" and "Cream". Both are multi-mode filters, each having a different design. A lot of care and attention has been paid to the Albino's filter design in order to make them especially "musical" and to ensure that they use very little CPU resources.



The Albino has 2 filter modules, each of which can be set to one of the two filter types mentioned above. To turn a filter on or off, select the "On/Off" button to the right of the filter's label. An important point to note is that when a filter is turned off no audio can pass through it. To change the filter type click on the menu to the left of the Filter label.

The output from both filters can be sent to either Effect 1 or Effect 2 by clicking on the output buttons to the right of the filter module. Filter 1 has an additional option; its output can be sent to Filter 2. This can be used to produce really extreme filtering.

Each filter has its own "Sat" (Saturation) dial located on the far right of the filter section. The Sat dial is used to overdrive the Albino's filters. Although the Sat dial is located on the right of each filter section, in terms of signal flow, it precedes the filter so that the overdriven signal passes through the filter.

Each filter also has its own Pan control. This is used to position the filter's output signal within the stereo field.

A Balance control is also available. This is used to set the relative output levels of Filter 1 and Filter 2. When set all the way to the right Filter 2 outputs with maximum volume while Filter 1 is muted. When set all the way to the left Filter 1 outputs with maximum volume while Filter 2 is muted. When set to an intermediate position both filters' output is in proportion to the dial's position. When connecting both filters in series (that is, when you route Filter 1 to Filter 2) this control should be set to the middle position.

Each filter's controls differ slightly. These controls are described in detail below.

## Silk Filter



The Silk filter contains 4 filter types: LP 12 dB (Low Pass 12 dB/Oct), LP 24 dB (Low Pass 24 dB/Oct), HP (High Pass 12 dB/Oct) and BP (Band Pass 24 dB/Oct).

The Silk filter contains several parameter controls. These are: Cutoff, Reso (Resonance), Track (Tracking), Env (Envelope Depth) and Envelope Direction.

Cutoff is used to set the frequency (in Hz) above which frequencies are filtered out of the signal. When using the Low Pass filters higher settings produce brighter sounds while lower settings result in darker sounds. When using the High Pass filters higher settings produce thinner, brighter sounds, while lower settings produce fatter, darker sounds.

Resonance is used to set the amount of emphasis around the cutoff frequency. Higher settings create a more pronounced peak in the signal while lower settings produce a flatter response.

Tracking is used to control the degree to which the filter tracks the signal's frequency.

Env is used to set the degree to which the filter's envelope effects the signal. Setting Env to 0.00 means that the envelope has no effect on the filter. Setting Env to 1.00 means that the filter is modulated by the envelope's full range.

The Envelope Direction button is used to set either a positive or negative envelope shape. This can be used for a range of effects including opening the filter when a note is released (this is impossible with a non-inverted envelope).

## Cream Filter



The Cream filter has 4 types and 2 modes. The 4 types are: LP ("Low Pass"), HP ("High Pass"), BP ("Band Pass") and N ("Notch"). Each of these filter types can be set to either 12 dB or 24 dB modes.

The Albino filter contains several parameter controls. These are: Cutoff, Reso (Resonance), Track (Tracking), Env (Envelope Depth) and Envelope Direction.

Cutoff is used to set the frequency (in Hz) above which frequencies are filtered out of the signal. When using the Low Pass filters higher settings produce brighter sounds while lower settings result in darker sounds. When using the High Pass filters higher settings produce thinner, brighter sounds, while lower settings produce fatter, darker sounds.

Resonance is used to set the amount of emphasis around the cutoff frequency. Higher settings create a more pronounced peak in the signal while lower settings produce a flatter response.

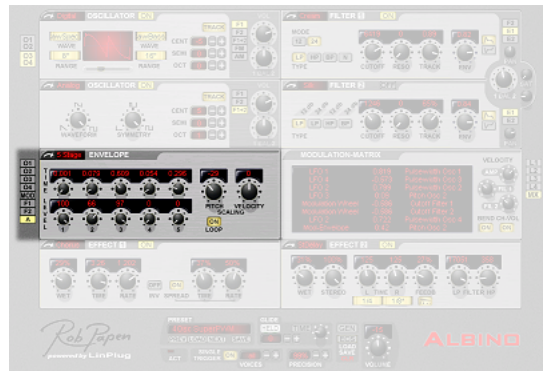
Tracking is used to control the degree to which the filter tracks the signal's frequency.

Env is used to set the degree to which the filter's envelope effects the signal. Setting Env to 0.00 means that the envelope has no effect on the filter. Setting Env to 1.00 means that the filter is modulated by the envelope's full range.

The Envelope Direction button is used to set either a positive or negative envelope shape. This can be used for a range of effects including opening the filter when a note is released (this is impossible with a non-inverted envelope).

# Envelopes

The Albino has 8 independent envelopes available for controlling various parameters. Seven of the envelopes have a pre-set destinations while the eighth ("Mod") can be routed to the Modulation Matrix and then sent to any of its modulation destinations. These destinations are: Oscillator 1, Oscillator 2, Oscillator 3, Oscillator 4, Mod, Filter 1, Filter 2 and Amplitude. To select an envelope click on one of the buttons to the left of the Envelope section.



Two options are available for controlling the envelopes: ADSFR and 5 Stage. To change the envelope type click on the menu to the left of the Envelope label. In general, the ADSFR envelope type sounds more natural (due to its exponential decay) while 5 Stage uses linear slopes and thus gives a different sound.

## ADSFR Envelope



The ADSFR envelope-type consists of controls for Attack, Decay, Sustain, Fade and Release.

