

HAHAHA CS33 USER'S GUIDE

v 1.00

Standard Edition



Contents

Welcome to the Hahaha CS33 Standard Edition!..... 3

About..... 3

Credits.....3

CS-33 Features at a Glance..... 4

The CS-33 Piece By Piece.....5

 OSC1.....5

 OSC 2.....6

 Common OSC Controls.....7

 FILTER..... 8

 LFO.....9

 EG1..... 10

 EG2..... 10

GLOBAL AND EXPRESSION CONTROLS..... 11

 Modulation..... 11

 Expression Controller Input Levels:.....11

 Synth Behaviour..... 12

 MIDI Learn12

EFFECTS.....13

 Distortion..... 13

 Reverb..... 13

 Delay..... 14

 Chorus..... 14

MASTER VOLUME..... 14

 Clip LED..... 14

PATCH MANAGEMENT..... 15

Welcome to the Hahaha CS33 Standard Edition!

The Hahaha CS33 is the "son of HahahaCS01", sporting two oscillators and radically enhanced filter, LFO, effects, and routing options.

The CS-33 comes in two guises: The Standard Edition and the Evolution Edition (to be released shortly after the Standard Edition). Although they look radically different, they are only two looks for the same synth and **they share the same VSTi ID number**. That means you should only have one of the versions in your VSTi folder(s) at any one time. On the other hand, it also means you can interchange them in your projects at any time, without having your host confused about which synth it is working with.

Why two versions? Well, the only purpose of the Evolution Edition is really to serve as a 1:1 copy of the Evolution UC-33 hardware controller. If you are the lucky owner of such a device and use the UC-33 overlay template included in the package, you'll find you can program this synth without looking at the computer screen at all for most of the time. And when you DO look, the on-screen layout is identical to the UC-33 hardware.

NOTE

This product is FREEWARE. If you have paid any money for it, or even for its specific distribution, you are a crime victim.

About...

To see which version of the synth you have, right-click somewhere other than on a control and select "About..." from the pop-up menu that appears.

Credits

Synth by Per Thulin.

User interface graphics by grymmjack.

Programmed in SynthEdit by Jeff McClintock, using additional modules by David Haupt.

Factory presets by pethu, grymmjack and dominus.

CS-33 Features at a Glance

- Subtractive and Phase Modulation (PM) synthesis.
- Two oscillators (called OSC1 and OSC2), each with Triangle, Saw, Square, Rectangle, Pulse Width Modulation (PWM), and White Noise (WN) waveforms. OSC1 can be synced to OSC2.
- Mono sound output (except when the CHORUS effect is active.)
- Monophonic and 6-voice Polyphonic modes.
- One filter (called, simply, the FILTER) with 5 modes, two of which are special "twin filter" modes.
- One LFO with 5 waveforms: Sample And Hold (S/H), Ramp, Square, Saw, and Sine. LFO tempo can be freely adjusted or synced to host tempo.
- Two envelope generators (called EG1 and EG2). Each can separately affect OSC1 amplitude, OSC2 amplitude, FILTER cutoff frequency, and LFO amount. EG1/EG2 levels can also be mixed, resulting in pseudo-multi-stage envelopes.
- Keyboard velocity scaling for EG1 and EG2 amplitudes.
- Expression input from Breath Controller (BC), Channel Aftertouch (AT), and Foot Pedal (PEDAL) can be used to affect AMP level and FILTER cutoff frequency.
- Effects section with Distortion, Reverb, Delay, and Chorus units.
- MIDI Learn function for easy mapping of the controls to a hardware MIDI controller.
- Tooltip help, showing short descriptions of each control including its default MIDI Controller Code mapping.

The CS-33 Piece By Piece



OSC1

PITCH. Use this knob to adjust the pitch between -2 and +2 semitones. When OSC SYNC is on, OSC 2 determines the pitch, and turning this knob instead changes the output waveform to produce "sync sounds".

OCTAVE. Selects the pitch in octaves. The lowest setting, WN, turns off the normal waveforms for this oscillator, and turns on the white noise generator.

WAVE. Selects the waveform for this oscillator. Choose between Pulse Width Modulation (PWM), Rectangle, Square, Saw, and Triangle.

PWM. Selects the PWM modulation speed. (It has no effect on other waveforms.)

EG1. Determines the amount of influence EG1 has on the output amplitude of this oscillator. *Note:* Either the EG1 or the EG2 must be turned up at least a bit for this oscillator to produce any sound (unless fully controlled by the AMP expression input).

