LENNAR DIGITAL

~ Sylenth 1 ~

Polyphonic VSTi syntheziser

User Manual

Version 2.0

http://www.lennardigital.com

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1. Introduction

Sylenth1 is a virtual analog synthesizer that takes the definitions of quality and performance to a higher level. Until now only very few software synthesizers have been able to stand up to the sound quality standards of hardware synths. Sylenth1 is one that does.

Sylenth1 is not just another synth. It was built from a producer's point of view. It was built to produce superior quality sound and music. It was built to perform. A lot of research has been invested in order to achieve unheard warmth and clarity. The graphical interface ensures the highest level of usability so you can fully unleash your creativity.

Oscillators
At its core Sylenth1 houses 4 alias-free unison oscillators, which generate analog shaped waveforms. Each oscillator is capable of producing 8 unison voices in full stereo, adding up to a total of 32 voices per note. With its 16 notes of polyphony this means you can play up to 512 voices simultaneously! The oscillators perform extremely well in both the very low (down to 0.01Hz and below!) and very high (all the way up to half the samplerate) frequency regions without losing their sharpness, liveliness or character. This makes them well suited for all kinds of sounds, from the deepest basses imaginable to the highest crystal clear bells.

Filters
On top of that there are 2 state of the art, pure analog sounding filter sections. Each of these consists of 4 filter stages with nonlinear saturation incorporated, in order to emulate the warmth and drive of a real analog filter. The resonance control can be turned up to a level way beyond self-oscillation and combined with the drive control this makes it possible to let the filters *SCREAM*! Where a lot of digital filters sound like they're made out of cheap plastic, these filters sound rock-solid, warm and raw.

Modulation
Sylenth1 offers many modulation options to sculpture the sound any way you like. There are 2 ADSR envelopes and 2 LFOs which can be used to modulate a whole set of different parameters. Next to that, it is possible to use the extra 2 amplitude envelopes, velocity, keyboard track or modulation wheel as a source for modulation.

Master FX
The final part of this synth is the master effects section. A set of 8 professional quality sound effects conveniently grouped into an LCD panel structure.

- **Arpeggiator** – 10 different melodic modes, built in step sequencer with adjustable pitch, velocity and hold settings. Outputs Step Velocity as a modulation source.
- **Distortion** - Five different types of distortion (overdrive, foldback, clip, decimator and bitcrusher) in full stereo, uses 4x oversampling to minimize aliasing artifacts.
- **Phaser** - 6-Stage stereo phaser, with 2x oversampling, an embedded LFO, feedback and frequency spread adjustment.
- **Chorus/Flanger** – 4-Stage stereo chorus, with 2x oversampling, adjustable delay time, depth, rate and feedback for flanging effects.
- **Equalizer** - Bass and treble adjustment by frequency and amplification.
- **Delay** - Delay module with low and high pass filters, unique echo smearing function, pingpong mode with stereo spreading, independent left and right delay time and adjustable stereo width.
- **Reverb** - Smooth reverb with adjustable pre-delay, damp, size and stereo width.
- **Compressor** - Stereo compressor with attack, release, threshold and ratio settings, which can be used to increase punch, drive, warmth and analog feel of your sounds.

Performance

With all the functionality and processing horsepower mentioned above, you might expect that this synth would max out even the fastest CPU in no-time, especially considering the high sound quality of each single voice and effect. Well, one of the many benefits of this synth is that it doesn't. It uses highly optimized code and SSE instructions in order to reduce the CPU usage to a minimum. It will also automatically turn off any parts that are not used, to save extra CPU time. This enables you to create pure quality sound using only minimal system resources.

2. Installation

Windows: Use the installer to install Sylenth1 into your common VST plug-ins folder (for example C:\Program Files\Steinberg\VSTPlugins\). In most cases your host software will automatically recognize the plug-in.

Mac OS X: Click on the downloaded image file to mount it, run the installer and follow the instructions.

Please refer to the manual of your host software for more information on how to open and use VSTi plug-ins with it.

Purchasing the Full Version

The demo version comes with a few limitations, as listed below. If you would like to buy the full version without limitations, then please visit our online web shop at http://www.lennardigital.com

After you have purchased Sylenth1 you will receive the full version installer and a personal license file. Run the installer and install Sylenth1 it into your common VST plug-ins folder. You can uninstall the demo first if you like, but it's not strictly necessary. After installation register Sylenth1 using your license key file (License.dat). To do so, save the file to any location on your computer and select the 'Register' option from the Menu on the LCD screen in Sylenth1. Now browse to where you saved the License.dat file and select it. You'll have to close and restart Sylenth1 to complete the registration.

If you encounter any problems or have any questions, head over to our website (www.lennardigital.com), or email us at support@lennardigital.com

