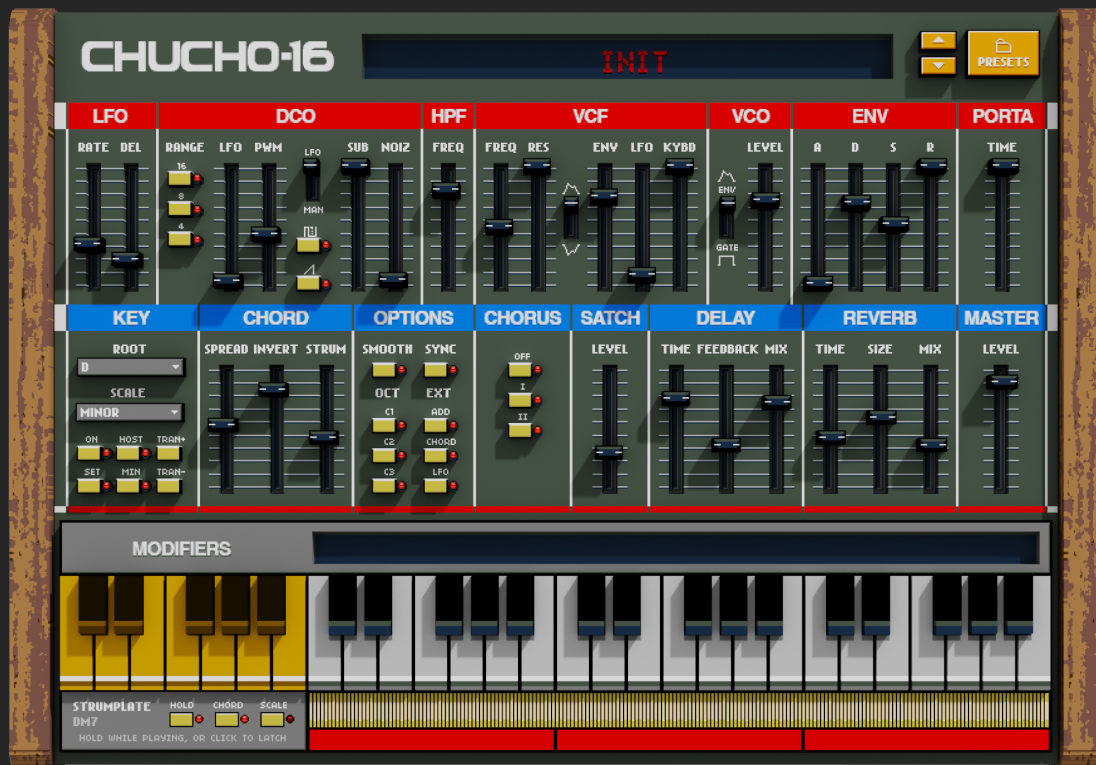


CHUCHO-16

SIX-VOICE CHORD SYNTHESIZER



OPERATION MANUAL



VERSION 0.9.6

WHAT THIS IS

CHUCHO-16 is two instruments wearing one faceplate. Underneath sits a six-voice model of a Roland Juno-106, built not from schematics but from measurements of a real, working unit: every fader was captured, sliced and fitted, so the envelope steps, the filter squelch, the collapsing pulse and the slow thermal wander of the voices behave like the hardware they came from. On top sits a chord machine in the proud lineage of the Omnichord: play one note and a voiced chord in key comes out, shaped by a modifier octave, six spread patterns, inversion, a fixed-register smooth mode and a tempo-synced strum, with a strumplate under the keys for glissing through the current harmony.

Everything you record stays honest: the plugin emits the chords it performs as MIDI, follows or sets the key, and ships with the converted factory banks of the original hardware. This manual walks the panel top-left to bottom-right, then covers the chord engine, the strumplate, presets, MIDI and licensing.