EG2. Determines the amount of influence EG2 has on the output amplitude of this oscillator. *Note:* Either the EG1 or the EG2 must be turned up at least a bit for this oscillator to produce any sound (unless fully controlled by the AMP expression input).



OSC 2

INTERVAL. Use this knob to offset the pitch of this oscillator relative OSC1. The available musical intervals are Unison (no effect), minor 3rd, major 3rd, 4th, and 5th.

OCTAVE. Selects the pitch in octaves. The lowest setting, WN, turns off the normal waveforms for this oscillator, and turns on the white noise generator.

WAVE. Selects the waveform for this oscillator. Choose between Pulse Width Modulation (PWM), Rectangle, Square, Saw, and Triangle. *Note:* The PWM speed for this oscillator is fixed at a setting corresponding to the lowest OSC 1 PWM speed.

P MOD. Sends a Phase Modulation signal to OSC1. When using OSC2 as a modulator for OSC1 this way, you may want to turn the MIX knob all the way left, so that the actual sound of OSC2 is not heard.

EG1. Determines the amount of influence EG1 has on the output amplitude of this oscillator. *Note:* Either the EG1 or the EG2 must be turned up at least a bit for this oscillator to produce any sound (unless fully controlled by the AMP expression input).

EG2. Determines the amount of influence EG2 has on the output amplitude of this oscillator. *Note:* Either the EG1 or the EG2 must be turned up at least a bit for this oscillator to produce any sound (unless fully controlled by the AMP expression input).



Common OSC Controls

OSC SYNC switch. When activated, this syncs OSC1 to OSC2 so that whenever the waveform of OSC2 restarts, so does OSC1 regardless of where it currently is in the "execution" of its own waveform.

Apart from enabling the creation of typical "gnarly sync sounds", this means that the pitch of OSC1 becomes completely decided by the pitch of OSC2.

OSC MIX. Sets the balance between OSC1 and OSC2 sound output. (The same thing can be achieved by adjusting individual OSC1/OSC2 EG faders, but this is more convenient.)



FILTER

TYPE. Select between the following filter configurations:

- LP/LP: Serially linked 12dB Lowpass/Lowpass filters. (See SPREAD below.)
- HP/LP: Serially linked 12dB Lowpass/Highpass filters. (See SPREAD below.)
- LP24: A 24dB Lowpass filter (identical to the one in CS01 MkII).
- LP12: A 12dB Lowpass filter (identical to the one in CS01).
- HP12: A 12dB Highpass filter.

FREQ. Determines the filter cutoff frequency.

RES. Determines the amount of frequency boost (resonance) around the filter cutoff frequency.

SPREAD. This knob only works for the LP/LP and HP/LP filters, and separates the cutoff frequency of the second filter from the first.

In LP/LP mode, with the spread at 0, both 12dB LP filter sections work with the same cutoff frequency, you effectively have a 24dB lowpass filter (albeit with radically different characteristics from the single 24LP filter).

Increasing the spread means the second filter gets a higher cutoff frequency which means you get an increasingly softer frequency roll-off (with two resonant peaks if RESONANCE is turned up).

In HP/LP mode, you have a variable bandpass filter with "two degrees of freedom": The width of the "passed frequency range" is determined by the SPREAD setting, while the lowest passed frequency is determined by the

FREQ setting.

(Note that this mode also has two resonance peaks, one at each end of the passed frequency spectrum.)

EG1. Determines the amount of influence EG1 has on the cutoff frequency.

EG2. Determines the amount of influence EG2 has on the cutoff frequency.

KEY TRACK switch. When activated, the cutoff frequency changes with the pitch of the played note with a 1:1 ratio (1 octave higher note = 1 octave higher cutoff frequency).



LFO

TYPE. Selects the waveform of the LFO.

SPEED. Adjusts the LFO speed from 0.8 up to 21 Hz. (For LFO tempo sync, see the Global section below.)

EG1. the amount of influence EG1 has on the amount of LFO modulation.

EG2. the amount of influence EG2 has on the amount of LFO modulation.

>OSC1 destination switch. LFO affects OSC1 pitch.

>OSC2 destination switch. LFO affects OSC2 pitch.

>FILTER destination switch. LFO affects filter cutoff frequency.

TEMPO SYNC switch. When active, the host's tempo will control the LFO speed, using the setting of the two adjacent buttons. For example, setting the tempo buttons to "1" and "4" means quarter-note tempo.



EG1

ATT. Determines the time it takes for the envelope to go from 0 to its maximum level.

DEC. Determines the time it takes for the envelope to go from the maximum level to the SUSTAIN level.

SUS. Determines the EG level from the end of the DECAY phase until the note is released.

