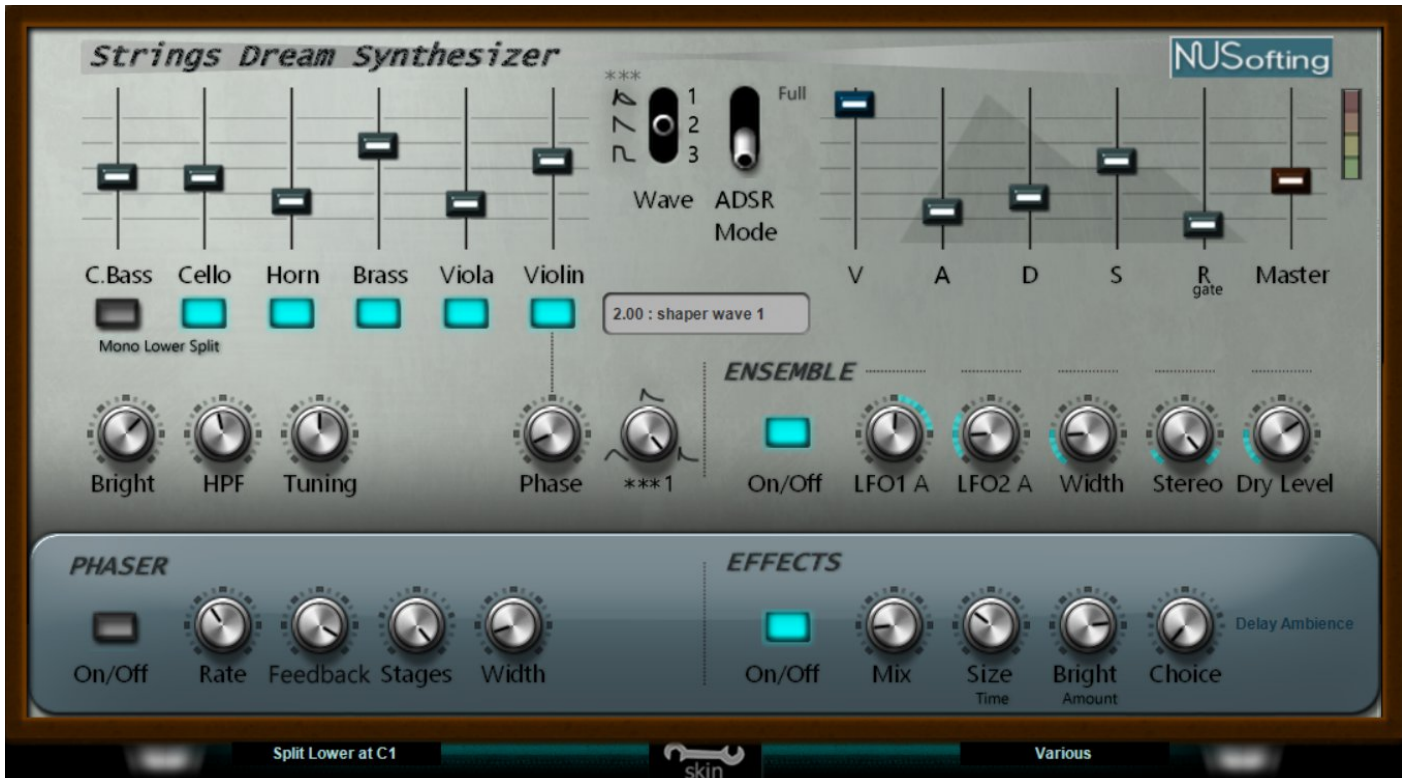# Strings Dream Synthesizer "writings for docs"

2019 Luigi Felici nusofting.com
Edited by Scot Solida and Cj

Strings Dream 2.0 [NUSofting SDS VST2 x64 Synth]

"A new synth under the old skin !"

One more psychedelicious synth from NUSofting!

Strings Dream is able to reproduce an infinite array of rich, analog pads from the most famous string machines in synthesizer history.

Emulate the classic Eminent Solina as well as its sister keyboards from Elka, Crumar and even their Japanese cousins.

Italy was the home of many strings machines, most notably the Crumar, Elka and Logan ones.

Italy is the home of Strings Dream as well.

The Elka Rhapsody was extensively used by Tangerine Dream both in the studio and on stage. These keyboards have a very different sound the Solina. Their sound is somewhat harsher and thinner than that of the Eminent, but can be rich, like the Logan String Melody and some Crumar keyboards, though the latter tends to be more aggressive.

String Dream does not use samples. Instead the "octave divider" circuity typical of those early polyphonic synths has been natively emulated, so that all sounds are computed in realtime in true VA fashion. (Alternative name for this kind of oscillators is "phase-locked")

The fundamental "Ensemble" effect accurately follows the architecture of its hardware counterpart: the three voices Solina chorus. However, it has been extended for a wider range of "chorus" effects.