Minimum System requirements

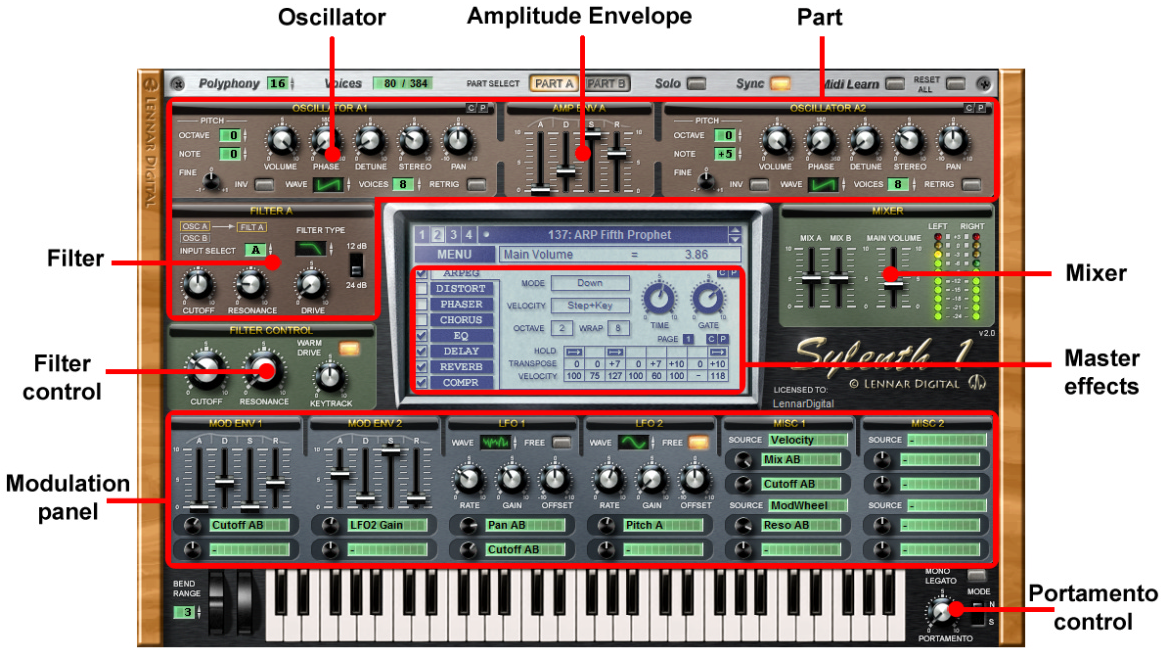
- Any CPU that supports SSE (Intel Pentium III and above, AMD XP and above, all Intel Macs but no PPC)
- 128MB RAM
- 10 MB free harddisk space
- Windows 2000/XP/Vista or Mac OS X 10.4 or higher
- VSTi compatible host software

Limitations of the demo version

- A demo reminder sample will be heard about every 60 seconds
- Half of the modulation options have been disabled
- Limited to 128 presets

3. Overview

Sylenth1's user interface is divided into four main sections. Each section has a different color which makes them easy to distinguish. The first section contains two oscillators and a filter and is called the *Part* section. Sylenth1 has two of these parts, *Part A* and *Part B*, but only one of them is shown at a time on the user interface. *Part A* has a red background color, *Part B* yellow.



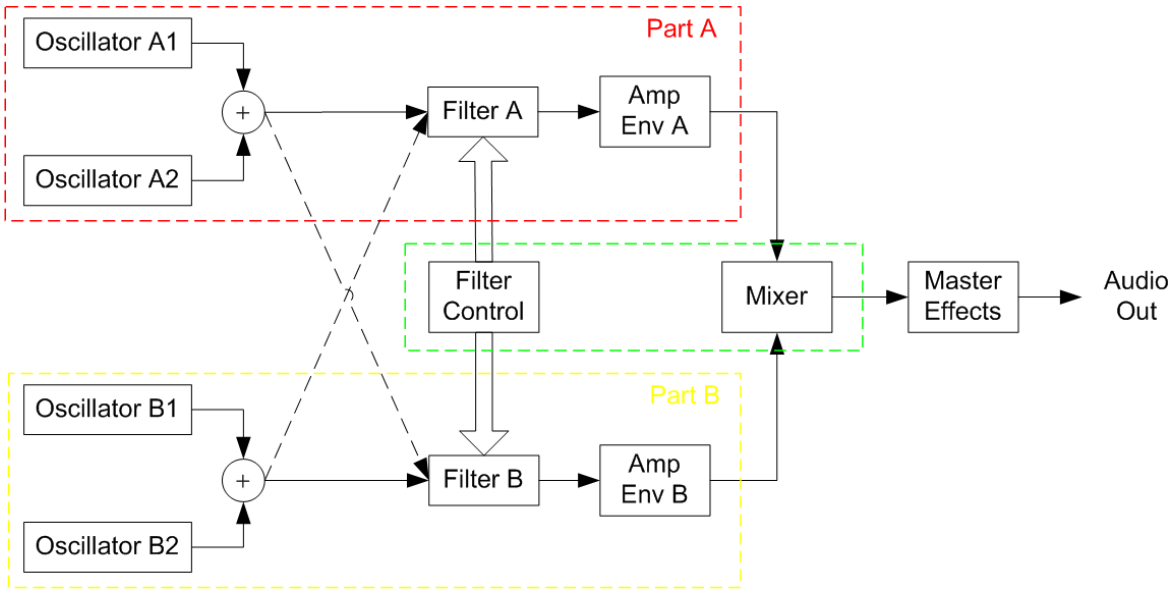
The second section, colored green, contains the filter control and mixer panels. They control the sound from both parts. The blue panel at the bottom of the interface, the third section, contains all modulation options. Finally, the fourth section is formed by the LCD display and contains the master effects.

Next to the four main sections, there's a keyboard, pitchbend and modulation wheel and portamento control located at the bottom of the interface.

3.1 The Audio Path

The block scheme below shows the internal structure of the audio path in Sylenth1. Each line represents a stereo audio signal. The outputs of the two oscillators on each part are added together, and run into the filter sections afterwards. It is also possible to run the output of the oscillators from part *A* into the filter of part *B*, as indicated by the dashed crossing lines.
The outputs of the filters are then shaped by the amplitude envelope generators and enter the mixer afterwards. Finally, the master effects are applied and the audio output is sent to the host.

As you can see in this diagram, the Filter Control panel controls both filters *A* and *B* at the same time.



The master effects section consists of an arpeggiator and seven sound effects stacked in series. The first effect applied is distortion, followed by the phaser, chorus, equalizer, reverb, delay and finally the compressor.

3.2 Working with parts

Part Select

You can switch between the two parts using the *Part Select* buttons shown on the top bar on user interface. It is easy to see which part is currently shown on the interface, because part *A* has a reddish background color, while part *B* is colored yellow.

Solo

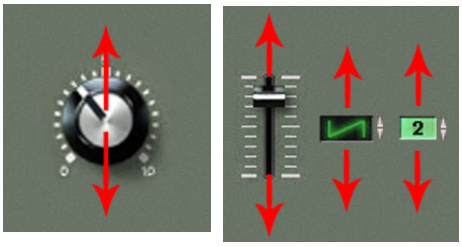
Right next to the part select buttons you'll find a button named *Solo*. Whenever this button is activated, you will hear only the sound of the

currently selected part. This is very useful if you are working on complex sounds.