CONTENTS

03	QUICK START	_____
04	PANEL MAP	_____
05	LFO / DCO / HPF	_____
06	VCF / VCA / ENV / PORTAMENTO	_____
07	WHAT MAKES IT A 106	_____
08	THE CHORD MACHINE: KEY	_____
09	MODIFIERS	_____
10	CHORD & OPTIONS	_____
11	STRUMPLATE	_____
12	CHORUS & EFFECTS	_____
13	PRESETS & DISPLAY	_____
14	MIDI IN / MIDI OUT	_____
15	MONO, DEMO & LICENSE	_____
16	SPECIFICATIONS	_____



QUICK START

1 INSTALL & OPEN

Run the installer, then load CHUCHO-16 (VST3 or AU) on a MIDI track. Presets install themselves to Documents/CHUCHO-16 Presets on first launch.

2 PLAY ONE NOTE

Play any key above C2. You get a voiced chord in D minor - the note you played decides the degree. The bottom display names the chord and lists its notes.

3 HOLD A MODIFIER

Hold a key in the C2 octave (the tan keys on screen) while playing: MIN makes it minor, 7 adds the seventh, SUS4 suspends it. Release and the plain chord returns.

4 SET YOUR KEY

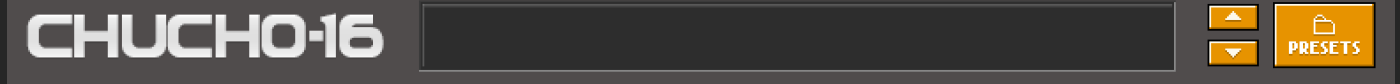
Pick ROOT and SCALE from the pulldowns, or click SET and play a note - the display confirms the key.

5 STRUM & SWEEP

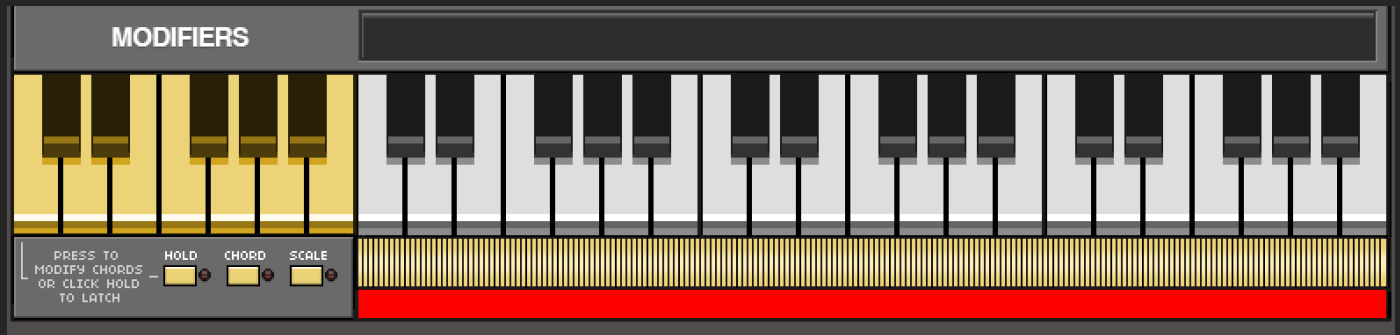
Raise STRUM to roll the chords in tempo. Drag across the gold strumplate to gliss through the chord. Then start pulling faders - it is a Juno underneath.



PANEL MAP



TOP BAR - the main display shows the loaded preset and flashes every value you touch; the arrows step presets and PRESETS opens the menu (save, load, license, version). Right-click anywhere for UI size.



KEYBED - the tan octave holds the twelve chord modifiers (momentary, exactly like the matching MIDI octave). The grey octaves play. Stars mark held modifiers and the sounding chord root; the chord display sits above; the gold strumplate and its note rail sit below.

The synth rows read like the hardware: red row is the voice (LFO, DCO, HPF, VCF, VCA level, envelope, portamento), blue row is the machine around it (key, chord, options, chorus and the Born Second effects chain). Every fader is 0-127, exactly the resolution the original CPU used - and every one of them was measured.