The Attack dial setting determines the length of time (in seconds) it takes for the amplitude envelope to reach the full envelope depth. For example, if the Attack slider is set to 0.100 seconds, the sounds amplitude will move from zero to full volume within 100 milliseconds.

The Decay dial setting determines the length of time (in seconds) that the amplitude envelope takes to move from the Attack peak level to the Sustain level.

The Sustain dial setting determines the amplitude level after the initial Attack/Decay phase.

The Fade dial is used to set the rate at which the signal amplitude moves from the Sustain level to either silence (for negative Fade values) or full output (for positive Fade values). A Fade setting of 0 means that the signal amplitude remains at the Sustain level until the key is released.

The Release dial is used to set the length of time (in seconds) that the amplitude envelope takes to move from the current level to silence after the key is released.

Pitch Scaling allows you to scale the envelope time using the pitch of the incoming MIDI note.

Velocity Scaling allows you to scale envelope time using the velocity of the incoming MIDI note.

In both cases, setting the dial to 0 means that the envelope is not scaled according to the incoming MIDI note's pitch or velocity.

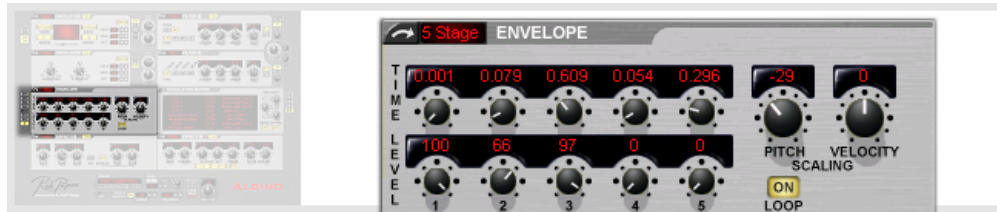
The dials can be set to deliberately under-track or even reverse-track. This allows you to create sounds that are very smooth and even across their range, or that drastically change across their range (as is the case with many acoustic instruments). Reverse Track produces an unnatural effect which is useful for more experimental sounds.

Pitch Scaling is often used in creating Patches that have different amplitude release characteristics across their range. By setting an amplitude envelope's Pitch Scaling parameter to a value greater than 0 you can create a Preset in which low frequency notes have a longer release time while the high frequency notes have a short release time.

Velocity Scaling can be used in a similar manner.



## 5 Stage Envelope



In the 5 Stage Envelope each section of the envelope has its own Time and Level setting. The Time setting indicates the time (in seconds) it takes for the signal amplitude to reach the corresponding Level setting.

In the above example the full level (100) is reached in 1 milliseconds (ms) after the note has started. The envelope falls to 66% within 79 ms, rises slowly to 97% within a 609 ms (or 0.609 seconds) and falls to a sustain level of 0% within 54 ms.

Note that the 4<sup>th</sup> level is always the Sustain level and the 5<sup>th</sup> time and level are the release time and the release level. The release level should normally be 0.

The "Loop" button makes the envelope loop continuously. When the Sustain level (4<sup>th</sup> level) is reached, the envelope starts from the beginning again, and is looped as long as the note is held. Once the note is released it no longer loops but instead moves into the release stage (5<sup>th</sup> level) from wherever it is at the moment the note is released. This can be used in conjunction with the Albino's Single Trigger mode to apply a continuous, repeating envelope to a series of notes.

Pitch Scaling allows you to scale the envelope time using the pitch of the incoming MIDI note.

Velocity Scaling allows you to scale envelope time using the velocity of the incoming MIDI note.

In both cases, setting the dial to 0 means that the envelope is not scaled according to the incoming MIDI note's pitch or velocity.

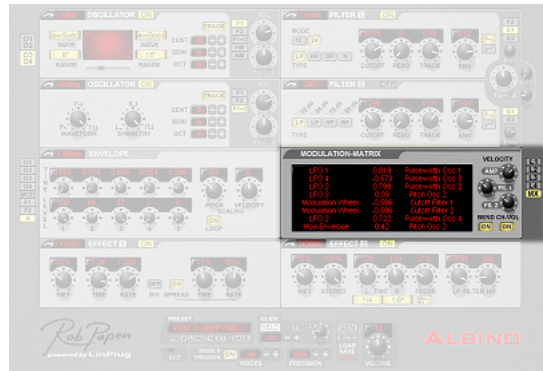
The dials can be set to deliberately under-track or even reverse-track. This allows you to create sounds that are very smooth and even across their range, or that drastically change across their range (as is the case with many acoustic instruments). Reverse Track produces an unnatural effect which is useful for more experimental sounds.

Pitch Scaling is often used in creating Patches that have different amplitude release characteristics across their range. By setting an amplitude envelope's Pitch Scaling parameter to a value greater than 0 you can create a Patch in which low frequency notes have a longer release time while the high frequency notes have a short release time.

Velocity Scaling can be used in a similar manner.

# Modulation

One of the key features of the Albino is its sophisticated modulation capabilities. The instrument contains four independent LFOs (low frequency oscillators) as well as a Modulation Matrix that is used to control modulation routing.



To select one of the LFOs click on one of the four buttons ("L1", "L2", "L3", "L4") to the right of the Quad LFO/Modulation Matrix section. To select the Modulation Matrix click on the "MX" button beneath the four LFO buttons.

The LFO controls and Modulation Matrix are described in more detail below.

