



WAVES Element 2.0 Subtractive Polyphonic Virtual Analog Synthesizer User Guide

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ELEMENT 2.0
USER GUIDE



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INTRODUCTION

Welcome

Thank you for choosing Waves! In order to get the most out of your new Waves plugin, please take a moment to read this user guide.

To install software and manage your licenses, you need to have a free Waves account. Sign up at www.waves.com. With a Waves account you can keep track of your products, renew your Waves Update Plan, participate in bonus programs, and keep up to date with important information.

We suggest that you become familiar with the Waves Support pages: www.waves.com/support. There are technical articles about installation, troubleshooting, specifications, and more. Plus, you'll find company contact information and Waves Support news.

Product Overview

Waves Element 2.0 is a subtractive polyphonic virtual analog synthesizer, designed to provide fat analog sound in the tradition of the classic analog synths, with all the control and flexibility of modern digital units. Element 2.0's control panel combines tradition with intuitive interaction, so you can easily customize existing presets or build custom patches from the ground up. Special care and attention have been given to the synth's sound quality in order to recreate the fatness and depth of its analog ancestors.

Drawing inspiration from the classics, Element 2.0 lets you create seemingly complex sounds using very simple settings, and then add "bells and whistles" using its built-in modulators, effects and sequencer/arpeggiator. All Element 2.0 parameters are accessible via a single page interface, conveniently laid out so you can see the entire patch at all times. Fully MIDI-controllable, with easy-to-use MIDI Learn for all controls, Element 2.0 is designed for quick integration with any connected MIDI control device and can be used either as a plugin within your DAW host, or as a standalone application.

Concepts and Terminology

Element 2.0 is powered by Virtual Voltage™ technology, which connects its various generators, transformation filters, envelopes and modulators. Element 2.0 therefore uses many of the same concepts used by its hardware forerunners: VCF (Voltage Controlled Filter), VCA (Voltage Controlled Amplifier), and so on.

Anyone acquainted with synthesis especially classic '80s-style polyphonic subtractive synthesis should feel right at home with Element 2.0. You'll be able to dive right in and start programming immediately. For novice synthesisers, Element 2.0 is an ideal place to learn the basics of synthesis theory. The learning curve will pay off when encountering other synthesizers, whether software or hardware, analog or digital.

All users can partake in the instant gratification of Element 2.0's vast selection of factory presets. Element 2.0's team of experienced preset developers created hundreds of presets, sorted by category, so you can quickly find just the sound you need: leads, pads, basses, sound effects, sequences, gated rhythmic lines and motions. Or simply browse until something catches your ear or imagination.

Whether in the studio or live on stage, many musicians like to control synthesizer parameters in real time for enhanced creativity and expression. Element 2.0 supports the basic automation features of plugin hosting technologies like VST, but it also supports MIDI Learn. Assigning an Element 2.0 control to a knob on your MIDI controller is as easy as right click > Learn, knob turn, done!

Analog modeling and sound quality do come at a price. Element 2.0 can be rather CPU hungry compared to other software synthesizers. During the days of analog hardware, less expensive oscillators were often considered "dirty," while accurate oscillators cost more than was practical for music making. Ironically, in today's digital world, creating a pristine oscillator is comparatively easy; it's the "dirtiness" that takes more CPU calculations to recreate. To conserve CPU power, Element 2.0 lets you select the maximum number of simultaneous voices.



Components

Element 2.0 has one component: Element 2.0 Stereo

Element 2.0 is a virtual instrument plugin and will appear under the related selection menus for virtual instruments under all supported DAW host applications. Waves Element 2.0 also works as a standalone application, using ASIO (Windows) or Core Audio (Mac) drivers to play through your audio device of choice. Element 2.0 receives MIDI data to trigger notes and control changes.