LFO / DCO / HPF



RATE / DEL - one triangle per voice, 0.4 to 29.5 Hz on the measured curve. DELAY holds it silent up to 3 s after note-on, then fades it in, like the 106 does.

RANGE - 4' / 8' / 16', exact octaves.

LFO / PWM - LFO is vibrato depth, a few cents to a wild fifth-wide wobble. PWM sets pulse width, 50 percent down to silence: past about 108 the pulse collapses to nothing. Authentic, not a bug.

LFO/MAN - pulse width follows the fader (MAN) or is swept by the LFO. The sweep is one-sided: square toward the fader width, never past square.

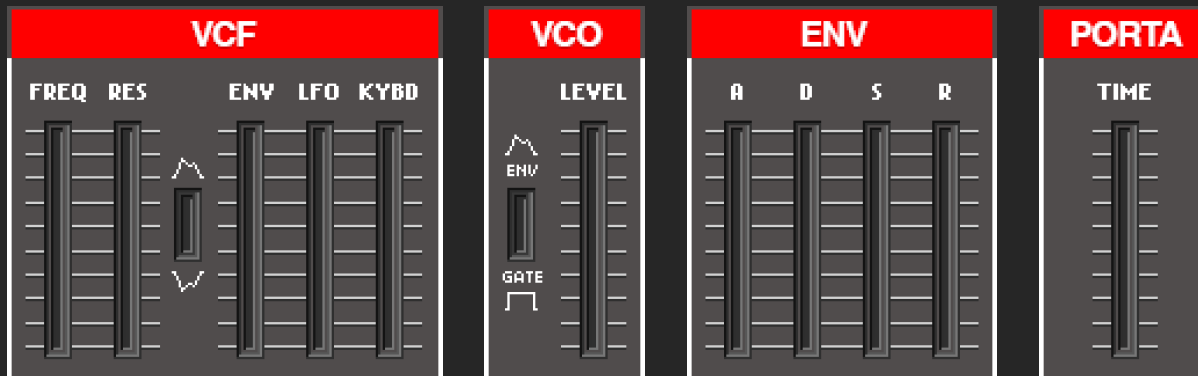
WAVE BUTTONS - pulse and saw sum in phase, so both-on genuinely stacks. The saw is ideal-bright to the top of hearing.

SUB - a square one octave down. The bottom of the fader is a dead zone, as on the unit; from there it rises to 7.8 dB over the saw fundamental.

NOIZ - one generator feeds all six voices, as in the hardware, so chords breathe together.

HPF FREQ - position 1 is flat, 2 and 3 thin at 250 / 670 Hz - and position 0 is secretly a BASS BOOST shelf, +8.5 dB below 120 Hz.

VCF / VCA / ENV / PORTAMENTO



FREQ - the four-pole OTA ladder on the measured law, about 9 steps per octave, 6 Hz to past hearing. Most of what people mean by the Juno sound.

RES - resonance to self-oscillation (it sings from step 122, playable in tune with KYBD). Passband droop is compensated, so notes do not vanish as you push it.

ENV / polarity - envelope depth on the cutoff, about a tenth of an octave per step; the +/- switch inverts it. Negative polarity with a low cutoff can close the filter to silence - by design.

LFO / KYBD - LFO sweeps the cutoff up to +/-3.5 octaves. KYBD is key follow: at full it tracks 1.0 octave per octave around middle C, so self-oscillation plays in tune.

VCA LEVEL & ENV/GATE - level is a 24 dB range and never fully mutes - the real VCA leaks a little, and so does ours. GATE swaps the envelope for fixed 4 ms up / 5 ms down edges: instant organ.

A D S R - the 106 CPU reborn: the CV updates 240 times a second, attack is LINEAR from 13 ms to 3.2 s, decay and release share one measured knee curve. Attack 0 with filter env up is the classic chirp.

PORTA TIME - glide between notes, 20 ms to about 3 s, exponential. In MONO mode this is where 202-style lines come from.