## Quad LFO



An LFO is an oscillator that generates low frequency signals that can be used to modulate other aspects of the signal. The Albino contains 4 separate LFOs each offering 9 user parameters. These are: Wave, Freq (Frequency), Symmetry, Phase, Delay, Attack, Decay, Sync and Mono.

To select one of the LFOs waveforms click on one of the waveform buttons at the bottom left of the LFO section. Six LFO waveforms are available: Sine, Triangle, Ramp, Square, Noise and Sample and Hold. It should be noted that when the Noise and Sample and Hold waveforms are synced to tempo, they run at a faster tempo than the other LFO waveforms. For example, if you set sync to 1/1, use a tempo of 120 bpm and play a whole note (4 beats), the duration of one cycle of the regular waveforms (Sine, Triangle, Ramp, Square) will be 2 seconds. However, the Sample and Hold and Noise waveforms will change their state within 1/8 of 2 seconds or 0.25 seconds.

The "Freq" (Frequency) parameter determines the LFO's frequency (in Hz).

The "Symmetry" parameter can be used to distort the waveform's shape, stretching it or compressing it as required.

The "Phase" parameter sets the point in the waveform cycle at which modulation begins.

You can also apply an envelope to the LFO using the Delay, Attack and Decay dials.

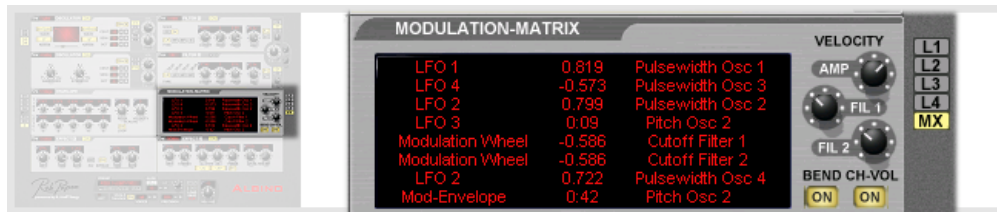
The "Delay" parameter sets the amount of time (in seconds) before the LFO begins modulating the signal. A Delay setting of 0 means that the LFO begins operating immediately.

The Attack dial setting determines the length of time (in seconds) it takes for the LFO to reach the full modulation depth. This can be used to slowly increase the amount of modulation applied to the signal. A setting of 0 means that modulation commences immediately.

The Decay dial setting determines the length of time (in seconds) that the LFO modulation depth takes to move from the Attack peak amount to 0. Setting this parameter to oo (infinite) means that modulation is applied for an infinite amount of time, that is, the full duration of the signal. Finally, you can use the Sync menu to sync LFO triggering with the current tempo (see Appendix B for the range of possible sync settings).

The Mono button enables one LFO waveform to be applied to all synth voices simultaneously. When the Mono button is off the LFO waveform is applied to each voice individually. Alternatively, when the Mono button is on, a single LFO is used for all voices and runs permanently.

## Modulation Matrix



The Albino's Modulation Matrix allows you to create 8 user-defined modulation routings. 34 modulation destinations are available for modulation by 24 modulation sources (see Appendix C for a listing and description of all modulation sources and destinations).

Modulation sources are shown in a column on the left of the display, while the destinations are shown on the right. The modulation amount is displayed in the middle. To change a routing click on the source or destination that you want to change. A menu will appear which lets you select the new source or destination. To remove a modulation source or destination select the "- - - -" entry in the menu.

To change the modulation depth click on the amount display and move the mouse (while keeping the mouse button pressed) upwards or downwards (increasing or decreasing the value) until the desired amount has been reached. A negative modulation depth inverts the waveform of the modulation source.

The modulation of Main Pitch has a special display for modulation depth. The example above shows a modulation depth of "0:42" (see last row of the Modulation Matrix). This means oscillator 2's pitch is modulated to a depth of 0 semitones and 42 cents (or 0.42 semitones) by the modulation envelope.

The three dials on the right of the Modulation Matrix are used to determine 3 default modulation settings: the Amplitude ("Amp") by the MIDI key velocity, the Filter 1 Cutoff Frequency ("Fil 1") by MIDI key velocity and the the Filter 2 Cutoff Frequency ("Fil 2") by MIDI key velocity.

The two buttons ("Bend" and "Ch-Vol") on the bottom right of the Modulation Matrix are used to select two default modulation settings: pitch modulation by the pitch wheel ("Bend"), and Patch volume by the MIDI channel volume ("Ch-Vol"). The amount of pitch change caused by the pitch wheel can be set on the Albino's rear panel (see below for more information about the Albino's rear panel).

Remember, without using the Modulation Matrix the following can be modulated:

- the oscillators' amplitude by an envelope,
- the envelope rate by the pitch of the note played,
- the envelope rate by the velocity of the note played

## Effects

The Albino has two independent stereo effects units: Effect 1 and Effect 2. Both effects units are identical



Each effects unit contains six modules: Delay, Chorus, Phaser, Filter, Reverb and Stereo Delay ("StDelay"). To change the effect type click on the menu to the left of the Effect label. Both effects modules can be set to either "On" or "Thru" using the button to the right of the Effect label.

Each effect's controls differ. All effects are described in detail below.

**Hint:** Even if a preset does not use effects most often the effects are programmed to add a usefull effect to the sound when switched on. So switch it on just to see how the sound changes and if this may suite your needs better.



## Delay



The Delay effect can be used to create "echoes" and other related effects. It features controls for "Wet", "Time", "Feedback", "Filter", "Depth", "Rate" and "Sync".

The Wet dial allows you to set the balance between the processed "wet" signal and the original unprocessed "dry" signal.