REL. Determines the time it takes for the envelope to go from the SUSTAIN level back to 0 once the note has been released.

KEYBOARD VELOCITY switch. When activated, keyboard velocity will affect the amplitude of EG1.



EG2

Identical to EG1 really, except for one thing:

INV switch. Turns the envelope "upside down", so that the max and sustain levels become negative. (Mainly of use when applied to the filter.)



GLOBAL AND EXPRESSION CONTROLS

Modulation

MOD WHEEL RANGE. Sets how drastically the modwheel will affect the LFO.

PITCH BEND RANGE. Sets the max pitchbend amount in semitones. (Clicking the button cycles through the numbers 0-12 on the LED display.)

GLISS. Sets the glissando time.

Expression Controller Input Levels:

AMP. Sets how much the expression controller (Breath Controller / Channel Aftertouch / Foot Pedal) will affect the OSC1 and OSC2 volume.

FILTER. Sets how much the expression controller (Breath Controller / Channel Aftertouch / Foot Pedal) will affect the FILTER cutoff frequency.

Synth Behaviour

PEDAL INPUT switch. When active, the synth accepts Foot Pedal expression input instead of the standard Breath Control / Channel Aftertouch.

GUI WHEEL switch. When active, mouse actions on the on-screen modwheel and pitchbend wheel can be used to affect the sound. However, this option should be disabled whenever you are using an external controller's actual wheels, since it lowers the resolution of the hardware wheels' input.

PRIO switch. This only affects monophonic playing: When in position HIGH, high note priority is in effect. LAST means last note priority.

POLY switch. Switches on the 6-note polyphonic mode.



MIDI Learn

You can easily assign any midi controller code in the ranges 2-32 and 65-128 to any button, slider or knob:

Click the **TEACH button**. The MIDI LEARN LED should light up, indicating the synth is in MIDI learn mode.

Now move a control on the GUI using the mouse. Then move the desired control on your hardware MIDI controller. The MIDI LEARN LED should go out, indicating that the controller mapping has been memorized.

The **RESET button** resets **all** MIDI controller assignments to the Hahaha CS33 defaults.

EFFECTS



The order of the effects from left to right reflects the effects chain of the CS33. Note that all effects are MONO, except the Chorus, which is the final stage in the effects chain.

Distortion

When ON, this effect distorts the original sound.

The sound of the distortion depends on the input level, which is determined by the settings of the OSC1 and OSC2 EG faders (plus any expression controller AMP input). Lower input levels produce a "rounder", more mellow tone; higher input levels add more high frequency material.

Shape. The amount of distortion to the wave shape. (Note: When at 0, no sound will pass through.

Limit. Limits the output amplitudes. (Note: When at 0, no sound will pass through.

Reverb

When ON, this effects adds some "space" to the original (dry) sound.

Damp. Determines how much high frequencies are rolled off in the reverb signal. 0 = no damping.

Size. Sets the size of the reverb space.

Vol. Sets the amount of reverb ("wet") signal.

Delay

When ON, this effect adds echo to the original (dry) sound.

Feedback. Sets the amount of feedback (repetition) of the delay.

Speed. Sets the interval between echoes when the Sync button is OFF.

Sync button. Syncs the tempo of the delay to the host application using the adjacent buttons. For example, setting the sync tempo to "1" and "4" as in the illustration means quarter-note tempo.

Chorus

When ON, fattens the sound to produce an "ensemble", while also adding a stereo effect to the sound.

Amt. Amount of Chorus effect.

Speed. Sets the speed of the chorus modulation.

Mix. Sets the signal from full dry (left) to full wet (right).

MASTER VOLUME



Clip LED

Since the synth works in 32 bits internally, it is in fact impossible to overload the output: However, it is rather impolite to feed the host a way-too-loud signal – leading to possible clipping, mixing problems and ear damage!

The **Clip** LED indicates when a host running CS33 at unity gain (‘0dB’) will clip digitally at the output. In other words, keeping the output from the CS33 just below the clipping limit is a good rule-of-thumb in the sound design.

Note: For polyphonic patches, remember to test the level using chords, not just single notes!

PATCH MANAGEMENT

The CS33 has a patch memory for 128 patches, but no built-in patch management system for saving and loading patches, etc – for this, it depends on the functions of the VSTi host. Any changes you make to a patch takes permanent effect immediately: The only way to recall the original, overwritten patch for that instance of the synth is to load it from a previously saved patch bank (.fxb) or single program (.fxp). Refer to your host's documentation.

For your convenience, the factory preset patch bank (CS33Factory.fxb) is included in the delivery package.

Hahaha CS33

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