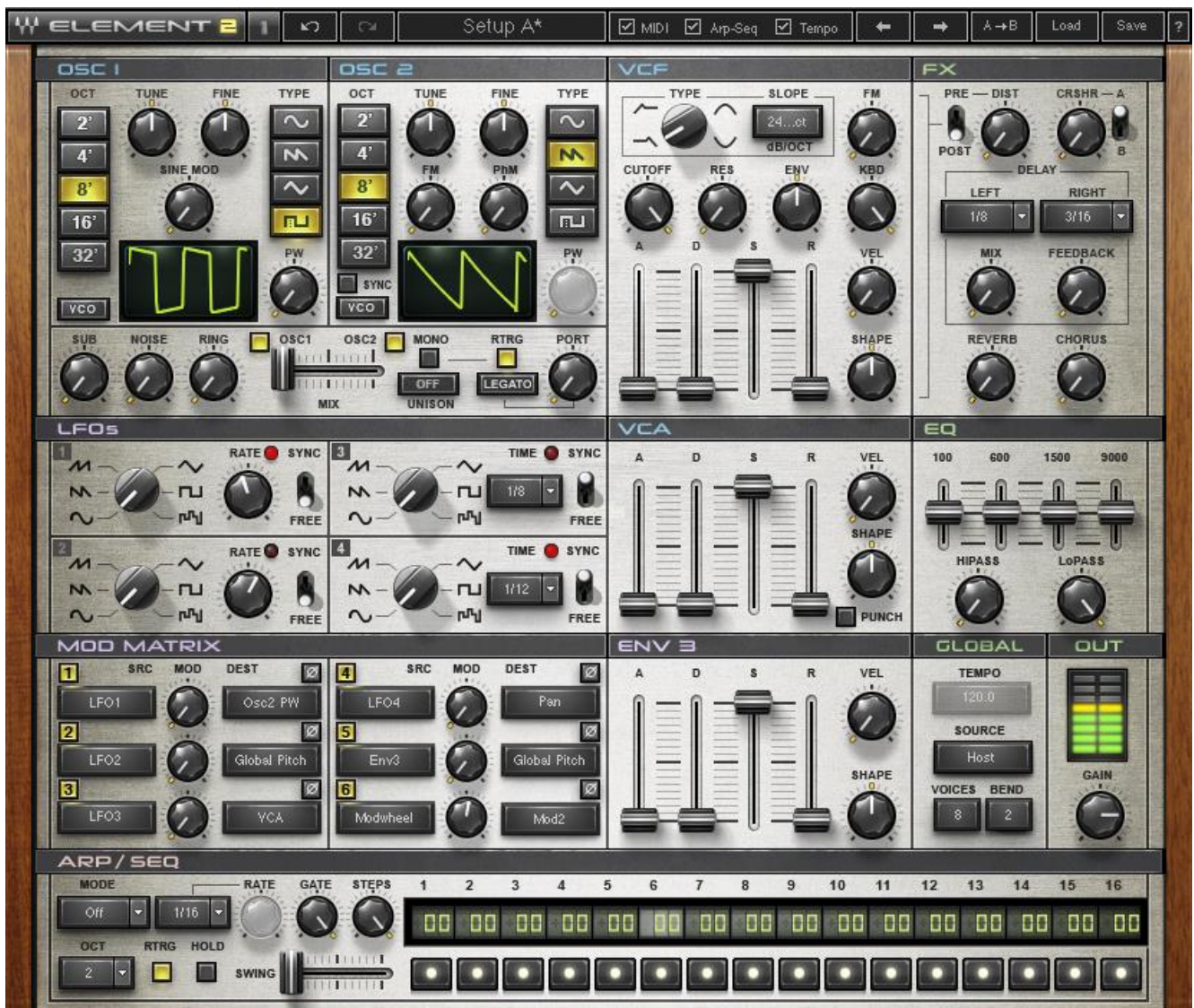
QUICK START GUIDE

1. Open Element 2.0 on an instrument track in your DAW of choice, or launch the Element 2.0 standalone application.
2. Select a preset from Element 2.0s factory presets.
3. Play!