The Time dial is used for setting the delay time (in milliseconds). This can range from 1 ms to 680 ms.

The Feedback dial allows you to set the number of times the signal repeats or "echoes".

Also included in the Delay section is a variable low pass/high pass 6dB/Oct filter.

The Depth dial is used to set the depth to which the delayed signal is modulated, while the Rate dial determines the modulation speed. For example, if you set a delay time of 100ms and a depth of 50%, the amount of modulation is 50% of 100ms (50 ms). In this case you'll get a delay time that varies from 100 - 50ms (50ms) up to 100 + 50ms (150ms).

The Delay Rate sets the rate (in Hz) at which the modulation takes place. As an example, when you set the Delay Rate to 0.5Hz you get a complete sweep from 50ms (using the above example) to 150ms and back to 50ms in 2 seconds. Finally, you can use the Sync menu to sync the delay time with the current tempo (see Appendix D for the range of possible sync settings).

When modulation is applied a stereo effect is created because both channels are modulated in opposite directions.

## Chorus



The Chorus effect can be used to "thicken" a single sound creating the impression that it contains multiple voices. The Chorus works by mixing delayed signals with the original signal. The Albino's Chorus features controls for "Wet", "Time", "Rate", "Inv", "Spread", "Spread Time" and "Spread Rate".

The Wet dial allows you to set the balance between the processed "wet" signal and the original unprocessed "dry" signal.

The Time dial is used for setting the delay time (in milliseconds). Longer times produce a "chorusing" effect while shorter times create a "flanging" effect.

The Rate dial sets the rate at which the signal is modulated.

The Inv (Invert) button allows you to invert the signal that is used to create the chorus effect. This is particularly useful when creating flanged sounds with shorter delay times (0.25 ms and below).

A unique feature of the Albino Chorus is its Spread parameter which is turned on or off using the Spread button. Basically, "Spread" makes the chorus sound fatter by adding random deviations to the Time and Rate parameters. The degree of "randomness" depends on the spread Time and Rate parameters; setting the Spread Time and Rate to 0 cancels the effect; increasing the value of the Spread Time and Rate parameters adds additional richness and fullness to the sound. It can also make the effect sound more natural.

## Phaser



The Albino Phaser can be used to create "swirling" dynamic movement in sounds. The Phaser effect is created by automatically sweeping a series of equally spaced frequency notches up and down the audio spectrum. The Albino's Phaser features controls for "Wet", "Rate", "Depth", "Center", "Feed", "Inv" (Invert) and "Stages".

The Wet dial allows you to set the balance between the processed "wet" signal and the original unprocessed "dry" signal.

The Rate dial sets the rate at which the signal is modulated. The Depth dial is used to set the depth to which the signal is modulated.

The Center dial is used to set the frequency around which modulation occurs.

The "Feed" (Feedback) control is used to set the amount of internal feedback employed within the phaser. More internal feedback produces increasingly pronounced resonant peaks.

The Inv (Invert) button allows you to invert the signal that is used to create the phasing effect.

The final phaser control is "Stages". Each phaser stage shifts the signal's phase by 180 degrees. The higher the Albino's Stages setting, the more frequency notches there are in the signal and so the more pronounced is the phasing effect.

## Filter



The Filter features controls for: Wet, Satur (Saturation), Filter Type, Cutoff, Reso (Resonance), Cutoff-Mod Speed and Cutoff-Mod Depth.

The Wet dial allows you to set the balance between the processed "wet" signal and the original unprocessed "dry" signal.

The "Satur" (Saturation) dial enables you to set the amount of filter drive or distortion.

The Filter Type buttons allow you to select one of four filter types: LP (Low Pass), HP (High Pass), BP (Band Pass) and N (Notch).

The Cutoff dial is used to set the frequency (in Hz) above which frequencies are filtered out of the signal. When using the Low Pass filters higher settings produce brighter sounds while lower settings result in darker sounds. When using the High Pass filters higher settings produce thinner, brighter sounds, while lower settings produce fatter, darker sounds.

The Resonance dial is used to set the amount of emphasis around the cutoff frequency. Higher settings create a more pronounced peak in the signal while lower settings produce a flatter response.

The filter's cutoff frequency can be controlled using the Cutoff-Mod Speed and Cutoff-Mod Depth controls. The Cutoff-Mod Speed dial allows you to set the rate (in Hz) at which the filter's cutoff frequency is modulated. The Cutoff-Mod Depth control is used to set the depth to which the filter's cutoff frequency is modulated. A setting of 0% means no modulation occurs.

## Reverb



The Reverb effect is used to add ambiance to sounds. It features controls for: Wet, Predelay, Roomsize and Damp (Damping).

The Wet dial allows you to set the balance between the processed "wet" signal and the original unprocessed "dry" signal.

The Predelay dial enables you to delay the processed signal by a given amount (in milliseconds) so as to achieve a more natural reverberation. Normally, shorter predelay times are applied in the case of smaller room sizes while longer predelay times are applied in the case of bigger room sizes.

The Roomsize dial is used to set the size of the simulated room. The Roomsize varies from a small chamber (displayed as small box) up to a huge hall (displayed as big box). You can also set the room size by clicking directly on the Roomsize display.

The simulated room's wall materials can be adjusted with the Damp (Damping) control. This parameter ranges from practically loss-free reflecting walls (0% damping) up to very absorbent walls (90% damping). In practical terms, the amount of damping determines the amount of higher frequencies that are contained in the processed signal: The higher the Damp setting, the less higher frequencies are contained in the processed signal.

