Fancyyyyy — K-Accumulator Digital Complex Oscillator

- Manual PDF

Manual PDF

K-ACCUMULATOR Cheat Sheet

What it is

A **complex digital oscillator voice** built around: - **Main OSC** with stereo **sine/cosine outputs** - **Mod oscillator** for PM / harmonic relationships - **UFG** = function generator / oscillator / modulation source - **Δ−∑** = stepped/ smoothed pattern generator - **Root** pitch system tying sections together

Best mindset: start from **Centre** (pure sine/cosine), then add **Shift / Depth / Shape / Stretch / Damped-Pulsar** one at a time.

Fast Start

Centre state

To get back to a clean reference sound: - Center **all attenuverters** - **Damped/Pulsar** fully CCW - **Stretch** fully CCW - **Shift / Depth / Shape** fully CCW

This always gives **pure sine + cosine** at the main outputs.

First moves

1. Patch **Sine out** and **Cosine out** to L/R mixer inputs.
2. Use **Freq.** to set oscillator pitch.
3. Raise **Shift** for blended harmonic frequency shifting.
4. Raise **Depth** for self-feedback phase-mod distortion.
5. Raise **Shape** for harmonic wavefolding.
6. Turn **Mod Detune** to animate the folder.
7. Add **Stretch** to shift generated harmonics while keeping the fundamental fixed.
8. Raise a waveshaper CV attenuverter to let **UFG** or **Δ–∑** modulate it.
9. Raise **Damped/Pulsar** for sync + AM from the UFG.
10. Use **1V/TZ** attenuverter to bring in **Δ–∑** pitch motion.

Core Concepts

Root system

The **Root** section sets the tuning reference for: - OSC - UFG - Mod oscillator

You can quantize Root to: - **12-TET** - **Just Intonation**

Morph system

The **Morph encoder** moves through a matrix of waveshaping topologies, not separate engines.

Good beginner route: stay on the **left-hand path**: - **FMNT → FBPM → 2OP → XPM → Asym** This path keeps control meanings more consistent.

OSC control meanings in most modes

- **Shift** = harmonic frequency shifting
- **Depth** = phase modulation / PM amount
- **Shape** = wavefolding

Best Practical Patches

1. Pure stereo oscillator

- Go to **Centre**
- Patch **Sine** + **Cosine**
- Tune with **Freq.**
- Optional: route **Root** to OSC for quantized pitch

2. Animated harmonic tone

- Start at Centre
- Raise **Shift**
- Raise **Shape**
- Turn **Mod Detune**
- Add a little **Stretch**

3. West-coast-ish complex tone

- Morph to **2OP** or **XPM**
- Raise **Depth**
- Set Mod **Order** near center or higher
- Use **Harmonic** for ratio
- Fine-tune with **Detune**

4. Percussive / pulsar voice

- Raise **Damped/Pulsar**
- Set **UFG Time** to sub-audio
- Trigger UFG
- Shape UFG with **Skew** and **Shape**
- Patch OSC outputs to LPG/VCA/filter as desired

5. Quantized melodic sequence

- Route **Root** to OSC
- Enable **Scale**

- Use **Δ–∑** into OSC via normalled modulation or external patching
- Use **Chance / Length / Smooth** to evolve sequence
- Turn on **Q.Trig** for threshold-triggered UFG behavior

6. External audio tracking

- Patch external waveform into **Ext. Sync/Track**
- Set button to **Track**
- K-ACCUMULATOR follows pitch and outputs shaped sine/cosine
- Works well for square waves, weird but recognizable with voice/material

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Morph Modes Reference

Poles

- **FMNT (green)**: formant-like AM + PM
- **Asym (yellow)**: asymmetric PM/AM, granular pulse-train-like spectra

Left-hand path

- **FBPM (green)**: self-feedback PM, sine-to-saw style distortion
- **2OP (yellow)**: Mod oscillator PMs OSC
- **XPM (red)**: cross-phase modulation feedback

Right-hand path

- **FBPM2 (green)**: chaotic self-feedback / subharmonic latching
- **2OP2 (yellow)**: separated self-mod vs Mod PM
- **XPM2 (red)**: fully separated XPM controls

Color meaning

- **Green** = self-feedback PM only
- **Yellow** = Mod oscillator PM added

- **Red** = cross-feedback between oscillators

Controls Reference

1. Root Section

Knobs / Buttons

- **Root knob**
- Sets root frequency
- Mode selected by **CRS/FIN/OCT** button
- **CRS/FIN/OCT button**
- Cycles:
    - coarse
    - fine
    - octave
- Soft-pickup behavior
- **Scale knob**
- Selects one of 21 scales in current tuning system
- **TET/JI button**
- Toggles **12-TET / Just Intonation**
- **Root Send button**
- Routes Root to:
    - OSC only
    - OSC + UFG
    - UFG only
    - neither