WHAT MAKES IT A 106

This model was built by measuring one specific, slightly cantankerous Juno-106 for a week. These are the fingerprints we kept, on purpose:

STEPPED ENVELOPES - the CV updates at 240 Hz. Fast filter sweeps have a faint zipper, exactly like the hardware.

SIX IMPERFECT VOICES - each voice carries its own measured filter offset and level trim. Chords shimmer because the voices genuinely differ.

THERMAL DRIFT - the filter wanders a few cents over tens of seconds. Tuning stays solid - DCOs do not drift, and neither do ours.

ONE NOISE SOURCE - all voices share a single noise generator, so noise-heavy patches pump as one instrument instead of six.

THE COLLAPSING PULSE - full PWM chokes the pulse silent. Sweep PWM by LFO and the sound breathes in and out of existence.

A VCA THAT NEVER SLEEPS - level at zero still whispers. Fun fact from the bench: the sub oscillator slider leaks the same way.

TUNING TABLE - the actual unit's 61-key tuning is baked in; the top octave sits about a cent flat.

CHORUS FROM THE CIRCUIT - anti-phase BBD pair, wet path rolled off near 5 kHz, rates 0.52 / 0.86 Hz. No hiss was added; buy the hardware for the hiss.



THE CHORD MACHINE : KEY



One note in, a chord out. The KEY section decides what "in key" means; everything else in the blue row decides how the chord is voiced and delivered.

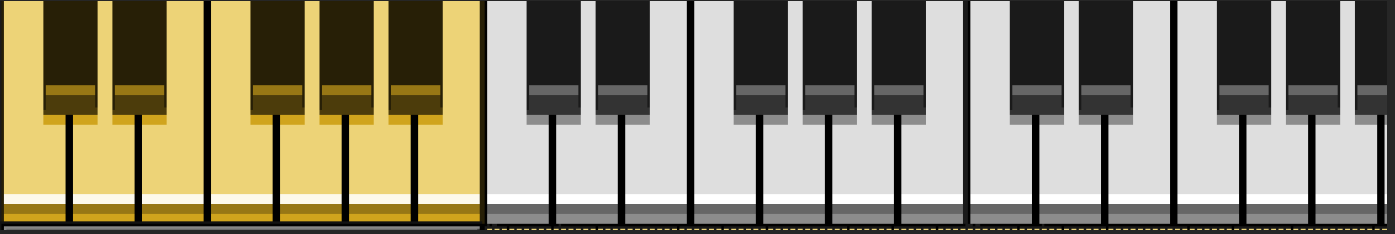
ROOT / SCALE - the key. Nine scales: major, minor, dorian, phrygian, lydian, mixolydian, locrian, harmonic and melodic minor. Notes you play snap to the nearest scale tone; the diatonic triad on that degree is the starting chord, named on the display with its Roman numeral.

ON - the master switch. Off, CHUCHO-16 is a stock six-voice Juno: every key plays a plain note, modifiers included, and nothing chordal touches the path.

ARP - the arpeggiator. Instead of sounding at once, held chords play as an up-down pattern (endpoints not repeated) over everything you are holding. The STRUM fader becomes the rate - synced it snaps 1/32 to 1/2 and reads ARP 1/16 etc. on the display; strum 3 is a clean sixteenth. Modifiers retune the pattern mid-flight, and the arp streams out of the MIDI output like everything else.

SET - click SET, play a note: that is the new root. MIN toggles minor. TRAN+/TRAN- transpose the output by semitones, +/-12.