## Stereo Delay



The Stereo Delay features controls for: Wet, Stereo, L Time, R Time, FeedB (Feedback), LP Filter (Cutoff), HP Filter (Cutoff), Left Channel Sync, Right Channel Sync and Feedback Couple.

The Wet dial allows you to set the balance between the processed "wet" signal and the original unprocessed "dry" signal.

The Stereo dial sets the position of the echoes in the stereo field. When the dial is set all the way to the right the delay's output is full stereo. As the dial is turned anti-clockwise the stereo positioning of the delay's output becomes narrower. When the dial is in the middle position both echoes appear in the middle of stereo field, thus creating a mono output. Turning the dial further to the left inverts left and right delays. When the dial is turned fully anti-clockwise the delay's output is again, stereo, however the stereo positioning of the left and right echoes is reversed.

The L Time and R Time dials are used for setting the left and right channel delay times (in milliseconds). This can range from 1 ms to 1300 ms.

The "FeedB" (Feedback) dial allows you to set the number of times the signal repeats or "echoes".

The "LP Filter" (Low Pass Filter Cutoff Frequency) dial is used to set the frequency (in Hz) above which frequencies are filtered out of the signal. Higher settings produce brighter sounds while lower settings result in darker sounds.

The "HP Filter" (High Pass Filter Cutoff Frequency) dial is used to set the frequency (in Hz) below which frequencies are filtered out of the signal. Higher settings produce thinner, brighter sounds, while lower settings produce fatter, darker sounds.

The left and right channels of the delay's output can be independently synced to the song's current tempo using the Sync menus located beneath the L Time and R Time dials (see Appendix D for the range of possible sync settings).

The Feedback Couple button (located beneath the Feedback dial) is used to automatically match the feedback amount of the shorter delay to that of the longer delay. For example, if you set the left channel delay time to 10 ms, the right channel delay time to 100 ms and feedback to 90%, you will hear the left channel delay fade out much more quickly than the right channel delay (this is what you would expect!). However, when you press the Feedback Couple button the feedback of the channel with the shorter delay time is adjusted so that the signal fades out in the same amount of time as the longer delay (thus the feedback for the shorter time is increased).

# Main

The Albino's Main section contains various controls for setting global parameters. These settings are stored within the preset.



## Preset Control

The Preset Control is used for all File-related operations. The Load button opens a dialog that lets you select a file for loading. The Previous and Next buttons allow you to traverse a list of Albino presets. The Save button allows you to save the current preset settings. The settings of all sections, including the Volume setting, are saved with the preset. The Albino loads and saves all of its presets directly to hard disk so your computer's RAM does not limit the number of available presets.

## Glide

The Glide or "portamento" section allows you to set the Albino's portamento parameters. "Glide" continuously changes the pitch from one note to the next, connecting the notes and letting you smoothly "glide" from one to the other.

The Glide section has three controls: the Glide button, the Range control, and the Time/Rate control.

The Time/Rate control has two settings: Time and Rate. These settings determine the manner in which the pitch of one note moves to that of the next note. When set to "Time", it takes a constant amount of time to move from one note to the next. In this case it will take the same amount of time to reach the destination pitch regardless of whether the preceding notes are a semitone apart or an octave apart. When set to "Rate", the amount of time it takes to move from one note to the next depends upon how far apart the two notes are. The further apart the notes, the longer it will take for the pitch of the first note to reach that of the following note.

The Glide button has 4 values: On, Off, Held and Bend. The On and Off functions turn "Glide" on and off. When "Glide" is on, the Time/Rate dial is used to set the



length of time it takes for the first note to reach that of the second note. The "Held" setting works as follows. If notes overlap then Glide is applied, however if they don't then the notes are played without Glide. This makes it possible to apply Glide only to selected notes. "Bend" allows you to apply a predetermined pitch bend to each note. The bend range is set using the Range control. A bend range of -48 to +48 semitones is available.

## **Sound Generation**

The "Gen" control is used to generate random patch settings. To generate a new patch click on the button and some or all of the current parameter settings will be changed to new settings. The Gen range is set on the Albino's rear panel (see below). Not all parameters are changed with each new random patch. With lower settings (e.g. 5%) even less parameters are affected. Normally, a setting in the range of 2 to 10% will produce the most interesting and useable results.

## **Easy Controller Setup**

The ECS (Easy Controller Setup) section makes it simple to control the Albino from an external MIDI controller (either hardware or software). All you have to do is switch on the ECS button, select a Albino parameter with the mouse and then send some MIDI messages to the Albino from you MIDI source. That's all there is to it! From now on you can change the parameter with that controller. In addition to this, more than one controller can be defined to change a particular parameter. In fact, you can define up to 128 parameter-controller-combinations. This does not depend on the type of controller you have nor the particular MIDI Control Change messages it sends. Don't forget to switch off the ECS button after you have finished using it!

ECS settings can be saved and restored using the "Load" and "Save" buttons. In addition, a single controller assignment can be cleared using the "Clear" button. All you have to do is turn on ECS, select a control and then click "Clear".

## **Volume Control**

The "Volume" control sets the overall Albino's volume. Volume can be set in a range from -24dB to +12dB.

## **Activity Indicator**

The "Act" (Activity) indicator shows if any notes are currently being played. Clicking on the indicator automatically triggers a C3 note on the synthesizer.

## Single Trigger

The Single Trigger is used to activate single trigger mode. When this switch is activated envelopes are only triggered by non-legato (or separated) notes. If you play in a legato (or overlapping) manner then envelopes are continuously applied across all notes. The envelope is only re-triggered when legato playing ceases.

