

JunoX² Synthesizer Manual



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About JunoX²

The "Roland Alpha Juno" was a famous synthesizer in the 90's. Now you got that fantastic sound back on your computer as a VST Instrument. We tried to keep the remake as simple as possible. You will notice that building sounds is very easy and you will get impressive results quickly.

About JunoX² Demo Version

If you are using the demo version of JunoX² please note the following limitations of the demo version:

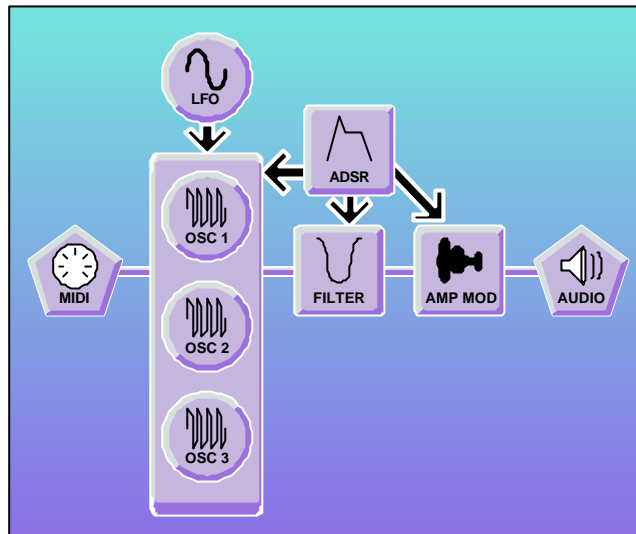
- **Demo version is only 2-voice polyphonic**
- **Demo version works only 15 minutes! After this you'll have to restart your VST host to be able to use JunoX2 again.**
- **Demo version doesn't receive or send MIDI-CC data**

The full version of JunoX² can be ordered at:

<http://www.reFX.net/>

Signal Generation

JunoX² is a subtractive synthesizer. Subtractive means that a filter is used to filter specific harmonic contents. The basic structure is very simple:



Oscillators

When a note is played on your midi-keyboard or in your host software, JunoX² starts to play up to three oscillators with the frequency depending on the note. There are different types of oscillator waveforms. Some offer a feature called Pulse-Width-Modulation (PWM) that changes their duty-cycle-length. This animates the sound in various ways.

LFO

The LFO can be used to modulate the Pulse-Width of the oscillators.

Envelope

The envelope controls three different sound-parameters.

- The Volume – this controls the volume of the oscillator
- The Pulse-Width – this controls the duty-cycle-length of the oscillator (if supported)
- The Filter – this controls the cut-off frequency of the filter

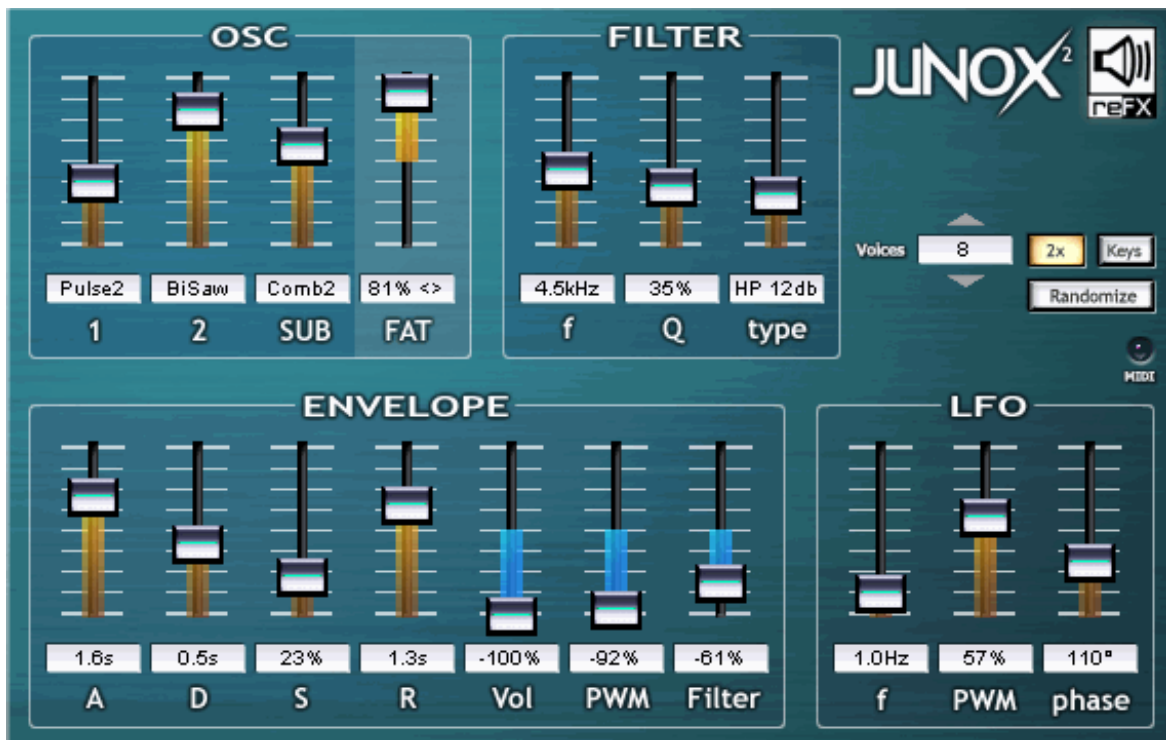
Filter

The filter is used to emphasise or dampen the harmonic content of the sound. There are eight different filter types that filter different frequencies and/or distort the sound.