MODIFIERS



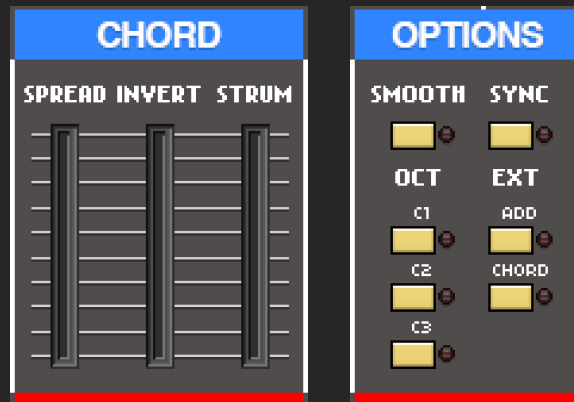
The modifier octave - C2 on your controller by default, the tan keys on screen - reshapes the chord while held. Hold one or several and play; or press modifiers alone and the last chord replays with the change. On-screen and MIDI behave identically: momentary, released when you let go - or flip HOLD (by the strumplate) and latches take over - and they are remembered PER ROOT: each of the twelve keys keeps its own modifier set. Play a root, tap its modifiers, move on; come back and it recalls. The stars always show the setting of the last-played root. It is the Omnichord one-finger idea taken further: you are not filtering every chord, you are harmonising the key, one degree at a time.

C	BASS	adds the root an octave down	F#	SUS2	suspends to the second
C#	6	adds the sixth	G	MIN	forces minor
D	7	adds the diatonic seventh (maj7 or 7 as the key decides)	G#	M7B5	half-diminished
D#	11	adds the eleventh	A	SUS4	suspends to the fourth
E	9	adds the ninth (add9, or 9 when 7 is held)	A#	5	power chord: root, fifth, octave
F	MAJ	forces major	B	DIM	diminished

SECRET COMBOS

MAJ + SUS4 = augmented. DIM + SUS4 = power chord. MIN + SUS4 = minor add4. MAJ + MIN + 7 = the 7#9 "Hendrix" chord. Extensions stack on any quality - MIN + 7 + 9 is a m9, and BASS goes under all of it.

CHORD & OPTIONS



SPREAD - six voicing shapes, from a tight triad through open voicings to two-handed spreads that copy the root across three octaves. Shape 3 up starts doubling notes; SMOOTH tames them again.

INVERT - rolls the chord: positive lifts the lowest note up an octave per step, negative drops the highest. With SMOOTH on it instead chooses the register.

STRUM - 1 to 10, always low-to-high; free-running it is 15 ms per step with a touch of slop. With SYNC it becomes note lengths per chord tone, 1/128 up to 1/8, read out on the display as you drag. With ARP on this fader is the arpeggiator rate instead.

SMOOTH - fixed-register voice leading. Every chord is folded into one octave-wide window (INVERT places the window), so progressions connect without jumps.

SYNC - one button, three targets: STRUM, DELAY TIME and LFO RATE all snap to the host tempo and read as divisions while it is on.

OCT C1/C2/C3 - where the modifier octave lives on your controller. Playing keys start one octave above it. Held notes survive the switch - we made sure.

EXT ADD/CHORD - modifier changes while a chord rings: ADD moves only the notes that differ; CHORD restrums the whole thing.

MONO - see page 15. One voice, 202 manners.

STRUMPLATE



The gold strip under the keys is a twelve-zone touch plate holding the current harmony, lowest at the left, rising to the right, starting from the chord root. It plays like a ribbon: a zone sounds while your finger is down, slides legato as you drag - even past the plate edges - and releases the moment you let go. The red rail underneath names every zone, with octave markers where the octave turns, and follows every chord, key or mode change instantly.

CHORD / SCALE - what fills the zones. **CHORD** limits the plate to the current chord tones stacked upward - drag and you are rolling the chord itself. **SCALE** opens it to every note of the key, for melodies over the harmony. Switching retiles the plate on the spot.