3.3 Controlling Knobs

Knobs and controls

Rotary knobs, as well as sliders and other controls, can be controlled by clicking the knob and dragging up or down in vertical direction. If you need a higher accuracy, you can hold the *Shift* key while dragging the mouse. You can also use knobs in rotary mode by holding down the *Alt* key.

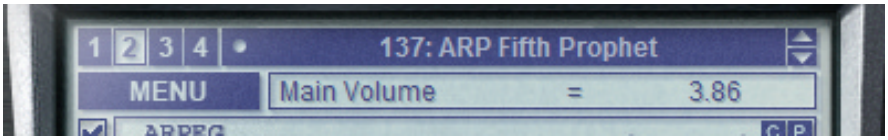


Center value

Some knobs and controls have a centered default setting, like the pan knob or the octave and note values on the oscillators for example. Double-clicking these controls will make them jump to their center value. Alternatively, all knobs can be centered by holding the *Ctrl* key down while clicking the knob.

Parameter value display

Whenever you change the value of a parameter by dragging a knob, the value of that parameter will be displayed on the LCD screen.



If you want to know the exact value of a parameter, but you do not wish to change it, you can simply click a knob once. This will display its value on the screen without changing it.

3.4 MIDI control

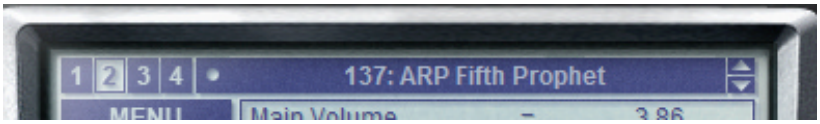
Most knobs on Sylenth1 can be controlled by MIDI Control Changes (CC). Each knob has a default CC parameter, listed in the appendix. You can also very easily assign CCs to knobs by using the *MIDI Learn* buttons located on the top bar on the user interface.

When you press the *MIDI Learn* button, it will light up and wait for MIDI input. Turn a knob on your MIDI controller, and drag a knob you want to control on the user interface with the mouse. The *MIDI Learn* button will now go back to grey and controller has been linked. Sylenth1 will store the CC parameters it learned permanently, so they will still be active after you close and restart your host.

Right next to the MIDI learn button you'll find a button named *Reset All*. Pressing this button will reset all learned MIDI CC values to the default settings as listed in the appendix.

3.5 Changing Programs

Sylenth1 soundbanks contain 512 presets divided over four sub-banks of 128 presets each. The currently selected sub-bank and program are shown on top of Sylenth's LCD display.



There are several ways to change the program.

- By using the host software functionality to change programs.
- By using the *Program Select* arrows on the LCD display.
- By clicking on the program name on the LCD display, this will show a popup menu containing 128 program numbers. You can switch sub-banks by clicking their number to the left of the program name.
- By sending a program change message via MIDI (as there are only 128 MIDI programs, you can only select the first 128 programs this way).

3.6 Polyphony

Sylenth1 is a polyphonic synthesizer, which means you can play multiple notes at the same time. The maximum number of simultaneous notes can be controlled by the *Polyphony* control located on the top bar of the user interface. It can be set anywhere between 0 and 16.

Voices
The Voices indicator displays the number of active voices and the maximum total number of voices. Each oscillator can generate several voices. The maximum number of voices is equal to the sum of voices generated by all oscillators, multiplied by the maximum number of polyphonic notes. For example, when there are 2 oscillators active which generate 3 voices each, Sylenth1 will synthesize 6 voices for every note you play. When polyphony is set to 4, this means there's a maximum of 24 voices in total.

3.7 Sync

The Sync button is located on the top bar of the user interface. It forces several timing parameters like LFO rates and delay times to be synchronized with the host tempo.

If Sync is turned off, these parameters will display their values in seconds or Hertz. When it is turned on, they will show their values in bar parts. One bar contains four beats, so a value of 1/4 means once every beat, and a value of 1/8 means twice every beat. Triolic and punctuated values are also possible: *T* stands for triolic and *D* for punctuated note lengths.

3.8 Loading, Saving and Editing Presets

You can load, save and edit presets and soundbanks using the MENU button on the LCD display.

Loading and saving presets and banks
Single presets can be saved using the *Save Preset (.fxp)* option. They are saved with the .fxp file extension. To load a preset to the currently selected program number, choose *Load Preset (.fxp)* and select the preset file you want to load.

In a similar way you can load and save soundbanks containing 512 presets using the *Load/Save Bank (.fxb)* option. Soundbanks are saved with the .fxb file extension.

Renaming presets
The name of a preset can be changed by clicking the small dot on the left side of the preset name. To cancel editing, press the *Esc* key or click anywhere outside the edit box. To apply the changes press *Enter*.

Editing presets

You can copy a preset to another program number by clicking the *Copy Preset* option and using the *Paste Preset* or *Insert Preset* options at a different program number afterwards. *Delete Preset* will delete a preset from the list.

If you want to create your own presets and start with a clean setting, you can choose the *Init Preset* option that will initialize all parameters of the currently selected preset. The *Randomize Preset* option allows you to randomize all parameter settings which can be useful if you want to create new sound effects.

With the *Reset Preset* option you can reset the parameters of the currently selected preset to its original state. This way you can undo all parameter changes you made to the selected preset.

4. Components Detailed

In this chapter we will take a closer look at the different sections of the Sylenth1. Each section consists of several components that will be discussed one by one.

4.1 The Part Section

As said before, there are two *Part* sections on the Sylenth1, named *A* (red) and *B* (yellow), which can be switched using the part select buttons. Each of these parts contains two oscillators, a filter panel and an amplitude envelope.

4.1.1 The Oscillator

Voices
Each oscillator on the Sylenth1 synthesizer can generate 0 to 8 voices in unison. You can select the number of voices by dragging the *Voices*-selector up or down. The oscillator can be turned off by setting the number of voices to 0.