Note that the registers names like *Horn* and *Brass*, do not mean you will have a realistic horn and brass sounds from those, they are simply vintage conventions for filter settings:
so the *Horn* is a low-passed tone and *Brass* a resonant one.

We've provided a full ADSR envelope generator and Waveform selection (for several strings and organs sounds). Putting the **ASDR** switch down will engage the paraphonic mode, where only one ADS envelope is used for all voices and the **R** slider controls the gate smoothing for each keys.

You will also find:
- A volume fader and switch for each of 6 stops (C.Bass, Cello, Brass, Horn, Viola, Violin). The fader for each stop allows an almost infinite number of mixtures.
- A powerful parameter to tune the relative phase of Violin wave against the other voices.
- Brightness and highpasss filters are also adjustable for all but C.Bass and Cello.

More performance flexibility with MIDI velocity and polyphonic mode selectable (see ADSR switch).

Note also that the C.Bass and Cello are monophonic with full legato mode and you can select one of eight keyboard split points, allowing you to layer the mono voices with the others, or to avoid overlapping.

Beside the chorus "Ensemble" effect, Strings Dream offers a four-stage Phaser for those famous "Jarre pads" and several new ambience effects (2.0).

You can select KeyMap View in the "Various" menu on the GUI to see this:

What's new in 2.0:

- VST2 64-bit for Windows* (and soon also VST2 for Mac).

- Brand new control for waveshape morphing.

- Extra sound engine for the paraphonic mode ("Paraphony" on GUI)
with new timbral characteristics, featuring "analogue pulsed noise" emulation.

- The paraphonic mode allows very different articulations
compared to the standard polyphonic mode ("Polyphony" on GUI).

- As per above, "Polyphony" vs "Paraphony" is now not just a change of behaviour
 of the ADSR envelope.

- Redesigned filters for the voice stops, especially for the ones labeled "Brass" and "Horn".

- Recalibrated relative gains of all the voice stops.

- "Ensemble" chorus DSP upgraded to higher order interpolation (improved transparency and warmth).

- MIDI CCs fixed mapping as:

MIDI Continous Controllers:

Modwheel	CC 1	Shaper
Breath	CC 2	Master Volume
Volume	CC 7	Master Volume
Expression	CC 11	Bright
	CC 15	Paraphony : Polyphony
	CC 16	Phaser LFO Rate
	CC 17	Wave selector : 1/2/3
Hold	CC 64	Sus Envelope

PitchBend to $\pm$1 semitone range

- Reviewed all presets/patches.

- Analogue Drum Kit: bonus feature : 20 of the best LoFi sounds from Drum Machines* of the late Seventies.
(playable using the MIDI keys above the Strings sound range)

- Larger GUI and other minor bugs fixed.
 Three skins included: small and big.
Users can easily make custom skins by making theier own PNG files and copy/edit the skin.xml file.

- Everything that was already good in 1.x has been kept.
(Presets previously made for SDS 1.x needs to be adjusted when loaded in SDS 2.0)

   – New effects: see below *The Effects.* paragraph.

*Formats: 32-bit VST2 will be delivered on customer request.

SDS AU for macOS will be produced after at least 100 requests.

*Drum Machines samples from NUSofting DK+ Library.
MIDI keys range: note 92 to 111. Volume controlled by MIDI Velocity.
[note: this is just a bonus feature for SDS, if you are interested in a true
Analogue Drum Set VST plugin to be release please let me know]

Sound --------: Note Number
HiHat1--------: 92 [usually G#5 in pianoroll]
Snare1--------: 93
KickDrum1-----: 94
Rim1----- ----: 95
Clave1--------: 96
CowBell1------: 97
Cymbal1-------: 98
Guiro1--------: 99
Bongo1--------: 100
Bongo2--------: 101
Conga1--------: 102
Maracas1------: 103
HiHat2--------: 104
Snare2--------: 105
KickDrum1-----: 106
Cymbal2-------: 107
Tom1----------: 108
Tom2----------: 109
Tom3----------: 110
Tom4----------: 111

Tweaking The Parameters of SDS.

The 6 stops (C.Bass, Cello, Brass, Horn, Viola, Violin) are modeled after console organs or the big accordions, and should be conceived of in the same way.

C.Bass and Cello are the bass instruments, monophonic in SDS plugin. Cello has the standard tuning, also called 8' in organs, while C.Bass is one octave lower (16' voice). Their waveforms are fixed and the filters of these voices enhance the low tones.

Brass, Horn and Viola are 8' voices in the standard tuning. The names suggest the kind of filters applied to these stops, therefore Brass is bright and shrill, Horn is a much darker tone, and Viola is more open and even. Using an accurate mixture of these three stops you can emulate a huge array of string machine synth tones, and many variations besides.