Use the next/previous preset arrow controls on the toolbar   to scroll through presets. If you're looking for a certain type of sound, click the load button to reveal the factory presets, sorted by category.

INTERFACE AND CONTROLS

Interface



Controls

The Element 2.0 interface is arranged into four sections grouped according to function, each highlighted in a different color:

Voice generation and subtractive elements (blue)

Modulation sources and patches (purple)

Effects, EQ, global and output sections (green)

Arpeggiator/sequencer (red)

OSCILLATORS



Element 2.0 has two modeled analog oscillators which are labeled OSC 1 and OSC 2.

OCT determines the pitch range.

Options: 2, 4, 8, 16, 32 (from highest to lowest pitch)

TUNE determines the pitch.

Range: -12 to +12 semitones

FINE fine-tunes the pitch.

Range: -100 to +100 cents

TYPE determines the waveform type.

Options: Sine, Saw, Triangle, Pulse

PW determines the pulse width. (Pulse waves only.)

Range: 099

VCO selects between virtual Voltage-Controlled Oscillation (VCO) and virtual Digitally Controlled Oscillation (DCO). VCO starts the oscillation at a random phase and jitters the pitch within a contained range; DCO starts the oscillation when triggered by a note and is more consistent.

Options: VCO, DCO

SINE MOD controls the modulation of OSC 1 using a sine oscillator. (OSC 1 only.) Range: 0100

FM (Frequency Modulation) controls the degree to which the frequency of OSC 2 is modulated by OSC 1. (OSC 2 only.)

Range: 0100

PhM (Phase Modulation) controls the degree to which the phase of OSC 2 is modulated by OSC 1. (OSC 2 only.)

Range: 0100

SYNC synchronizes OSC 2's pitch to that of OSC 1. When SYNC is activated, OSC 2's pitch controls (OCT, TUNE, FINE) affect only OSC 2's timbre, not its pitch.

Options: On, Off

ADDITIONAL OSCILLATORS & MIX SECTION



This section is used to combine OSC 1 and OSC 2, as well as add noise, sub-oscillation and ring modulation.

SUB mixes in a triangle wave one octave below OSC 1.

Range: 0100

NOISE mixes in white noise.

Range: 0100

RING controls the ring modulation of OSC 1 and OSC 2.

Range: 0100

OSC 1 / OSC 2 activate each oscillator.

Options: In, Out

MIX balances the mix between OSC 1 and OSC 2.

Range: -50 to +50

MONO toggles between monophonic and polyphonic modes.

Options: On (mono), Off (polyphonic)

RTRG controls envelope re-triggering. When activated, every note restarts the envelopes. (Mono mode only.)

Options: On, Off

UNISON stacks multiple voices for a richer sound.

Options: Off, 2 Voices, 4 Voices

PORT determines the glide time (portamento) between notes.

Range: 0.52500 ms (02.5 seconds)

LEGATO determines whether glide will always occur, or only when the previous note is still held.

Options: Legato, Always

VOLTAGE-CONTROLLED FILTER (VCF)



The VCF section includes selectable filter slope, frequency and resonance parameters as well as a filter envelope which determines the filter movement on each trigger.

TYPE determines the filter type.

Options: High Pass, Low Pass, Band Pass, Band Reject

SLOPE toggles between two types of pole filters.

Options: 2-pole/12 dB per octave, 4-pole/24 dB per octave

CUTOFF controls the VCF cutoff frequency.

Range: 0100 (20 Hz20 kHz)

RES controls the amount of filter resonance.

Range: 0100

ENV determines the envelope's cutoff modulation depth.

Range: -100100

KBD controls keyboard tracking using C3 as its reference point.

Range: 0100

FM controls the amount of frequency modulation on filter cutoff by OSC 1.