## Voices Control

The Voices control is used to set the number of voices ("polyphony") available. The maximum polyphony is 32. A variety of settings are available for polyphony. These include "mono", "2" to "8" and "all". One thing that may be confusing is the "mono" setting. It can be explained as follows. Say that you hold down one key and then press and release a second key. In the case of the "mono" voice setting, the first note will sound, and then the second note sounds. When the second note is released *the first note sounds again*. This creates a "pedal tone" effect.

## Precision Control

The "Precision" control can be used to set the accuracy of the Albino's signal generation. When the "Precision" control is set to less than 100% small inaccuracies are introduced into the waveform at various point in the Albino's signal chain. This is useful if you're trying to replicate the warmth of an old analog synthesizer. Precision can be set in a range from 90% to 100%.

## Rear Panel

The "Rear Panel" of the Albino is accessed by clicking on the Rob Papen or Albino logos at the bottom of the Albino. Several master controls have been located here to make the front panel less crowded, and also so that they are not changed accidentally while the Albino is in use. The controls located here are Dial Mode, MasterTune, Bend Range and Gen Range.



Dial Mode is used to select the Albino dial operation mode. Two modes are available: "Cir" (Circular) and "Lin" (Linear). In "Cir" mode the Albino's dials track cursor movement in a circular fashion around the dial. In "Lin" mode the Albino's dials track vertical cursor movement. It's important to note that some sequencers can override the instrument's dial mode settings so if the Albino's dials are not operating in the correct manner, check the host program's settings.

Master Tune is used to set the overall tuning of the Albino. Tuning can be set from 430.0 Hz to 450 Hz.

Bend Range is used to set the Albino's response to pitch bend messages. Bend Range can be set from 1 to 24 semitones.

In order to make the Bend Range settings from the Albino's rear panel work correctly in FruityLoops, FruityLoops' pitch bend range setting for the Albino must be set to 12 . Otherwise, FruityLoops changes the PitchWheel MIDI messages.



The Gen Range control is used to set the range for random parameter generation. It has a range of 0% to 100%. Using lower values will effect the patch less than using higher values.

Finally, the rear panel also contains your Albino's serial number and version number.

To switch back to the main edit screen click the Rob Papen or Albino logos at the top of the Albino's rear panel.

## Get The Full Version

You can use the demo version of the Albino for evaluation purposes only. If you then decide that you would like to keep using the Albino you must register your demo version.

Registering the Albino is very easy. All you have to do is visit one of our online shops at [www.robpapen.com](http://www.robpapen.com) or at [www.linplug.com](http://www.linplug.com) and purchase a license. As soon as your credit card transaction has been authorized you will be sent a personal serial number. In most cases this will only take a few minutes.

After you've installed and opened the full version of the Albino, go to the instrument's rear panel. The S/N edit box should read "Please enter serial number here". Enter the serial number you have received into the S/N edit box. If the serial number has not been entered or it has been entered incorrectly, the full version of the Albino will not play any notes.

After entering the serial number return to the Albino's front panel. Now send the Albino a few note-on messages. After the Albino receives the first few note-on messages it automatically becomes registered. After registration, the S/N field is no longer editable. You can confirm this by looking at the S/N field on the instrument's rear panel.

If you have any questions regarding the Albino's registration process, please write to [support@linplug.com](mailto:support@linplug.com).

## 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 modulator that is included in an instrument adds to the CPU load. As a result, it's best to switch off any unused units within the Albino to conserve CPU resources.

# Glossary

AM:	AM or "Amplitude Modulation" is a process where the amplitude 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) tremolo is produced. When the modulation frequency is within the audio range, Ring Modulation is produced.
Amplifier:	A signal processing device that changes the amplitude, and hence the volume, of a signal.
Brown Noise:	A signal in which the amplitude is inversely proportional to pitch. It has the special property of being a "fractal" or statistically self-similar waveform. No matter how far you zoom in on the wave with an oscilloscope, the waveform has the same "texture". Brown noise is also the sound made by a "random walk" which makes the amplitude of a waveform travel up and down at random. The pitch motion of most musical melodies has a $1/f$ distribution.
Effect:	A 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) and Distortion (which changes the shape of the waveform usually adding overtones).
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. The shape of the envelope is determined by the number of control parameters. Usually four parameters are available: Attack Time, Decay Time, Sustain Level and Release Time.
Filter:	A signal processing device that suppresses or "filters" out specific parts of a signal's frequency spectrum. Numerous types of filter are used in audio synthesis. These include Low Pass, High Pass, Band Pass and Notch. The tone controls on a stereo amplifier are one example of an audio 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, Frequency Modulation is 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 volume) and tremolo (by modulating the pitch).
Modulation Matrix:	A signal "junction" where a source signal can be patched so that it controls a destination signal. The Albino's Modulation Matrix is used for tasks such as modulating an oscillator's amplitude by an LFO.
Oscillator:	A signal source that generates a periodic waveform at a given frequency.
Pink Noise:	A signal which contains equal energy per octave. This means that the volume decreases logarithmically with frequency. Pink noise sounds more natural than white noise (it sounds like rushing water or the surf) and is quite relaxing. It's often used for ambience in electronic music, and as a test signal for "tuning" sound reinforcement systems (many equalizers and audio spectrum analyzers have built-in pink noise generators).
Ring Modulation:	The process of combining two audio signals by multiplication. Ring Modulation produces sidebands but suppresses both the carrier and modulating frequencies.
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 Albino	Version 1.01+	Date: 24.Jan 2003
<b>Manufacturer</b>	<b>LinPlug Virtual Instruments GmbH</b>		
<b>Function</b>	<b>Transmitted</b>	<b>Recognized</b>	<b>Remarks</b>
Basic Channel			
Default	no	no	
Changed	no	no	
Mode			
Default	no	Omni	
Changed	no	no	
Note Number			
True Voice	no	<b>yes</b>	
True Voice	no	no	
Velocity			
Note On	no	<b>yes</b>	
Note Off	no	no	
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>	
System Exclusive	no	no	
System Common			
Song Position	no	no	
Song Select	no	no	
Tune Request	no	no	
System Realtime			
Clock	no	no	
Commands	no	no	
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: Digital Oscillator Types and Waveform Ranges