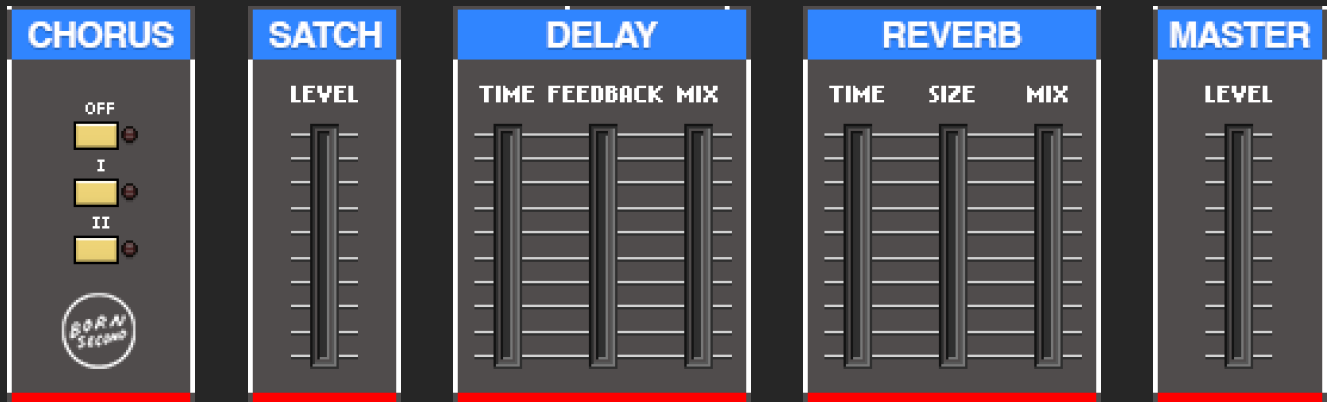
HOLD - despite the neighbourhood, this button belongs to the modifiers: on, presses latch into a per-root memory (each key remembers its own chord; press again to clear); off, modifiers are momentary and global. The memory survives **HOLD** being toggled, preset changes and your DAW session. The plate itself always plays ribbon-style.

PLAYS NICELY - the plate never steals notes from a held chord: if it lands on a note your keys already own, it retriggers the attack and the chord keeps ringing when the plate lets go.

A TECHNIQUE

Hold a chord with **STRUM** at 1, then answer it on the plate in **SCALE** mode: one hand plays the pad, one finger slides the lead, both always in key. This is most of the reason the instrument exists.

CHORUS & EFFECTS



CHORUS OFF / I / II - the famous ensemble, modelled from the board: two bucket-brigade delay lines swept in anti-phase by one triangle (that is where the stereo comes from), 1.5-5.1 ms, 0.52 Hz in I and 0.86 Hz in II, wet path rolled off near 5 kHz. It is the on switch for "sounds expensive".

SATCH - the Born Second saturator from the BS-203: a level-compensated bright clip that goes from glue to snarl. Chords like a little; basses like a lot.

DELAY - mono-input echo with feedback into self-oscillation territory. **TIME** free-runs 20 ms to 0.9 s, or snaps to divisions with SYNC (fader up = longer, up to a whole note).

REVERB - a plate-ish tail: **SIZE** is the room, **TIME** the damping, **MIX** to taste. It sits after the delay, so echoes bloom into it.

MASTER - the output, with a gentle knee limiter at the very top so resonant six-voice pile-ups grind musically instead of clipping hard.

PRESETS & DISPLAY

CHUCHO-16



THE MENU - PRESETS opens everything: save, the factory folders, your own folders (any folder of .ch16preset files inside Documents/CHUCHO-16 Presets becomes a submenu), license entry, and the version at the bottom. The arrows step through the full list in order; MIDI Program Change 0-127 reaches the first 128.

WHAT A PRESET IS - a preset is a SOUND: the Juno engine and the effects. It deliberately does not touch the chord machine - your key, spread, strum, smooth, octave and mono choices are performance state and survive every preset change, and your DAW session saves all of it exactly.

FACTORY BANKS - CHUCHO FACTORY loads first: the Born Second patches plus 165 conversions from classic Juno-106 banks. 106 FACTORY is the complete original 128 by name. Converted byte-for-byte from real sysex, loudness-matched, set to 8 foot.

SAVING - PRESETS > Save preset writes wherever you point it inside the presets folder. Factory folders are refreshed by updates; keep your own work in your own folders.