Range: 0100

ADSR determines the filter's envelope cutoff behavior after a note is triggered:

A (Attack): 110,000 (1 millisecond10 seconds)

D (Decay): 110,000 (1 millisecond10 seconds)

S (Sustain): 0100% amplitude R (Release): 110,000 (1 millisecond10 seconds)

VEL sets the VCF cutoff in relation to the Note On velocity.

Range: 0100

SHAPE determines the contour of the envelope time constants.

Range: -5050

At 0, time constants are linear; at positive values, the envelope slopes become more logarithmic for a response more similar to analog envelopes. Negative values result in an exponential curve.

VOLTAGE-CONTROLLED AMPLIFIER (VCA)



The VCA envelope controls the note level from trigger to release:

A (Attack): 110,000 (1 millisecond10 seconds)

D (Decay): 110,000 (1 millisecond10 seconds)

S (Sustain): 0100% amplitude

R (Release): 110,000 (1 millisecond10 seconds)

VEL sets the envelope depth in relation to the Note On velocity.

Range: 0100

SHAPE determines the contour of the envelope time constants.

Range: -5050

PUNCH controls the dynamic transient enhancer which makes for a "snappier" attack.

Options: On, Off

LOW-FREQUENCY OSCILLATORS (LFOS)



Element 2.0 features four identical LFOs that can be either free-running or synced to both MIDI clock and Note On commands.

TYPE controls the LFO waveform shape.

Options: Sine, Saw Down, Saw Up, Triangle, Pulse, S&H (random)

RATE controls the frequency of the free LFO.

Range: 0.1100 Hz

TIME controls the rate of the synced LFO, locked to the project BPM.

Options: 4/1, 3/1, 2/1, 1/1, 1/2, 3/8, 1/3, 1/4, 3/16, 1/6, 1/8, 3/32, 1/12, 1/16, 3/64, 1/24, 1/32

SYNC determines whether the LFO is free-running or synced to clock. LED displays pulses at the same rate as the LFOs.

ENVELOPE 3



In addition to the filter and the VCA envelopes, Element 2.0 includes an envelope generator that can be freely assigned to selectable destinations via the modulation matrix.

A (Attack): 110,000 (1 millisecond10 seconds)

D (Decay): 110,000 (1 millisecond10 seconds)

S (Sustain): 0 to 100% amplitude

R (Release): 110,000 (1 millisecond10 seconds)

VEL sets the envelope depth in relation to the Note On velocity.

Range: 0100

SHAPE determines the contour of the envelope time constants.

Range: -5050

MODULATION MATRIX



The Modulation Matrix allows the patching of modulation sources to selectable destinations.

PHASE inverts the phase, per assignment. Depending on the phase setting, this will change the direction of the modulation.

Options: On, Off

SRC determines the modulation source.

Options: LFO1, LFO2, LFO3, LFO4, Env3, MoD wheel, Keyboard, Velocity, After touch, Bender, VCF Envelope, Sequencer

DEST determines the destination of the modulation source.

Options: Global Pitch, Osc1 Pitch, Osc2 Pitch, Osc1 PW, Osc2 PW, Sine Mode, Osco FM, Osco Ph.M., Osco Mix, Sub, Noise, Ring, Portamento, VCF Cutoff, VCF Res, VCF Env, VCF FM, VCF Env Shape, VCA, VCA Env A, VCA Env D, VCA Env S, VCA Env R, VCA Env Shape, Pan, LFO1 Rate, LFO2 Rate, LFO3 Rate, LFO4 Rate, Env3 A, Env3 D, Env3 S, Env3 R, Env3 Shape, Arp/Sew Rate, Arp/Sew Gate, Mod1, Mod2, Mod3, Mod4, Mod5, Mod6, HP, LP, Distortion, Crusher, Delay Mix, Delay Time, Reverb, Chorus MOD sets the degree to which the modulation source affects the destination. Range: 0100%.