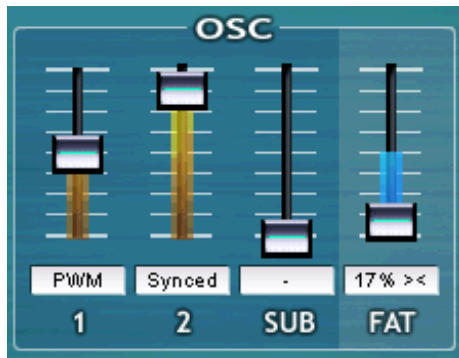
Amplifier

The last step is the amplifier, which can also be controlled by the envelope.

User Interface



Oscillator Controls



JunoX² supplies three oscillators that generate the basic sound. Oscillator 1 generates square-waves, oscillator 2 generates saw-waves and the sub-oscillator generates a square signal that is one or two octaves below the main frequency. It is used to give the sound more bass and depth. Some oscillators can be modulated. This is called pulse-width-modulation or short PWM. Pulse-width-modulation depth can be modulated by the envelope or by the LFO.

Oscillator 1

Controls the waveform that is generated by the first oscillator. Possible waveforms are:

<i>WaveForm</i>	<i>PWM Control</i>
Pulse	No
Pulse 2	No
Pulse	Yes, basic PWM control
Double Pulse	Yes, basic PWM control
BiPulse	Yes, basic PWM control
FM Pulse	Yes, controls the level of FM
Formant	Yes, controls the timbre

Oscillator 2

Controls the waveform that is generated by the second oscillator. Possible waveforms are:

<i>WaveForm</i>	<i>PWM Control</i>
Saw	No
Saw 2	No
Comb Saw	No
Comb Saw 2	No
Saw	Yes, basic PWM control
BiSaw	Yes, basic PWM control
SyncSaw	Yes, controls the sync level
Digital	Yes, controls the waveform

Sub Oscillator

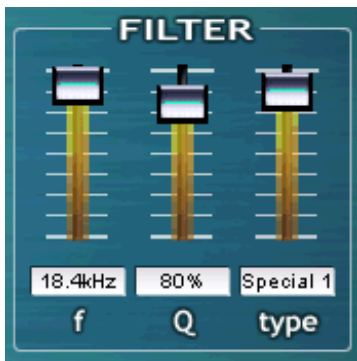
Controls the waveform that is generated by the sub oscillator. Possible waveforms are:

<i>WaveForm</i>	<i>PWM Control</i>	<i>Tuning</i>
Pulse	No	-1 octave
Pulse 2	No	-1 octave
Comb Pulse	No	-1 octave
Comb Pulse 2	No	-1 octave
Pulse	No	-2 octaves
Pulse 2	No	-2 octaves
Vocal	Yes, controls vocal	None

Fatness

The fatness controller has never heard of the weight watchers. Once set to a comfortable level it brightens up the sound considerably. When the display contains a "<>" both oscillators are mixed into one mono stream, creating a narrower sound. Should the display show "><" then the sound is widened to give that extra touch. If you are short on performance, you can set the fatness to "mono" which does only calculate the left channel and mirrors it into the right.

Filter Controls



JunoX² offers eight different filter types. Filters are used to form the harmonic content of the sound.

f

Controls the filter cut-off frequency.

Q

Sets the filter resonance level. It defines how much the frequencies near the cut-off frequency are emphasised. When set high enough some filters will self-oscillate with the cut-off frequency.

Type

Last, but not least, is the filter-type selector. Here you can choose between several low-pass, high-pass or combination filter types which are listed below.

Type	Description	Effect
LP 12db	Low-pass	12dB
Moog	Moog Low-pass	24dB
HP 12db	High-pass	12dB
Notch	Notch (Band-stop)	12dB
LP + Dist	Moog Low-pass with distortion	24dB
BP + Dist	Band-pass with distortion	12dB
Special 1	Moog low pass parallel to high-pass at 12kHz	24 dB
Special 2	Notch parallel to band-pass with distortion	12 dB

Low-pass - Only low frequencies are passed. High frequencies are cut.

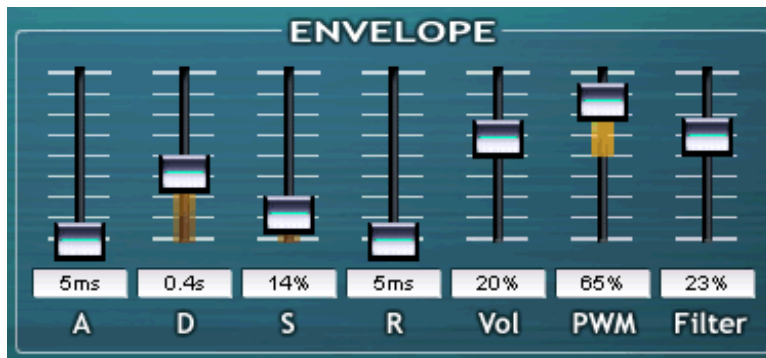
High-pass - Only high frequencies are passed. Low frequencies are cut.