Jack

- **1V input**
- 1V/Oct calibrated input for Root pitch
- **Voltage range: not stated in quick-start manual**

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2. OSC Section

Outputs

- **Main Sine output**
- Waveshaped sine output
- Intended as stereo pair with cosine
- **Output voltage range: not stated in quick-start manual**
- **Main Cosine output**
- Waveshaped cosine output
- **Output voltage range: not stated in quick-start manual**

Knobs / Buttons

- **Freq.**
- Main oscillator frequency
- **Q.Trig button**
- Sends trigger to UFG when oscillator crosses quantizer thresholds
- Requires Root tracking + scale
- **Stretch**
- Harmonic stretching / harmonic-only shifting
- **Damped/Pulsar**
- Amount of damped sync + AM from UFG or external source
- **Ext. Sync/Track button**
- Cycles:
    - Sync
    - Track
    - Off
- **Shift**
- Waveshaping control
- **Depth**
- Waveshaping control
- **Shape**
- Waveshaping control
- **Morph encoder**
- Selects morph position

- Press = coarse/fine
- Double-press = snap to nearest position

Jacks

- **Ext. Sync/Track input**
- External sync source or pitch tracking source
- **Voltage/audio range: not stated**
- **TZPM input**
- External AC-coupled through-zero phase modulation
- **Voltage range: not stated**
- **1V/TZ input**
- Auto-detecting pitch CV / through-zero FM input
- Stepped/slower CV treated as DC-coupled 1V/Oct
- Audio-rate treated as AC-coupled TZFM
- **Voltage range: not stated**
- **Shift CV input**
- CV for Shift
- Normalled from UFG or Δ–∑
- **Voltage range: not stated**
- **Depth CV input**
- CV for Depth
- Normalled from UFG or Δ–∑
- **Voltage range: not stated**
- **Shape CV input**
- CV for Shape
- Normalled from UFG or Δ–∑
- **Voltage range: not stated**
- **Morph CV input**
- CV for morph position
- **Voltage range: not stated**
- **Damped/Pulsar CV input**
- CV over damped sync/pulsar amount
- **Voltage range: not stated**

Attenuverters / mini-controls

- **1V/TZ attenuverter**
- **Shift attenuverter**
- **Depth attenuverter**
- **Shape attenuverter**
- **Morph CV attenuverter**
- These have:
- midpoint deadzone
- exponential response
- Bottom-row source select buttons:
- LED lit = **Δ–∑** normalled
- LED unlit = **UFG** normalled
- cable inserted overrides normalization

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3. Mod Section

Knobs / Buttons

- **Harmonic**
- Sets Mod oscillator ratio/offset relative to tracked source
- **Order**
- Sets Harmonic behavior:
    - min = free pitch offset
    - center = blended harmonics above, free below
    - CW = odd-harmonic emphasis
    - CCW = even-harmonic emphasis
    - max = quantized to current scale / integer ratios
- **Detune**
- Detunes Mod from tracked frequency
- Also animates main harmonic folder behavior
- **OSC/UFG button**
- Selects Mod tracking source:
    - OSC
    - UFG
    - none lit = Root

Jack

- **HMX/TZ CV input**
- CV for Harmonic / TZ-related behavior
- Tracks 1V/Oct in free-pitch mode at full attenuverter
- **Voltage range: not stated**

Attenuverter

- **HMX/TZ attenuverter**

Outputs

- **No dedicated Mod audio output shown in quick-start**

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4. UFG Section

Outputs

- **Function output**
- Anti-aliased function waveform
- **Output voltage range: not stated**
- **Gate output**
- Gate/pulse output, pulse width set by Skew
- **Output voltage range: not stated**

Knobs / Switches / Buttons

- **Loop/Trig 3-position switch**
- Up = toggle looping
- Middle = single-shot triggered externally
- Down = momentary manual trigger
- **Time**
- UFG rate/frequency
- **Skew**
- Rise/fall asymmetry and gate pulse width

- **Shape**
- Morphs linear / sine / exponential / raised cosine
- **Type button**
- 4 trigger response modes:
    - hard sync with subharmonic locking
    - sync reversal
    - sustain + hard sync
    - sustain + sync reversal