ARPEGGIATOR / SEQUENCER



The ARP/SEQ section functions as both a traditional arpeggiator and a 16-step sequencer. Each sequencer step has an In/Out toggle as well as a pitch control which may be set +/-24 semitones from the currently held note.

MODE determines the operational mode.

Options: Off, (Arp) Up, (Arp) Down, (Arp) Up/Down, (Arp) Random, Sequence

OCT determines the range, in octaves, of the arpeggiator.

Options: 1, 2, 3, 4

RTRG determines whether the sequence should restart when a new note is played.

HOLD keeps the sequence running even after the keys are released.

TIME (drop-down) activates the host BPM sync function, and sets the rate using note values.

Options: Free (host BPM sync off), 1/2, 3/8, 1/3, 1/4, 3/16, 1/6, 1/8, 3/32, 1/12, 1/16, 3/64, 1/24, 1/32

RATE sets the arpeggiator rate when TIME is set to Free. Range: 150 Hz

GATE determines the length of each sequencer step as a percentage of its note length. Range: 5100%

STEPS determines the number of steps in the current sequence. Range: 116

SWING pushes even-numbered notes/steps toward the next odd-numbered note/step, to create a shuffle/swing feel.

Range: 0100

EFFECTS



DIST controls the amount of distortion effect. Distortion is applied per voice, eliminating IMD (inter-modulation distortion.) Settings below 50% create a warm saturated drive effect; settings above 50% result in a more aggressive, “crunchier” sound.

Range: 0100%

PRE/POST is a toggle control which determines the placement of the distortion effect in the signal path, either pre-VCF or post-VCF.

Options: Pre, Post

CRSHR is a distortion-like effect which simulates a reduction in the bit-depth and resolution of the sound.

Range: 0100

CRSHR A/B switches between distinct crushing algorithms.

Options: A, B

DELAY is a stereo delay that allows separate delay times for the left and right channels, using note values.

- **LEFT** sets the delay time for the left channel. Options: 1/2, 3/8, 1/3, 1/4, 3/16, 1/6, 1/8, 3/32, 1/12, 1/16, 3/64, 1/24, 1/32
- **RIGHT** sets the delay time for the right channel. Options: 1/2, 3/8, 1/3, 1/4, 3/16, 1/6, 1/8, 3/32, 1/12, 1/16, 3/64, 1/24, 1/32
- **MIX** determines the amount of delay effect in the mix. Range: 0100
- **FEEDBACK** determines the amount of gain fed back to the delay input. Range: 0100

REVERB controls both the amount and size of the virtual plate reverb sound. In addition to increasing the amount of reverb, higher values also increase the reverb size and time.

Range: 0100

CHORUS determines the amount of chorus modulation.

Range: 0100

EQ



The EQ section is a 4-band fixed frequency graphic equalizer with high-pass and lowpass filters. At high boost levels, the EQ saturates with different tonal qualities than the Distortion module.

HI PASS controls the high-pass filter frequency.

Range: 2020,000 Hz

Lowpass controls the low-pass filter frequency.

Range: 1020,000 Hz

100 controls equalization at 100 Hz.

Range: -30 to +30 dB

600 controls equalization at 600 Hz.

Range: -20 to +20 dB

1500 controls equalization at 1500 Hz.

Range: -20 to +20 dB

9000 controls equalization at 9000 Hz.

Range: -25 to +25 dB

GLOBAL AND OUT SECTIONS



TEMPO displays the current tempo.

Range: 1300

SOURCE determines the clock source.

Options: Host, Internal

VOICES determines the number of voices which may be played simultaneously.

Range: 116

BEND determines how far the pitch-bend controls will increase/decrease the pitch in semitones.

Range: 012

GAIN sets Element 2.0's overall output volume, after all generators and processors.