Violin is a 4' voice, which that means that it is one octave above the Brass, Horn and Viola. Note that for this stop a Phase knob is available, providing a significant harmonic change when the Violin is layered with another stop. (Not with **Square** wave selected)

Note also that C.Bass and Cello are played only by the keys below the split point (the note set by the "Split Lower at XX" menu), while the other can be played over the entire range. But only when the Paraphony is not selected: Paraphony changes the sound engined used to more fat and dirty (not too much) oscillators and their lower note is C2.

Another remarkable feature is the ability to choose from three* different waveforms for the set Brass, Horn and Viola, Violin. You get two "sawtooth" waveforms and a "vintage" square. The latter allows for more evocative psychedelic effects.

*The first one scan be finely shaped using the Shaper knob.

The spectrum of the oscillators sound can be further shaped by the Brightness and HPF controls. Brightness boosts the high frequencies and HPF controls the main highpass filter. Raising the value of this parameter reduces the low frequencies. This is very useful when emulating some lighter textures of a viola or violin ensemble, that would not hurt the whole mix of a song.

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The Amp Envelope.

This is a full four-stage ADSR envelope (attack time, decay time, sustain level, release time). The vintage hardware string machines usually featured only attack and release times in order to fade the sound in and out, but we've given you a little more control.

The ADSR mode switch allows to simulate the so called "paraphonic" mode used in the first hardware string machines. When the switch is up, the ADSR is fully polyphonic and plays like a more conventional synthesizer envelope.

Note about "paraphonic" mode, or Paraphony on the SDS GUI.
With SDS v.2.0 this changes more than just the ADSR envelope beaviour.

The MIDI velocity sensitivity is also something which obviously didn't exist in that funky old gear, but SDS allows it as an option.

The Effects.

 PHASER "Stages" selector:
1) "2=Notches" : a light phasing effect.
2) "4=Notches" : a typical swooshing effect.
3) "4+Damp"   : same as "4=Notches" but with dampened highs.
4) "2+Damp"   : same as "2=Notches" but with dampened highs.
5) "4+High Range" : swooshing effect shifted 2 octaves up.

The other PHASER controls are:
- LFO rate / speed
- Resonance / feedback.
- Width / range.

 EFFECTS "Choice" selector:
1) "Delay Ambience" : a cross-talking stereo echo with vintage sound.
2) "Echo Ambience" : coupling of "Delay Ambience" and "Algo Ambience"
3) "Algo Ambience" : simple digital reverb
4) "Spring Reverb" : a reverb emulating the colours of a "spring tank" electro-acoustic reverb.

5) "Vibra Chorus"   : a two voices chorus that converges to a mono vibrato
 effect while the "Mix" knob reaches its maximum value.
 can be used both as extra chorus or as vibrato for playing solos.

The other EFFECTS controls are
- Mix / Dry-Wet
- Size / Time.
- Bright / Amount.

 Experiment with their knobs and have fun!

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Known issues:

- A few Effects parameters may be noisy (crackles) when automated, not in every host though.
- Uneven loudness of some notes (keys) has been reported as well.
- Switching VST host sampleRate (E.G. 44100 to 96000) slightly changes the brightness of the sound,
use this at your advantage.
Please report any other issue you may found.

2010 - 2019 Luigi Felici
mail to lqhminei@nusofting.com

Our Support Forum is at
http://www.kvraudio.com/forum/viewforum.php?f=29

See you there for News too

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About Strings Machines.

A remarkable number of musicians recognize the desirable sonic character of "string machines".
String machines were unique to the Seventies and nearly every major manufacturer offered some
variation on the theme. ARP's biggest selling instrument was in fact their Omni, an instrument that
combined a string machine with a simple synthesizer. Even Moog got in on the act with their Opus 3.

 Just as the Rhodes piano and Hammond organs were intended as portable solutions to musicians who
desired the sound of more cumbersome (and expensive) instruments, string machines were seen as
the gigging musician's alternative to the orchestra. Or, at the very least, it was easier to carry around
than a Mellotron! Of course, the string machines didn't sound like an orchestra, but had a character
that today's musicians find quite appealing on its own merits.

What makes a string machine?

This is a polyphonic electronic keyboard based on the top-octave divide-down technology as used in electronic organs to produce a fully polyphonic instrument from a single master oscillator. This means that just a single oscillation is the primary cause of all frequencies of all notes played. There are two main sonic characteristics of instruments that use divide-down technology:

1) The waveforms are all derived from a simple pulse (on, off states) using post filters
2) The relative phase of the waveforms for all generated pitch is locked, more later about why this is so valuable.