Waveform
By dragging the *Waveform* selector up and down, you can select the type of waveform all oscillator voices will generate. There are 8 different waveforms emulating common analog wave shapes.

Pitch
On the left part of the oscillator panel, you'll find the pitch control. Using the *Octave* and *Note* controls, you can tune the oscillator voices to any note you like. With the knob *Fine* the pitch can be fine-tuned between two half notes. Double-clicking these controls will reset them to their default 0 value.

There are a set of rotary knobs which can be used to change the sound of the oscillator:

- ***Volume*** – Sets the output volume of the oscillator.
- ***Phase*** – This knob will change the starting point of the waveform. It will only function when *Retrigger* is enabled.
- ***Detune*** – Detunes the pitch of the individual voices with a certain amount around the center pitch. This can be used to create supersaw hover effects, widen the sound, or add analog sounding effects.
- ***Stereo –*** Sets the level of stereo separation between the individual voices. If set to 0 it will generate a mono sound, if set to 10 the voices will be fully spread over the left and right channels. This only has effect if there are more than 1 voices.
- ***Pan –*** Pans the output of the oscillator to the left (0) or right (10) channel.

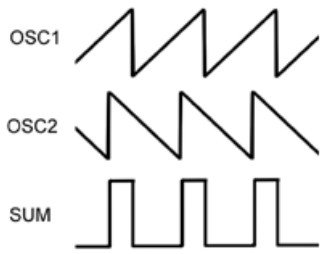
Retrigger and Phase

The *Retrigger* button can be used to force all voices to start at the exact same location on the waveform every time a new note is played. That location can be changed using the *Phase* knob. If *Phase* is set to 0, the voices will restart at the beginning of the waveform period. If it is set to 180 degrees, the voices will start halfway the period, while setting it to 360 degrees will make them start at the end of the waveform, which is equivalent to the beginning.

The phase setting cannot be heard if there's only one oscillator active, but as soon as there are two or more oscillators running at the same pitch and both have the retrigger button enabled, you can create useful effects with it. You can accentuate the level of bass tones for example, or create PWM-like effects by modulating the phase of one of the oscillators.

Inv

The Inv button inverts the oscillator's output. This can be useful when creating PWM-like sound effects. For example, if you add two saw oscillators and invert one of them, the resulting waveform will be a pulse. You can then adjust the pulse width by changing the phase of one of the oscillators.



Copy / Paste

In the right upper corner of each oscillator, you'll find two small buttons labeled *C* and *P*. With these buttons you can copy the oscillator settings and paste them to another oscillator, or to a different preset.

4.1.2 The Filter

Input Select
The outputs of the oscillators are shaped by the filters. Usually the output of the oscillators from *Part A* will be filtered by *Filter A*, but it is also possible to route the outputs of oscillators *B* to *Filter A,* and vice versa. This can be done by using the *Input Select* control. If it is set to *A*, only oscillators *A1* and *A2* will be filtered. If set to *AB*, all oscillators from part *A* and *B* will be routed to the filter. If set to --, this means the filter does not have any input. The routing scheme above the *Input Select* control will show the internal routing.

Filter Type
With the *Filter Type* selector the filter type can be set. There are 4 types:

- **Bypass –** This setting bypasses the filter.
- **Lowpass –** Attenuates all frequencies above the cutoff frequency, and lets the lower frequencies pass unchanged.
- **Bandpass –** Attenuates frequencies above and below the cutoff frequency, and lets only a small band of frequencies pass unchanged.
- **Highpass –** Attenuates all frequencies below the cutoff frequency, and lets the higher frequencies unchanged.

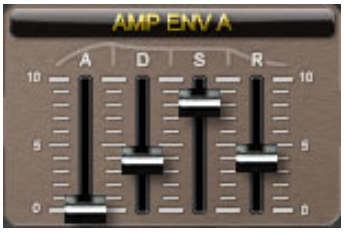
The amount of attenuation can be set using the switch on the right side of the filter panel. The attenuation can be switched between 12dB per octave or 24dB per octave.

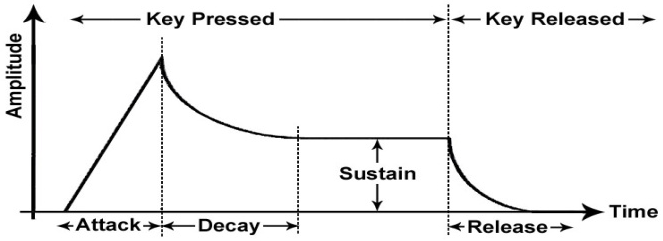
Cutoff and Resonance
The cutoff frequency can be changed using the *Cutoff* knob, and the *Resonance* knob sets the amount of filter resonance at the cutoff frequency. Setting the resonance to a very high level makes the filter self-oscillate, which means that it generates a tone all by itself.

Drive
You might already be familiar with the *Cutoff* and *Resonance* knobs, but the *Drive* knob is one that is not so common on synthesizers. It can be used to overdrive the internal filter stages. The filter contains four filter stages and each stage incorporates a non-linear saturation function. Driving these stages adds higher harmonics to the input signal, making the filter sound warmer and fuller, similar to the way an analog filter does.

4.1.3 The Amplitude Envelope

The sound created by the oscillators and filters can be shaped using the amplitude envelopes. These are common ADSR envelopes, with *Attack*, *Decay*, *Sustain* and *Release* parameters. You can use these to make the sound fade in and out, or add punch to it for example.





Note that setting the *Attack* or *Release* settings to 0 creates a very sharp on/off switching effect, which might result in a clicking sound. While this can be very useful for sounds that need a lot of punch, like a kick drum, it might be an unwanted effect for other sounds. If this is the case, then simply give *Attack* and *Release* a small value, so that any clicking effects will be eliminated.

4.2 The Main Section

4.2.1 The Filter Control Panel

The filter control panel contains controls that apply to both filters from *Part A* and *B* simultaneously. Note that this panel does not contain an individual filter; it merely controls the filters *A* and *B*.