Band-pass - Frequencies around the cut-off are passed. All others are cut.

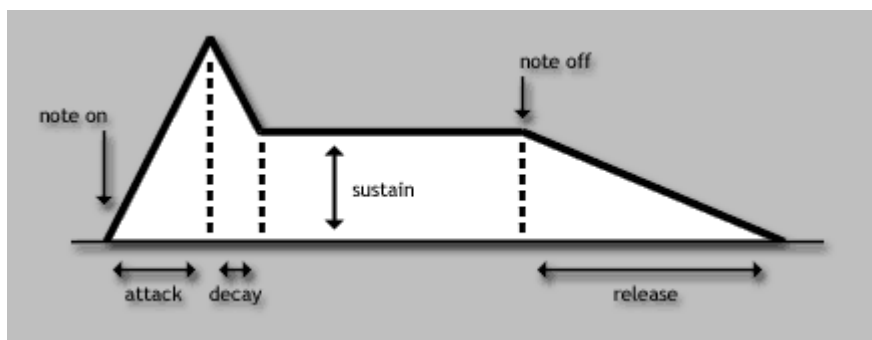
Notch - Opposite to Band-pass. Frequencies around cut-off are cut.

Distortion - Shape of signal gets formed non-linearly, which gives a grungy effect.

Envelope Controls



JunoX² uses an ADSR-envelope. You can change the attack- & decay-time, the sustain level and the release-time.



When a key is hit the envelope starts at zero. It then takes the given attack-time to reach full level. After reaching full level, the decay-phase begins and the envelope will gradually decrease until the sustain-level is reached. The sustain-level will last as long as the key is held. Once the key is released the release-phase starts. The envelope level will decrease further until zero is reached again.

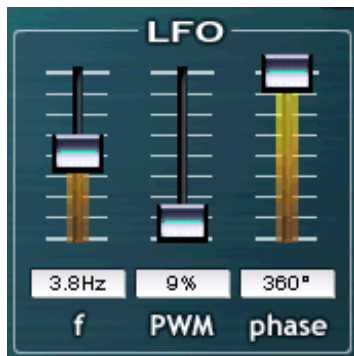
There are several controls to change the various parameters of the envelope.

These are

- A – Attack rate.
- D – Decay rate.
- S – Sustain level.
- R – Release rate.
- Vol – Changes the modulation level of the volume.
- PWM – Sets the modulation level for the pulse-width.
- Filter – Controls the modulation level of the filter.

The envelope of JunoX² has three send parameters, one for volume, one for PWM and one for the filter. These send values can be set to positive and negative levels. Negative levels invert the envelope. For example, if you do a cut-off modulation with the envelope filter-send and the level is set to a negative amount, the value of the envelope will be subtracted from the cut-off frequency, as opposed to added when the envelope filter-send level would have to be set to a positive value.

LFO Controls



The LFO can be used to modulate the oscillators.

f

Sets the frequency of the low frequency oscillator.

PWM

Defines how strongly the pulse width is modulated by the LFO.

Phase

Sets the startup phase of the LFO when the note is triggered.

Other Controls



Voices

Controls the polyphony limit (how many voices can be played at the same time).

2x

Controls if two times oversampling is used or not. When used, the oversampling reduces aliasing artefacts especially when playing high frequency sounds.

Keys

Toggles the onscreen 4 octave keyboard on and off.

Randomize

Sets all controls to random positions. If you're dry on ideas for new sounds, just keep clicking this button until you hit something worthy. Then tweak that sound until you get what you want.

MIDI

Lights up every time MIDI data is received by the synthesizer.

MIDI Control

Nearly every parameter is connected to a MIDI-Controller. By sending MIDI-Controller messages you can change this parameter at any time from your host.

<i>MIDI-Controller</i>	<i>Parameter</i>
94	Fatness
74	Filter cutoff
75	Filter resonance (Q)
73	Envelope attack rate
72	Envelope release rate
71	ENV->Filter modulation depth
16	ENV->PWM modulation depth
17	ENV->Volume modulation depth
19	LFO frequency
18	LFO->PWM modulation depth
7	Main volume
11	Expression

These MIDI-Controller messages are also send back to the host when the sliders are used. When you record a MIDI-track and you change one of the parameters from the previous list, the sequencer will record this parameter change (only in hosts supporting this feature).

Contact and Support

We have tried to keep **JunoX²** as bug-free as possible, but you never can be 100% certain things work as they should in the world of software. So if you should encounter any problems or if you have suggestions for future revisions, don't hesitate to contact our technical support at:

support@refx.net

Or come and visit us at:

<http://www.reFX.net/>

Thank you.

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