Ensemble and/or Chorus effects were perhaps the main contributing factor to the sound of these instruments. Not just any old chorus, either. Only a good old-fashioned analogue BBD-based chorus or ensemble will do. "BBD" is short for "bucket brigade device", a specific sort of analogue (not digital as we are used today) chip used to generate delay in audio: http://en.wikipedia.org/wiki/Bucket_Brigade_Device.

Between two and six BBDs were employed to create the thick, swirling ensemble effect.

The delay times of BBD components are modulated using from 2 to up to 6 oscillators at low rate (LFOs), with different waveforms and rate, depending on the Chorus design. (Modulation of delay times is a method to simulate an ensemble of instruments using audio processing)

http://www.dsprelated.com/dspbooks/pasp/Chorus_Effect.html

The BBD delay not only delays the audio signal but also modifies the audio spectrum in a remarkable way, further adding to the signature sound of the strings machines.

 Let's return to the subject of "locked phase" aspect of top-octave divide-down technology. The phase, "roughly speaking", tells us when the waveform of the sound is going through its positive or negative cycle. When the relative phases of two simultaneous sounds are not locked, you will hear variations in amplitude and timbre. This is especially obvious with electronically generated timbres.

Thus the inventors who aimed at the portable synthesized reproduction of a strings ensemble combined "locked phase" sound generation with a Chorus based on BBD chips. As luck would have it, this clever design results in a stable timbre, providing not only in a good emulation of the acoustic strings ensemble, but also a singularly hypnotic sound suitable to the psychedelic musicians, then and now.

The amplitude modulation issue, aka the Paraphonic voicing.

Organs using the top-octave divide-down technology are fully polyphonic. Each note is turned off and on using a simple gate on key down, so that the sound amplitudes change almost abruptly from zero to full volume and vice-versa when the key is released. Manufacturers sought to compensate for this with expression or volume pedals designed to articulate the sound with fade ins and fade outs, rising or lowering the volume.

String machines however, draw upon the same sort of simple Attack/Decay style envelopes familiar to synthesizer players. However, this presents a new problem. In order to achieve full polyphony, there would need to be an envelope generator for each and every note of the keyboard. A very costly (and cumbersome) solution!

Manufacturers found another answer in "paraphonic voicing". It works about like this: the first key played triggers the envelope, which increases the volume as set by the Attack parameter. So long as the first key is held, any other other note will start at the currently-held volume level. Since there is only one actual envelope generator, the envelope itself is not re-triggered.

What happens when the key is released depends on the particular manufacturer's implementation. Usually the first release key starts the fade out of the sound and following keys are slaved to that first key's volume.

In any event, the Paraphonic voicing has some little something to do with the familiar string machine sound, though many string machine manufacturers approached their envelope behaviour in different ways

The Paraphonic label is also applied to other synthesizer keyboards which have a polyphonic oscillator bank followed by a monophonic section with envelopes and filters. The classic Polymoog is one such instrument, and so is the Korg Poly-800, which had eight voices, but only a single filter.

Other Features and a little history

Not all strings machine feature Vibrato and De-tuning of coupled oscillators.

Ken Freeman was the inventor of an early strings machine. His machine's ensemble effect is not based on a BBD Chorus. Instead, multiple de-tuned oscillators are triggered with each note. See the great article by Gordon Reid at

http://www.soundonsound.com/sos/feb07/articles/freemanstring.htm

Like Freeman's String Symphonizer, the Yamaha SS30 had twin oscillator banks that could be de-tuned against one another.

The vibrato in organs and strings machines (which are organs plus envelope and chorus) is created by modulating the pitch of the master oscillator. This can add more (soemtimes too much!) movement to the strings sound, but it can't replace the chorus effect. The sort of vibrato is mostly useful for solo lines.

The first big chorus effect made using BBD components was the one designed by Eminent in Holland for their home console Eminent 310 Unique. A simplified version of this became the Ensemble effect of the famous the Eminent Solina. The Solina, in turn, was re-badged by ARP as the String Ensemble. Read more about that at

http://www.soundonsound.com/sos/may07/articles/eminent310.htm

ARP made it's own version of the chorus effect by essentially adding an LFO to the Eminent design

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that of the Eminent, but can be rich, like the Logan String Melody and some Crumar keyboards, though the latter tends to be more aggressive.

Crumar, Elka and Logan keyboards were sold in Germany and USA with different brand names.

Japanese manufacturers offered their own take on the string machine, including those made by Roland, with their now-classic chorus effect in tow. The advances in these designs would elevate the quality of the string synthesizer to a whole new level. Read more about that at:

http://www.soundonsound.com/sos/Jul02/articles/retrozone0702.asp

String machines were solid contenders for over a decade, even lasting well into the era of fully polyphonic synthesizers. It was only when sampling hit the scene that these dear old machines would finally be laid to rest.

Today we can still appreciate the first simple analogue strings machines for their unusual and evocative tones.

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