Cutoff and Resonance
With the *Cutoff* knob you can change the cutoff frequency from both filters *A* and *B*. This is useful, because it allows you to control the timbre of the sound created by the filters using a single knob. In a similar fashion the *Resonance* knob controls the resonance of both filters.

Keytrack
It is possible to link the cutoff frequencies of the filters to the pitch of the note played on the keyboard. This can be done using the *Keytrack* knob. When this knob is set to 0, the cutoff frequency will not depend on the note played. However, when this knob is set to 10, the cutoff frequency will change with the pitch of the note played. This enables you to keep (or change) the timbre of a sound whenever higher or lower notes are played.

If the filter is put into self-oscillation, setting the *Keytrack* knob to 10 makes it possible to play the filter like a piano.

Warm Drive
Turning the *Warm Drive* button on, makes the filter stages use a higher quality of saturation which introduces more higher harmonics. Turning this option off, makes the filters use less CPU power. If you're using a lot of polyphonic voices, it might be a good idea to turn it off when CPU usage becomes a concern.

4.2.2 The Mixer

The sounds produced by the oscillators and filters from Part A and B are mixed together using the Mixer panel. *Mix A* sets the volume of Part A; *Mix B* sets the volume of Part B. The *Main Volume* knob sets the volume of Sylenth1's audio output after the master effects have been applied.

On the right side of the Mixer panel is a VU meter which measures the output level. Please note that it is in general not a problem when the red LEDs are lighting because the output of Sylenth1 is not clipped. The host software can turn the volume down if needed to prevent clipping.

4.3 The Modulation Section

The modulation panel enables you to modulate a whole set of parameters using two ADSR envelope generators, two Low Frequency Oscillators and a set of other sources. Each source can be linked to two different parameters, which can be chosen from a popup menu that appears when you click on one of the destination displays.

You can set the amount of modulation for each parameter using the small rotary knobs next to the destination displays. Turning them to the right results in a positive modulation value, turning them to the left gives a negative value. The middle position is the default position and means there is no modulation. If you double-click the knob it will jump back to this default position.

4.3.1 The modulation envelope

The modulation envelopes are common ADSR envelopes with *Attack*, *Decay*, *Sustain* and *Release* settings, similar to the amplitude envelope. It can be used for all kinds of modulation, but two commonly used destinations are the filter cutoff (aka FEG) and the pitch (aka PEG).

4.3.2 The LFO

The Low Frequency Oscillator (LFO) is also a common modulation source. The two LFOs on Sylenth1 offer 10 different waveforms to be chosen from. The *Rate* knob sets the oscillator frequency, the *Gain* knob changes the amplitude and the *Offset* knob can be used to add a positive or negative constant value to output of the LFO. If *Offset* is set to 0, the output wave will be centered around

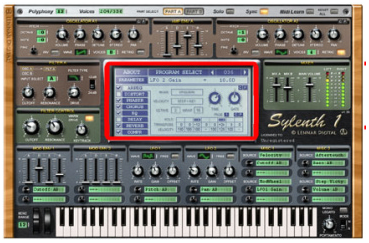
0. If the Free button is pressed, the LFO will run freely and will not be retriggered when a new note is played, nor will it sync to the host tempo.

Using the LFO you can create all kinds of vibrato effects, sweeping sounds and special effects.

4.3.3 The Miscellaneous Modulation Panel

The Miscellaneous Modulation panels allow you to choose other modulation sources, like velocity, aftertouch, keytrack, modwheel, the amplitude envelopes and the modulation envelopes and LFOs.
Since there are four of these selectable inputs, each with two destinations, this gives you a wide variety of modulation options. Again, each modulation amount can be changed using the small rotary knobs.

4.4 The Master Effects Section



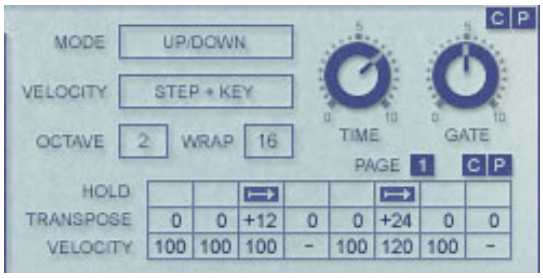
The LCD screen in the middle of the user interface contains seven master sound effects and an arpeggiator. The master effects are applied at the end of the audio path. Each effect has its own settings panel on the LCD screen. To switch between the different effect panels, click on the name of the effect on the left side of the screen.

Effects can be turned on and off by clicking the checkbox next to the effect's name. If an effect is turned off, it will stop processing and free up CPU time.

Effect settings can be copied and pasted to different patches using the *C* and *P* buttons in the right upper corner of each effect panel.

4.4.1 Arpeggiator

Mode
The arpeggiator is an automated MIDI sequencer. It plays the notes you press on your keyboard in a melodic order, defined by the *Mode* setting. When you select mode *Up* for example, it will arrange the keys you press in ascending order. If you select *Down*, it will play them in descending order. The *Up/Down* modes play combinations of ascending and descending order. *Random* will play random sequences and *Ordered* will play the notes in the same order as you pressed them on the keyboard. Finally there are the *Step Seq* and *Step Chord* modes, which will play notes in the order defined by the step sequencer. *Step Seq* mode will only play one note at a time, while in *Step Chord* mode you can play chords which will be arranged by the step sequencer.



Time
The *Time* knob sets the duration between two successive notes and thus defines the speed at which the notes are played.

Gate
You can change the length of each note using the *Gate* knob. When the *Gate* is set halfway this means the length of each note is half of the time between two successive notes.

Wrap
The note sequence can be looped at a certain number of notes, using the *Wrap* parameter. When *Wrap* is set to 8 for example, the arranged sequence will be restarted every 8 notes.

Octave
The *Octave* setting defines over how many octaves the note sequence will be played.

The Step Sequencer
At the bottom of the Arpeggiator panel you'll find the *Step Sequencer*. It can be used to arrange notes in any specific order. The *Transpose* parameters define the pitch of each note, which is added to the key you press on your keyboard. A value of +12 for example means the pitch will be transposed exactly 12 notes (one octave). The *Transpose* settings are used only when the arpeggiator *Mode* is set to *Step Seq* or *Step Chord*.

