

WAVES

ELEMENT 2.0

USER GUIDE



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CHAPTER 1 – INTRODUCTION

1.1 Welcome

Thank you for choosing Waves! In order to get the most out of your Waves processor, please take the time to read through this manual.

In conjunction, we also suggest that you become familiar with www.wavesupport.net. There you will find an extensive answer base, the latest tech specs, detailed installation guides, new software updates, and current information on licensing and registration.

By signing up at www.wavesupport.net, you will receive personalized information on your registered products, reminders when product updates are available, and more.

1.2 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.

1.3 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 synthesists, 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.

1.4 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.

CHAPTER 2 – 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.

CHAPTER 3 – INTERFACE AND CONTROLS

3.1 Interface



3.2 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)

3.2.1 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: 0–99

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: 0–100

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

Range: 0–100

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

Range: 0–100

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

3.2.2 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: 0–100

NOISE mixes in white noise.

Range: 0–100

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

Range: 0–100

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: 0.5–2500 ms (0–2.5 seconds)

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

Options: Legato, Always

3.2.3 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: 0–100 (20 Hz–20 kHz)

RES controls the amount of filter resonance.

Range: 0–100

ENV determines the envelope's cutoff modulation depth.

Range: -100–100

KBD controls keyboard tracking using C3 as its reference point.

Range: 0–100

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

Range: 0–100

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

A (Attack): 1–10,000 (1 millisecond–10 seconds)

D (Decay): 1–10,000 (1 millisecond–10 seconds)

S (Sustain): 0–100% amplitude

R (Release): 1–10,000 (1 millisecond–10 seconds)

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

Range: 0–100

SHAPE determines the contour of the envelope time constants.

Range: -50–50

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.

3.2.4 VOLTAGE-CONTROLLED AMPLIFIER (VCA)



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

- A** (Attack): 1–10,000 (1 millisecond–10 seconds)
- D** (Decay): 1–10,000 (1 millisecond–10 seconds)
- S** (Sustain): 0–100% amplitude
- R** (Release): 1–10,000 (1 millisecond–10 seconds)

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

Range: 0–100

SHAPE determines the contour of the envelope time constants.

Range: -50–50

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

Options: On, Off

3.2.5 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: 0.1–100 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.

3.2.6 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): 1–10,000 (1 millisecond–10 seconds)

D (Decay): 1–10,000 (1 millisecond–10 seconds)

S (Sustain): 0 to 100% amplitude

R (Release): 1–10,000 (1 millisecond–10 seconds)

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

Range: 0–100

SHAPE determines the contour of the envelope time constants.

Range: -50–50

3.2.7 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, Modwheel, Keyboard, Velocity, Aftertouch, 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, Osc FM, Osc PhM, Osc 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/Seq Rate, Arp/Seq 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: 0–100%.

3.2.8 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: 1–50 Hz

GATE determines the length of each sequencer step as a percentage of its note length.

Range: 5–100%

STEPS determines the number of steps in the current sequence.

Range: 1–16

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

Range: 0–100

3.2.9 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: 0–100%

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: 0–100

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: 0–100

- **FEEDBACK** determines the amount of gain fed back to the delay input.

Range: 0–100

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: 0–100

CHORUS determines the amount of chorus modulation.

Range: 0–100

3.2.10 EQ



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

HiPASS controls the high-pass filter frequency.

Range: 20–14,000 Hz

LoPASS controls the low-pass filter frequency.

Range: 10–20,000 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

3.2.11 GLOBAL AND OUT SECTIONS



TEMPO displays the current tempo.

Range: 1–300

SOURCE determines the clock source.

Options: Host, Internal

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

Range: 1–16

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

Range: 0–12

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

Range: -80 to 0 dBFS

METER displays Element 2.0's overall output energy.

CHAPTER 4 – STANDALONE APPLICATION

The Element 2.0 standalone application requires ASIO drivers for Windows or Core Audio for Mac OS X.

Element.exe (Win) or Element.app (Mac) loads the Element 2.0 instrument and configuration preferences dialogs.

The standalone application's menu file contains 3 items:

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

THE PREFERENCES DIALOG

The preferences dialog allows configuration of Audio, MIDI, and User Choices.

Audio offers control over the following parameters:

Device displays the audio devices available on the system.

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

Sample Rate allows selection of sample rate.

Control Panel (Windows) launches the selected ASIO device's control panel for selection of buffer size and latency.

Buffer Size (Mac) allows selection of buffer size, which determines latency.

MIDI offers control over the following parameters:

MIDI Input device displays a list of available MIDI input devices on the current system.

Select the MIDI device through which to receive MIDI data.

Input Channel - Element 2.0 standalone is ready to receive MIDI in OMNI mode from all channels. The MIDI channel control allows the selection to receive MIDI input only from certain channels as selected in the checkboxes.

Load Previous Settings – When checked, loads with last used settings; when unchecked, loads the Default settings.

CHAPTER 5 – ELEMENT 1 AND ELEMENT 2 MODES



5.1 Element 1 Mode



Waves Element 2.0 includes a fully features 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.

5.2 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.