THE DISPLAYS - the top LCD shows the preset (plus "- DEMO" until licensed) and flashes every touched value. The lower display reads the chord: name, notes with octaves, degree in key, and the held modifiers.

MIDI IN / MIDI OUT

INPUT - notes above the modifier octave play chords (or plain notes with KEY off, or a mono line in MONO). The modifier octave itself - C2 by default, movable with OCT - is intercepted as chord quality. Program Change selects presets. Velocity passes to the MIDI output; the Juno voice itself is not velocity-sensitive, exactly like the hardware.

OUTPUT - CHUCHO-16 emits everything it actually performs as MIDI: full chords with their strum timing, live modifier retunes, arpeggiator patterns, plate notes, mono lines. Record it and you own the arrangement as notes.

RECORDING THE CHORDS IN LIVE

1

Use the VST3. Live does not take MIDI from Audio Unit instruments.

2

Keep recording single notes into the CHUCHO-16 track as usual.

3

Create a second MIDI track. MIDI From: the CHUCHO-16 track; in the lower chooser pick the CHUCHO-16 device itself (not Pre/Post FX).

4

Set Monitor to IN, arm, record. The full voiced chords land as a clip you can drag onto any instrument.

SYNC DIVISIONS

With SYNC on: LFO RATE snaps 1/32 ... 1/1 (up = faster). DELAY TIME snaps 1/32 ... 1/1 (up = longer). STRUM snaps 1/128 ... 1/8 per chord note (up = wider), or 1/32 ... 1/2 as the ARP rate. All read on the display while you drag.

MONO, DEMO & LICENSE

MONO - the real 106 mono mode fired all six voices at once and sounded like an argument. Ours does not. MONO is a true monosynth with MC-202 manners: one voice, last-note priority with a held-note stack, envelope retrigger on every note, PORTA gliding from wherever the pitch was. The chord machine steps aside. SUB up, filter low: bassline machine.

DEMO - unlicensed, the instrument is fully functional but a soft noise swell washes through every fifty seconds or so, and saving presets is locked. Everything else works, forever.

LICENSE - buy it, then PRESETS > Enter license and paste the key from your email. Store keys activate online once per machine; CH16- keys work fully offline. Your name on the display means it worked. The license file lives in your user Application Support and survives reinstalls.

TROUBLE

NO SOUND? check KEY ON if you expected chords, VCA LEVEL, and whether VCF polarity is negative with a low cutoff - that combination is silence by physics.

CHORDS IN THE WRONG OCTAVE? RANGE, then TRANSPOSE, then remember playing keys start one octave above the OCT setting.

AU NOT SHOWING? Logic and Live cache Audio Units; rescan or reboot once after installing.

STUCK ON A KEY LIMIT? license activations are per-machine; if you rebuild a computer, write support and we reset it in a minute.



SPECIFICATIONS

ENGINE - six voices; PolyBLEP DCO (saw, variable pulse, sub square, shared noise); zero-delay-feedback four-pole OTA ladder; measured 240 Hz stepped envelope; per-voice calibration and drift from a real Juno-106.

CHORD MACHINE - nine scales, twelve modifiers (momentary, or latched with per-root key memory) with combos, six spreads, inversion, fixed-register smooth mode, tempo-synced strum, up-down arpeggiator, twelve-zone ribbon strumplate, full chord MIDI output.

EFFECTS - measured BBD chorus I/II, Satch saturator, tempo-syncable delay, plate reverb, knee limiter.

FORMATS - VST3, Audio Unit and Standalone. macOS 10.13+, universal binary (Apple Silicon + Intel). Windows build available separately.

PRESETS - 299 included: Chucho Factory and the complete 106 Factory bank, converted from original hardware sysex.

RESOLUTION - every continuous control is 0-127 - the native resolution of the instrument it models.

CHUCHO-16



MEASURED FROM A REAL JUNO-106, SEPTEMBER 2026

THANK YOU FOR PLAYING