The *Velocity* parameters define the velocity at which each note will be played. If Velocity is set to "-", the note will not be played at all. The length of each note can furthermore be extended using the *Hold* buttons. These can be used to create portamento sliding effects for example.

Velocity
There are five different methods you can choose to change the velocity of the arranged notes. If *Velocity* is set to *Key*, all different velocities of each of the pressed notes on the keyboard are used in the sequence. In *Hold* mode, all sequenced notes will have the same velocity, which is the velocity held by the note you pressed last. It is also possible to use the velocity from the step sequencer by setting the *Velocity* mode to *Step*. Then there are two more modes, namely *Step+Key* and *Step+Hold*. When either of these modes is selected, the velocity from the pressed keys will be mixed with the velocity from the step sequencer.

Step Velocity Modulation Source
The step sequencer also outputs its velocity and hold values as a signal that can be used as a modulation source in the Misc Mod panels. This signal is useful for creating *gate* effects for example. To do so, select *Step Vlcty* as a modulation source and *Mix AB* as destination. Then set the *Mix A* and *B* sliders to 0, so that the output volume will be set purely by the *Step Velocity*.

4.4.2 Distortion

Type
Sylenth1 offers five types of distortion: *Overdrive*, *Foldback*, *Clip, Decimate* and *Bitcrush*. Each type has a different sound and harmonic content. You can switch between the types by clicking on the arrow button, or by dragging the type display up and down.

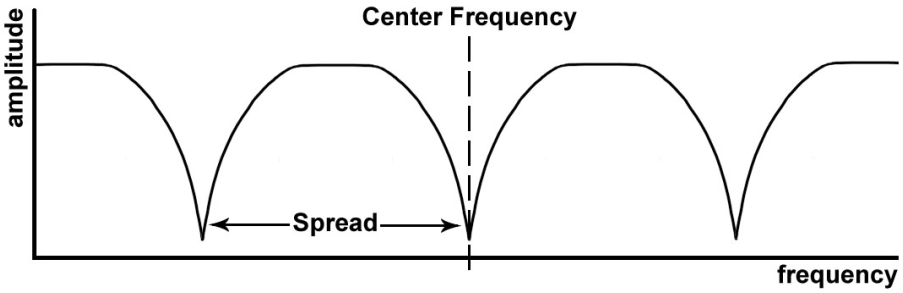
Amount
The Amount knob sets the harshness of the distortion. A low amount will produce a soft distortion effect which can be used to add warmth to a sound, much like a tube amplifier does. High amounts of distortion can be used to create a raw heavy distorted sound.

Dry / Wet
The Dry/Wet knob defines at what rate the distorted (wet) and original (dry) signals are mixed. A value of 0 means only the original signal is passed, while a value of 10 means only the distorted signal is passed.

4.4.3 Phaser

The six-stage stereo phaser creates notches in the frequency spectrum and shifts them up and down using the internal LFO.

CenterFreq
The *CenterFreq* knob sets the position of the middle notch in the frequency spectrum. Turning this knob makes all notches go up or down in frequency. This parameter can be modulated by the internal LFO, but you can also use the modulation panel to modulate it, or turn it by yourself. By doing so, you can make the phaser sound like a multistage filter effect.



Spread
The *Spread* knob determines the distance between the notches in the frequency spectrum. A low spread pushes the notches close together and creates a classical phaser sound. A higher spread can be used to create filter-like effects.

LR Offset
With the *LR Offset* knob you can change the amount of frequency-offset between the centerfrequencies for the left and right channels. This will create stereo phasing effects.

Width
The stereo width of the phaser effect is controlled by the *Width* knob. Set this knob to 0 to create mono sounding phaser effects, or set it higher to create wide stereo effects.

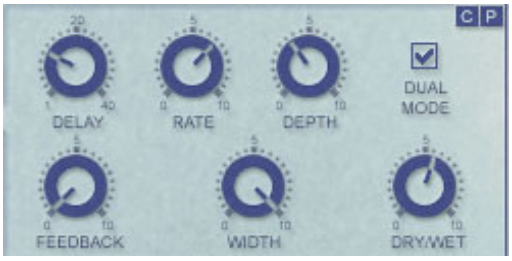
LFO Rate and LFO Gain
The phaser has an internal LFO, which modulates the phaser's center frequency. *LFO Rate* sets its frequency, and *LFO Gain* sets its amplitude. If you set the *Gain* to 0, the LFO will be turned off.

Feedback
The output of the phaser is fed back to the input to create resonance peaks between the notches in the frequency spectrum. This effect can be controlled using the *Feedback* knob. A high feedback creates sharp peaks with a characteristic resonating sound.

Dry / Wet
The phasing depth can be controlled using the Dry/Wet knob. This knob sets the ratio between the effect and the original dry input signal.

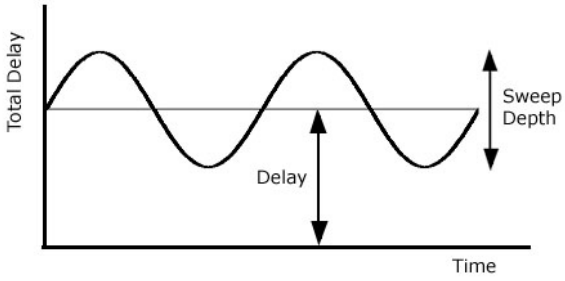
4.4.4 Chorus

Just as a chorus is a group of singers, the chorus effect can make a single instrument sound like there are actually several instruments being played simultaneously. This adds thickness and warmth to the sound.



Delay
The output of the chorus effect is a mix of the input signal and a delayed copy of it. The delay time is modulated by an LFO. With the *Delay* parameter you can set the delay offset in milliseconds. A higher delay will create a wider sound, but can also result in a muddy attack.

Depth
The *Depth* parameter adjusts the sweep depth of the delayed sound. A Depth value of 0 means there is no modulation (only a constant delay), while a value of 10 means the modulation amount will be maximal.