Jacks

- **Time CV input**
- 1V/Oct tracking
- Unpatched: random walk available through attenuverter
- **Voltage range: not stated**
- **Skew CV input**
- Unpatched: Δ−∑ normalled here
- **Voltage range: not stated**
- **1V input**
- 1V/Oct input for UFG frequency
- **Voltage range: not stated**
- **TZFM input**
- AC-coupled through-zero FM
- **Voltage range: not stated**
- **Trig input**
- External trigger/gate input across full frequency range
- **Voltage range: not stated**

Attenuverters

- **Time CV attenuverter**
- **Skew CV attenuverter**

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5. Δ–∑ Section

Output

- **Δ–∑ output**
- Stepped or smoothed pattern CV
- Good for pitch, PM, TZFM, or modulation
- **Output voltage range: not stated**

Knobs / Switch

- **Chance**
- Probability of new values entering sequence
- min = locked loop
- max = fully renewed
- **Length**
- Zooms pattern length from 2–16 steps
- center deadzone = 8 steps
- **Smooth**
- Glide/filter amount
- **Pattern switch**
- Right = enter new value at current step
- Left = restore previous value
- Hold right = overwrite pattern
- Hold left = double-length pattern

Jack

- **Clock input**
- External clock breaks UFG normalization
- **Voltage range: not stated**

Jack Summary

Outputs

Section	Jack	Function	Voltage Range
OSC	Sine Out	Main waveshaped sine	Not stated
OSC	Cosine Out	Main waveshaped cosine	Not stated
UFG	Function Out	Anti-aliased function waveform	Not stated
UFG	Gate Out	Gate/pulse output	Not stated
Δ−∑	Δ−∑ Out	Stepped/smoothed pattern CV	Not stated

Inputs

Section	Jack	Function	Voltage Range
Root	1V In	Root pitch CV, 1V/Oct calibrated	Not stated
OSC	Ext. Sync/ Track In	External sync or pitch tracking	Not stated
OSC	TZPM In	AC-coupled through-zero PM	Not stated
OSC	1V/TZ In	Pitch CV or TZFM, auto-detected	Not stated
OSC			Not stated

Section	Jack	Function	Voltage Range
	Damped/ Pulsar CV In	CV over damped sync / pulsar amount	
OSC	Shift CV In	Shift modulation	Not stated
OSC	Depth CV In	Depth modulation	Not stated
OSC	Shape CV In	Shape modulation	Not stated
OSC	Morph CV In	Morph modulation	Not stated
Mod	HMX/TZ In	Harmonic modulation / 1V tracking in free mode	Not stated
UFG	Time CV In	Rate CV / 1V tracking	Not stated
UFG	Skew CV In	Skew modulation	Not stated
UFG	1V In	UFG pitch CV	Not stated
UFG	TZFM In	AC-coupled through-zero FM	Not stated
UFG	Trig In	Trigger/gate input	Not stated
Δ–∑	Clock In	External clock	Not stated

Control Summary

Knobs

- Root
- Scale
- Freq.
- Stretch

- Damped/Pulsar
- Shift
- Depth
- Shape
- Morph
- Harmonic
- Order
- Detune
- Time
- Skew
- UFG Shape
- Chance
- Length
- Smooth

Attenuverters / mini-pots

- Root 1V attenuverter
- OSC 1V/TZ attenuverter
- Shift attenuverter
- Depth attenuverter
- Shape attenuverter
- Morph CV attenuverter
- Mod HMX/TZ attenuverter
- UFG Time CV attenuverter
- UFG Skew CV attenuverter

Buttons / push functions

- CRS/FIN/OCT
- TET/JI
- Root Send
- Q.Trig
- Ext. Sync/Track
- Morph encoder press
- Morph encoder double-press
- OSC/UFG (Mod source)

- UFG Type

Switches / toggles

- UFG Loop/Trig 3-position switch
- Δ–∑ Pattern momentary switch

Important Behaviors / Gotchas

- **Centre** is your reset point. Learn it.
- Many OSC CV inputs are **internally normalled** to **UFG or Δ–∑**.
- OSC bottom-row source buttons:
- **LED lit = Δ–∑**
- **LED off = UFG**
- **1V/TZ input auto-detects** slow CV vs audio-rate input.
- **Stretch only works when waveshaping is active.**
- **Detune** affects both Mod pitch relationship and folder animation feel.
- **Q.Trig** only works meaningfully when quantized Root tracking is active.
- **Δ–∑** edits are **non-destructive** at minimum Chance.

Missing Technical Data

The quick-start manual does **not specify actual voltage ranges** for CV inputs or outputs. It only explicitly states: - some inputs are **1V/Oct calibrated** - some are **AC-coupled** - some are **through-zero** - some are **normalled internally**

For exact voltage ranges, a full technical manual would be needed.