### Digital Oscillator Types:

Sine, Triangle, Sawtooth, Square1, Square2, Square3, Organ1, Organ2, Organ3, Spectra1, Spectra2, Spectra3, Spectra4, RichSaw1, RichSaw2, RichSaw3, RichSaw4, SawSpec1, SawSpec2, VintSaw1, VintSaw2, VintSaw3, SawBass1, SawBass2, SawBass3, SawBass4, SawBass5, SawBass6, SawBass7, SawBass8, Spectra5, Spectra6, Spectra7, Spectra8, Spectra9, Spectra10, Spectra11, Spectra12, Spectra13, Spectra14, Spectra15, Spectra16, Spectra17, Spectra18, Spectra19, Spectra20, Spectra21, Spectra22, Spectra23, Spectra24, Spectra25,

### Digital Oscillator Waveform Ranges:

32", 16", 8", 4", 2".

## Appendix B: LFO 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, 1/2T, 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: Modulation Sources and Destinations

### Modulation Sources:

--- (Off), Note played Exp, Note played Lin, Velocity, Aftertouch(poly), Aftertouch(mono), Pitch Wheel, Modulation Wheel, Breath Controller, Foot Controller, ExpressionContr, CC16 Controller, CC17 Controller, CC18 Controller, CC19 Controller, LFO 1, LFO 2, LFO 3, LFO 4, Osc 1 Envelope, Osc 2 Envelope, Osc 3 Envelope, Osc 4 Envelope, Mod-Envelope.

### Modulation Destinations:

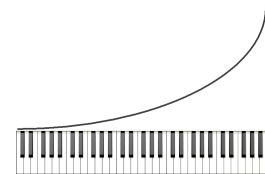
---(Off), Amplitude Osc 1, Amplitude Osc 2, Amplitude Osc 3, Amplitude Osc 4, Pitch Osc 1, Pitch Osc 2, Pitch Osc 3, Pitch Osc 4, Pulsewidth Osc 1, Pulsewidth Osc 2, Pulsewidth Osc 3, Pulsewidth Osc 4, Balance Osc 1, Balance Osc 2, Balance Osc 3, Balance Osc 4, Cutoff Filter 1, Cutoff Filter 2, Resonance Filt 1, Resonance Filt 2, Filter Balance, Main Amplitude, Main Pitch, Modulation Depth 1, Modulation Depth 2, Modulation Depth 3, Modulation Depth 4, LFO 1 Speed, LFO 2 Speed, LFO 3 Speed, LFO 4 Speed, Filter 1 Panning, Filter 2 Panning.

Two types of modulation source are available: unipolar and bipolar. Unipolar modulation sources increase the modulation destination's value in a single direction (e.g. the ModWheel), while bipolar modulation sources both increment and decrement the modulations destination value (e.g. an LFO).

### Modulation Sources

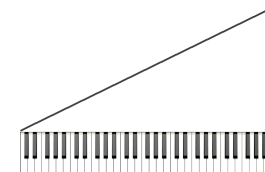
Note played Exp

The note being played with exponential response. The modulation value follows the frequency of the played note (bipolar).



Note played Lin

The note being played with a linear response. The modulation value follows the note number (bipolar).



Velocity

The MIDI note-on velocity information. The harder the key is hit, the higher the modulation value (unipolar).



Aftertouch(poly)	The Aftertouch value of each separate note is used as modulation source. Your MIDI keyboard must support this. If this doesn't work it is likely that your keyboard has no polyphonic aftertouch (unipolar).
Aftertouch(mono)	As above, however only 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).
Pitch Wheel	The value of the pitch-Wheel is takes as modsource, maybe it makes sense to switch off the default Pitch-wheel modulation when using as mod-source, bipolar
Modulation Wheel	The MIDI modulation wheel (MIDI CC 1) (unipolar ).
Breath Controller	MIDI CC 2 (unipolar).
Foot Controller	MIDI CC 4 (unipolar).
ExpressionContr	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).
LFO 1	LFO 1 (bipolar).
LFO 2	LFO 2 (bipolar).
LFO 3	LFO 3 (bipolar).
LFO 4	LFO 4 (bipolar).
Osc 1 Envelope	The envelope of Oscillator 1. Oscillator envelopes control the respective oscillator, however if the oscillator is not used, or it makes sense within the preset to do so, the envelope can be used as a modulation source (unipolar).

Osc 2 Envelope	The envelope of Oscillator 2. Oscillator envelopes control the respective oscillator, however if the oscillator is not used, or it makes sense within the preset to do so, the envelope can be used as a modulation source (unipolar).
Osc 3 Envelope	The envelope of Oscillator 3. Oscillator envelopes control the respective oscillator, however if the oscillator is not used, or it makes sense within the preset to do so, the envelope can be used as a modulation source (unipolar).
Osc 4 Envelope	The envelope of Oscillator 4. Oscillator envelopes control the respective oscillator, however if the oscillator is not used, or it makes sense within the preset to do so, the envelope can be used as a modulation source (unipolar).
Mod-Envelope	The Mod-Envelope is user-definable and can be routed to any available modulation destination (unipolar).