Range: -80 to 0 dBs

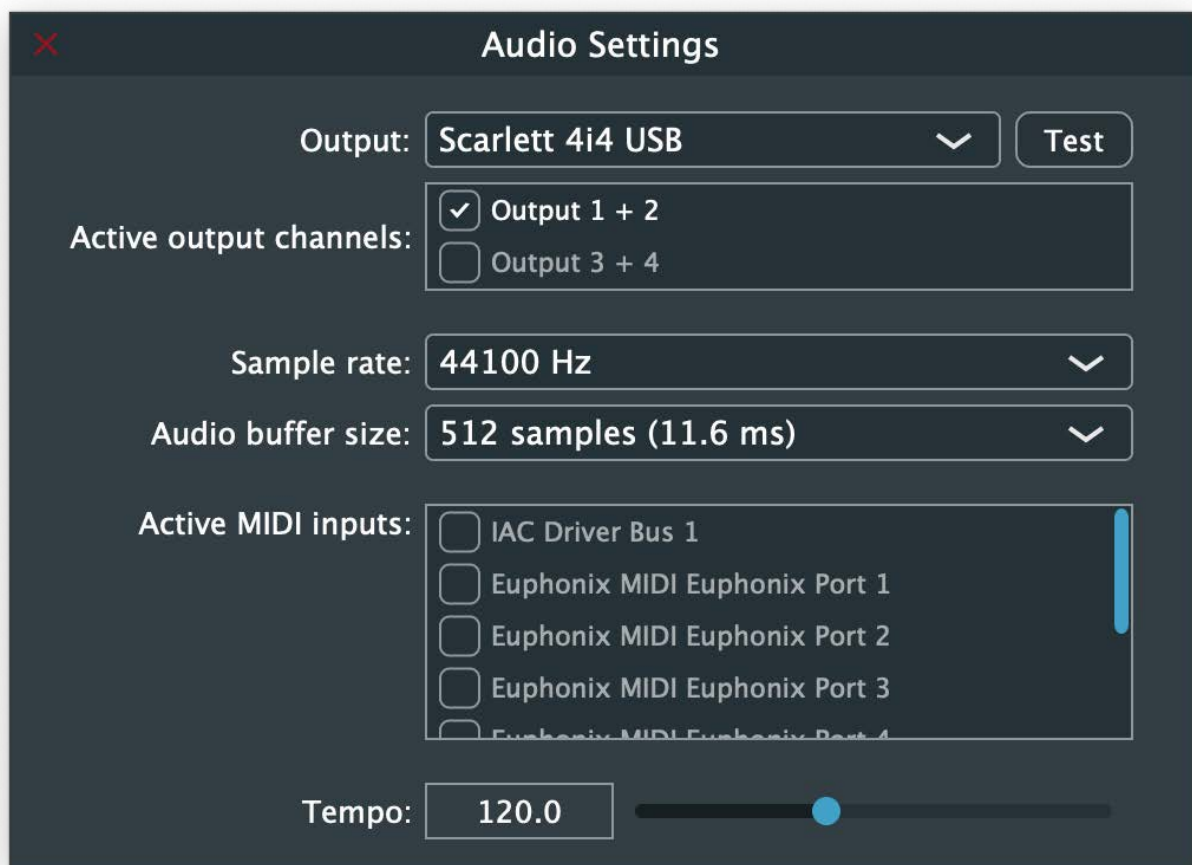
METER displays Element 2.0's overall output energy.

STANDALONE APPLICATION

The Element 2.0 application can be used as a standalone instrument. It requires ASIO drivers for Windows or Core Audio for macOS. Element 2.0 .exe (Win) or Element 2.0 .app (Mac) loads the Element 2.0 instrument and configuration preferences dialogs. Set up the standalone application from its File menu:

- All Notes Off
Sends an All-Notes-Off MIDI command to the Element 2.0 synthesizer. This is useful in cases of “stuck” sustaining notes.
- Preferences
Displays the Preferences dialog for the Audio, MIDI, and User Choices configurations.

PREFERENCES



(Windows Only)

Output displays the audio devices available on the system.