Rate
The modulation frequency can be set with the *Rate* knob.

Feedback
The *Feedback* knob sets the amount of feedback, which can be used to create flanging effects. When this knob is set to 0 there will be no feedback, while maximum feedback will occur when it's set to 10. To create flanger sounds set Delay to somewhere between 1 and 5 ms and add some feedback to it.

Dual Mode
Dual Mode adds another stage to the classic chorus effect, making it sound richer and thicker. Each stage consists of two delay lines and two LFOs, so in *Dual Mode* there are in total four delay lines modulating in quadrature phase.

Width
The stereo width of the chorus effect can be adjusted using the *Width* knob. Setting the width to 0 makes the effect mono, while setting it to 10 maximizes the stereo width.

Dry/Wet
The dry input signal can be mixed with the wet chorus effect signal using the *Dry/Wet* knob. At value of 0 it will only let the input sound pass, while at a value of 10 you'll only hear the chorus effect.

4.4.5 Equalizer

The equalizer can be used to make quick and simple adjustments to the bass and treble of the sound. The *Bass* knob will turn up the amount of bass, and the maximum bass frequency can be set using the *Bassfreq* knob. The treble can be adjusted in a similar way using the *Treble* and *Treblefreq* knobs.

If the *Bass* and *Treble* knob are both set to 0, the sound will be unchanged. Note that the equalizer will automatically normalize the volume level whenever bass or treble is added.

4.4.6 Delay

The delay panel can be used to create echoing sound effects. You can set the delay times for the left and right channel independently using the *Delay L* and *Delay R* knobs respectively.

Feedback
With the *Feedback* knob you can control the speed with which the delays will fade away. A high amount of feedback will produce long lasting echoes.

PingPong
There are two delay modes, normal and pingpong. In normal mode, the left and right channels have independent delays, but in pingpong mode the sound jumps from left to right and back, using the delay times specified by the *Delay L* and *Delay R* knobs. Pingpong mode can be enabled and disabled by clicking the *PingPong* checkbox.

Spread
The spread knob has only influence on the delay in pingpong mode. It determines the spreading of the echoes over the left and right channels. When Delay L and Delay R have different values, a spread of 0 can create Left-Center-Right delay types, while a spread of 10 will create pure pingpong delays.

Width
The stereo width of the delay effect can be changed using the *Width* knob. Echoes panned fully left or right usually sound too wide, so you can pull them to the center by lowering the width value. A width of 0 creates mono echoes.

Low Cut and High Cut
The sound of the echoes can be changed by filtering the high or low frequencies at each delay. The *Low Cut* knob determines how much of the low frequency content is filtered out. The *High Cut* knob does the same for the high frequencies and creates muffled sounding echoes.

Smear
In real world echoes, the sound also changes because its frequency content is smeared out over time. Sylenth's delay can simulate this effect to create real sounding echoes. Turning up the *Smear* knob will make this effect more pronounced. If it is set to 0, the delays will not be smeared out.

Dry/Wet
The level of delays compared to the original dry input signal is set using the *Dry/Wet* knob. A value of 0 will mute the delays, while a value of 10 will mute the original signal.

4.4.7 Reverb

The Reverb effect simulates sound reflections from surrounding walls or objects. Adding reverb to your sound will make it sound more realistic and adds depth to it.

Size
The size of the simulated room is controlled by the *Size* knob. A high value will generate a slowly decaying reverb, similar to what can be heard in a very large hall.

Damp
The brightness of the reverb can be changed using the *Damp* knob. A high damping value attenuates the higher frequencies. Damping can also be thought of as a damping material that covers the walls of the room.

PreDelay
With the *PreDelay* knob you can add a delay to start of the reverb. This can be compared to the distance of the walls that reflect the sound. Predelay can also be used to create rhythmic reverb bursts when the *Size* parameter is low for example.

Width
The Width knob sets the stereo width of the reverb effect. Setting the width to 0 makes the reverb mono, while setting it to 10 maximizes the stereo width.

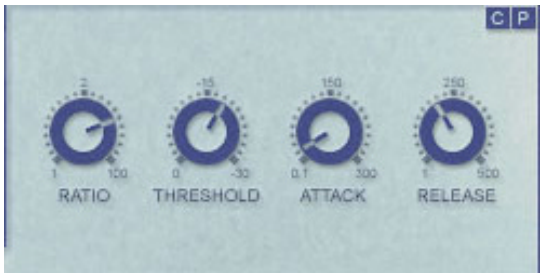
Dry/Wet
You can set the amount of reverb compared to the original dry input signal using the *Dry/Wet* knob.

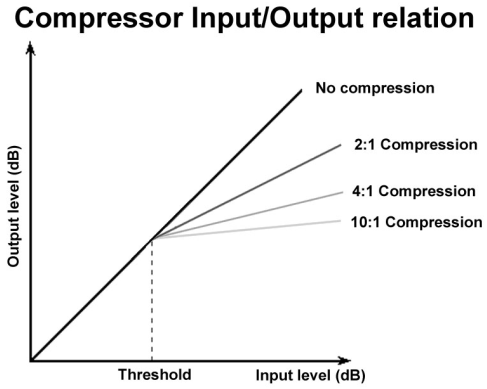
4.4.8 Compressor

The compressor can be used to limit loud or peaky sounds like a high resonance peak caused by a filter for example. It can also be used to accentuate softer sounds like reverb or delays in between pauses of the notes, or to add extra punch to sounds with a sharp attack for example.

A compressor is basically a variable gain device, where the amount of gain used depends on the level of the input. The gain will be reduced more when the signal level is higher, so that it reduces the dynamic range of the sound.

Ratio
The amount of gain reduction is determined by a *Ratio* control. For example, a ratio of 4:1 means that the input level would have to increase by 4 dB to create a 1 dB increase in the output. When the ratio is set to 1:1, no compression is applied. When the ratio is set to 100:1, the compressor works like a limiter.