## Modulation Destinations

Amplitude Osc 1	The amplitude of Oscillator 1, used for tremolo.
Amplitude Osc 2	The amplitude of Oscillator 2, used for tremolo.
Amplitude Osc 3	The amplitude of Oscillator 3, used for tremolo.
Amplitude Osc 4	The amplitude of Oscillator 4, used for tremolo.

N.B. In order to create the classic tremolo effect it is better to use Main Amplitude as the modulation destination as this is applied to the whole voice.

Pitch Osc 1	The pitch of Oscillator 1, used for vibrato.
Pitch Osc 2	The pitch of Oscillator 2, used for vibrato.
Pitch Osc 3	The pitch of Oscillator 3, used for vibrato.
Pitch Osc 4	The pitch of Oscillator 4 , used for vibrato.

N.B. In order to create the classic vibrato effect it is better to use Main Pitch as the modulation destination as this is applied to the whole voice.

Pulsewidth Osc 1	Pulsewidth or Symmetry of Oscillator 1's waveform, used to thicken a sound or make it swirl, effect depends on intensity and modulation speed, typically with LFO.
Pulsewidth Osc 2	Pulsewidth or Symmetry of Oscillator 2's waveform, used to thicken a sound or make it swirl, effect depends on intensity and modulation speed, typically with LFO.
Pulsewidth Osc 3	Pulsewidth or Symmetry of Oscillator 3's waveform, used to thicken a sound or make it swirl, effect depends on intensity and modulation speed, typically with LFO.
Pulsewidth Osc 4	Pulsewidth or Symmetry of Oscillator 4's waveform, used to thicken a sound or make it swirl, effect depends on intensity and modulation speed, typically with LFO.
Balance Osc 1	Balance of Oscillator 1, only useable when the Oscillator is routed to both filters (F1 + F2).
Balance Osc 2	Balance of Oscillator 2, only useable when the Oscillator is routed to both filters (F1 + F2).
Balance Osc 3	Balance of Oscillator 3, only useable when the Oscillator is routed to both filters (F1 + F2).
Balance Osc 4	Balance of Oscillator 4, only useable when the Oscillator is routed to both filters (F1 + F2).
Cutoff Filter 1	Cutoff frequency of Filter 1, often used with an LFO to create filter sweeps or with Velocity to simulate an acoustic instrument's response to note attack.
Cutoff Filter 2	Cutoff frequency of Filter 2, often used with an LFO to create filter sweeps or with Velocity to simulate an acoustic instrument's response to note attack.
Resonance Filt 1	Resonance of Filter 1, a rather subtle effect, typically used with an LFO or for Keyscaling (Note Lin or Note Exp source) to adjust Resonance over the key range.
Resonance Filt 2	Resonance Filter 2, a rather subtle effect, typically used with an LFO or for Keyscaling (Note Lin or Note Exp source) to adjust Resonance over the key range.

Filter Balance	Balance of both Filters (that is, which one is more prominent), only usable if both are Filters are switched on and receive a signal from the Oscillators.
Main Amplitude	Overall amplitude of all oscillators. Often used for tremolo.
Main Pitch	Overall pitch of all oscillators. Often used for vibrato.
Modulation Depth 1	Intensity of the first entry (line 1) in the Modulation Matrix, often used with the ModWheel as source to control a specific modulation parameter (e.g. Vibrato).
Modulation Depth 2	Intensity of the second entry (line 2) in the Modulation Matrix, often used with the ModWheel as source to control a specific modulation parameter (e.g. Vibrato).
Modulation Depth 3	Intensity of the third entry (line 3) in the Modulation Matrix, often used with the ModWheel as source to control a specific modulation parameter (e.g. Vibrato).
Modulation Depth 4	Intensity of the fourth entry (line 4) in the Modulation Matrix, often used with the ModWheel as source to control a specific modulation parameter (e.g. Vibrato).
LFO 1 Speed	Speed of LFO 1, this allows tempo changes of the LFO to be programmed. Typically this is used with Mod-Env as the source. Another example is Key Lin which can be used to make the LFO run faster with higher notes.
LFO 2 Speed	Speed of the 2, this allows tempo changes of the LFO to be programmed. Typically this is used with Mod-Env as the source. Another example is Key Lin which can be used to make the LFO run faster with higher notes.
LFO 3 Speed	Speed of the 3, this allows tempo changes of the LFO to be programmed. Typically this is used with Mod-Env as the source. Another example is Key Lin which can be used to make the LFO run faster with higher notes.
LFO 4 Speed.	Speed of the 4, this allows tempo changes of the LFO to be programmed. Typically this is used with Mod-Env as the source. Another example is Key Lin which can be used to make the LFO run faster with higher notes.

Filter 1 Pan	Pan position of Filter 1 output, used for stereo effects, for example, with an LFO as the source for a permanently moving sound, or with Envelopes to let the Filter output move through the stereo panorama. Only functions if Filter 1 is switched on and has an input signal. For Filter 1 this has no effect if F1 is routed to F2.
Filter 2 Pan	Pan position of Filter 2 output, used for stereo effects, for example, with an LFO as the source for a permanently moving sound, or with Envelopes to let the Filter output move through the stereo panorama. Only functions if Filter 2 is switched on and has an input signal.



## Appendix D: 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.