Test plays a sound if the outputs are configured correctly.

Active Output Channels allows selection of audio outputs from the selected device.

Sample Rate displays and sets the sample rate.*

Audio Buffer Size displays and sets the buffer size, which influences latency.*

*In Windows, sample rate and buffer size cannot be changed from this panel.

To modify these settings: close the application, adjust sample rate and buffer size with your driver’s control panel (link shown below), and then relaunch.

Active MIDI Inputs displays a list of available MIDI input devices on the current system. Select the MIDI device for receiving MIDI data.

Tempo: Sets the tempo for all relevant plugins. By default, tempo-based Waves plugins are in a “tempo listen” state. Their tempo rates will fix to this value.

ELEMENT 1 AND ELEMENT 2 MODES



Element 1 Mode



Waves Element 2.0 includes a fully featured version of its predecessor, the original Element synth. A dedicated control at the top left corner of the interface, labeled Element 1 and 2, lets you freely switch between the two versions. Projects saved with Element 1 will automatically load the plugin in Element 1 mode.

Element 1 vs. Element 2

Element 2 uses a vastly improved synthesis engine, which can result in highly audible differences between the two modes.

There are also functional differences between Element 1 and Element 2 modes:

1. Element 1 has a single Unison mode, rather than the more sophisticated selectable 2- or 4-voice Unison of Element 2.
2. Unlike the 4 LFOs in Element 2, Element 1's LFOs are arranged in two pairs. LFO 1 and 2 are free-running, whereas LFO 3 and 4 are synchronized both to MIDI clock and to Note On commands.
3. Element 1 does not feature a dedicated pitch-bend range control.
4. Element 1 has only a single 'Crusher' effect mode.

5. Element 1 features an HD switch that improves the overall sound of the instrument at the expense of increased CPU usage. Element 2 is always HD.
6. Element 1 has neither the ARP/SEQ `Hold` nor the `Retrigger` functionality of Element 2.

Wave System Toolbar

Use the bar at the top of the plugin to save and load presets, compare settings, undo and redo steps, and resize the plugin. To learn more, click the icon at the upper-right corner of the window and open the Wave System Guide.

Load with Preset MIDI, Arp/Seq and Tempo




The Load with Preset filter is a Element-exclusive custom toolbar that lets you choose whether or not to load certain preset characteristics such as MIDI assignments, arpeggiator/sequencer settings, and tempo. When checked, these parameters are loaded. Here are some practical examples: **MIDI** Let's say you've assigned a MIDI controller knob to Element's VCF cutoff. Loading the next preset will reset this parameter; you will then have to redo the MIDI Learn routine in order to attach the knob to the control. However, if you uncheck the MIDI checkbox, the next preset will be loaded, but the current MIDI assignment will remain in place.

Arp-Sew Let's say you have a bass line arpeggio that you like, and you want to test the pattern using a different sound. Uncheck the Arp/Seq checkbox, and the preset will be loaded without any associated Arp/Seq settings, leaving the pattern as is.

Tempo Let's say you are working on an arpeggio with an internal tempo of 140. Loading presets may set the tempo to a different value or to the value determined by your host computer. To ignore tempo settings saved with other presets, uncheck the Tempo box, and your current tempo setting will remain in place when other presets are loaded.

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Documents / Resources

	<p>WAVES Element 2.0 Subtractive Polyphonic Virtual Analog Synthesizer [pdf] User Guide Element 2.0 Virtual Analog Synth, Element 2.0, Virtual Analog Synth, Analog Synth, Element 2.0 Subtractive Polyphonic Virtual Analog Synthesizer, Subtractive Polyphonic Virtual Analog Synthesizer, Polyphonic Virtual Analog Synthesizer, Virtual Analog Synthesizer</p>
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References

- [Waves Audio | Mixing, Mastering & Music Production Tools](#)
- [Waves Audio | Mixing, Mastering & Music Production Tools](#)