Threshold
The *Threshold* knob sets the minimum amplitude level above which the compressor starts working. If the threshold is set to 0dB, it will compress close to nothing, since the input level doesn't exceed 0dB. Setting the threshold to -30dB means everything louder than -30dB will be compressed. Since most part of the sound will be louder than that, the compressor will be clearly audible.

Attack
The *Attack* knob determines how fast the compressor responds to changes in the input level. If set to a small value, the compressor will reduce the gain immediately after the threshold has been exceeded. If set to a higher value, the compressor will only slowly turn down the gain.

Release
When the input level drops below the threshold level again, the compressor will take some time to increase the gain until it reaches its uncompressed value. This time is controlled by the *Release* knob. A short time will make the gain increment very fast, while a long release time will only slowly increase the gain.

4.5 The Keyboard Section

The keyboard section at the bottom of the user interface consists of a 5-octave keyboard, a pitch bender, a modulation wheel and portamento controls.

Pitchbend

The leftmost wheel is the pitch bender. It can be controlled by MIDI or with the mouse and it will bend the pitch up or down. You can specify the bending range in half notes using the *BendRange* control.

Modwheel

The modulation wheel is located right next to the pitch bender. It can be used as a modulation source in the miscellaneous modulation panels for any type of modulation.

Mono Legato

When the *Mono Legato* button is activated, Sylenth1 will be forced into mono mode and the polyphony setting on the top bar will be discarded. It will also stop retriggering notes whenever another key is pressed. This enables you to slide notes up and down in pitch and velocity without actually restarting a new note.

Portamento

The *Portamento* knob sets the amount of time it takes to slide from one note to another. A small value makes notes slide fast, while a higher value will make them slide slower.

There are two portamento modes, *Normal (N)* and *Slide (S)*, which can be selected using the *Mode* switch right next to the portamento knob. In *Slide* mode it will always slide the pitch to the next note played. In *Normal* mode however, it will only slide notes whenever at least one other key is pressed, but it will not slide when you play a single note at a time.

5. Tips on Reducing CPU Usage

When using a lot of software synthesizers and audio effects at the same time (which you normally would do while producing music), CPU usage can become a problem. Here are some tips to reduce Sylenth1's CPU usage to a minimum.

Polyphony
Probably the most important setting concerning CPU usage is polyphony. For every polyphonic note, almost a whole copy of the audio path is made (except for the master effects). So two notes played simultaneously costs almost twice the amount of CPU needed for one note. Always try to keep the polyphony to a minimum.

Oscillators
The more oscillators you use, the more CPU power is needed. Also, having 4 oscillators with 1 voice each needs more CPU than 1 oscillator with 4 voices. So it's a good idea to try to use less oscillators with more voices each.

Envelope generators
Try to keep the Decay and the Release parameters as small as possible. Sounds with a smaller release time will usually also use less notes of polyphony.

Filters
If you don't use the filters, switch them to bypass mode. This will force them to stop processing. If you use a high number of polyphony, switch off the *Warm Drive* function to save some extra CPU time.

Master Effects
Switch off any effects that you don't use or need. If you run several instances of Sylenth1, all with the same kind of reverb, you might be better off using one external reverb send effect instead and route all audio signals to it. Be aware though that some reverb VSTs consume a lot more CPU time than Sylenth1's reverb!

Pitch and Phase modulation
Modulating the oscillators' pitch and phase can be quite demanding on sounds with a lot of voices, because each single voice needs to be modulated. If you need pitch or phase modulation, try to limit the total number of voices used.

If you are looking for a vibrato effect, you can also use the chorus instead of pitch modulation to do this. Set the chorus *Dry/Wet* to 10, the *Delay* as small as possible and make sure *Dual Mode* is turned off. This is a more CPU friendly solution, especially when playing a lot of voices.

6. Appendix

6.1 MIDI Control Changes

Parameter name	MIDI CC nr
Modwheel	1
Portamento	5
Main Volume	7
Mix A	8
Mix B	9
Osc A1 Volume	10
Osc A1 Phase	11
Osc A1 Detune	12
Osc A1 Stereo	13
Osc A1 Pan	14
Osc A2 Volume	15
Osc A2 Phase	16
Osc A2 Detune	17
Osc A2 Stereo	18
Osc A2 Pan	19
Osc B1 Volume	20
Osc B1 Phase	21
Osc B1 Detune	22
Osc B1 Stereo	23
Osc B1 Pan	24
Osc B2 Volume	25
Osc B2 Phase	26
Osc B2 Detune	27
Osc B2 Stereo	28
Osc B2 Pan	29
Hold Pedal	64
Chorus Delay	65
Chorus Dry/Wet	66
Filter A Drive	67
Filter B Drive	68
Filter A Resonance	69
Filter B Resonance	70
Filter Ctrl Resonance	71
Filter A Cutoff	72
Filter B Cutoff	73
Filter Ctrl Cutoff	74
Filter Ctrl Keytrack	75

AmpEnv A Attack	76
AmpEnv A Decay	77
AmpEnv A Sustain	78
AmpEnv A Release	79
AmpEnv B Attack	80
AmpEnv B Decay	81
AmpEnv B Sustain	82
AmpEnv B Release	83
LFO 1 Rate	84
LFO 1 Gain	85
LFO 1 Offset	86
LFO 2 Rate	87
LFO 2 Gain	88
LFO 2 Offset	89
Reverb Dry/Wet	91
Delay Dry/Wet	92
Distortion Amount	93
Distortion Dry/Wet	94
Phaser Dry/Wet	95
Phaser CenterFreq	96
Phaser Spread	97
Reverb Predelay	102
Reverb Damp	103
Reverb Size	104
Reverb Width	105
Delay Time Left	106
Delay Time Right	107
Delay LowCut	108
Delay HighCut	109
Delay Smear	110
Delay Spread	111
Delay Feedback	112
Delay Width	113
Phaser LR Offset	114
Phaser Width	115
Phaser LFO Rate	116
Phaser LFO Gain	117
Phaser Feedback	118
EQ Bass	119
All Notes Off	123
Comp Threshold	124
Comp Attack	125
Comp Release	127