Humble Audio — Quad Operator

- Manual PDF

Quad Operator Manual PDF

Humble Audio Quad Operator (+ Algo) for Melodic Eurorack Use

The **Humble Audio Quad Operator** is a 4-operator digital FM voice platform for Eurorack. With the **Algo expander**, it becomes a programmable FM algorithm morphing system. Used together, these modules are especially strong for building **melodic voices, harmonic layers, animated leads, plucks, bells, basses, and evolving sequence timbres**.

What these modules are

Quad Operator

A 4-operator oscillator/FM synthesis module with:

- 4 operators
- Variable operator waveshape:
- sine
- triangle
- square
- saw
- Per-operator:
- ratio
- detune
- shape
- gain CV

- 4 modulation sends
- independent output
- Global controls:
- coarse / fine tune
- VCO/LFO mode
- 1V/oct
- LF FM
- AR FM external mod input
- reset

Algo expander

Adds:

- 3 saved FM matrix snapshots: **A, B, C**
- **Live** state
- Crossfade between algorithms/states

In practice, the Algo turns the Quad Operator into a **morphable FM melody engine**.

Why they work well for melodic music

For melodic use, the key strengths are:

1. **Operators can stay in harmonic ratios**
2. In **lock state**, each operator follows integer multiples/divisions of the master pitch.
3. This is ideal for stable, tonal FM sounds.
4. **You can treat it like one voice or several**
5. One complex FM voice
6. Layered intervals

7. Four separate oscillators when operators are in **free state**
8. **You get timbral motion without changing pitch**
9. FM depth changes via modulation sends
10. Shape morphing per operator
11. Gain CV controlling both loudness and modulation intensity
12. **Algo adds performance-ready timbre recall**
13. Store one matrix for a mellow tone, another for a bright attack, another for a metallic variation
14. Crossfade between them while sequenced pitch remains stable

That makes it very good for **musical, melodic phrasing** instead of only harsh experimental FM.

The most important concept: lock vs free

Lock state

In **lock**, each operator is tied to the master pitch in integer ratios from **1/11 to 11x**.

Use this when you want:

- tuned FM voices
- harmonic overtones
- stable melodic tracking
- classic FM bass/lead/bell sounds
- chords built from related intervals

For melodic music, this is the default mode.

Free state

In **free**, each operator becomes its own oscillator:

- ratio knob becomes coarse tune
- ratio CV becomes 1V/oct for that operator

Use this when you want:

- 4 separate melodic oscillators
- interval stacking by ear
- independent counterpoint voices
- drones plus a lead
- pseudo-paraphonic patches

This is less naturally harmonic for FM, but very useful compositionally.

Best melodic workflows

1. Use it as a single FM voice

This is the most obvious melodic application.

Basic patch

- Sequencer pitch CV -> **1V/Oct**
- Gate/envelope elsewhere in rack -> VCA or LPG after one chosen operator output
- Start with:
- VCO mode
- all operators in **lock**
- detune at 12 o'clock
- shapes fully CCW (sine)
- all modulation sends off

Then:

- Choose one operator output as your audible output
- Use one or more other operators primarily as modulators
- Increase selected modulation sends slowly

Result

You get:

- plucks
- keys
- FM bass
- glassy leads
- electric piano-like tones
- tuned percussive melody lines

This is exactly the patch style the manual encourages for harmonic FM.

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2. Build layered melodic intervals from multiple outputs

Because each operator has its own output, the Quad Operator can generate **multiple related melodic layers** from one pitch source.

Patch idea

- Same pitch CV to Quad Operator **1V/oct**
- Keep all operators in **lock**
- Set ratios to musically useful values, for example:
- Op1 = 1
- Op2 = 2
- Op3 = 3
- Op4 = 4 or 1/2 depending on patch
- Take multiple outputs to separate VCAs/filters/mixers

Musical use

- Op1 as the fundamental melody
- Op2 an octave-up reinforcement
- Op3 a fifth-ish/upper harmonic color
- Op4 a sub or additional color tone

Strictly speaking these are harmonic partial relationships, not equal-tempered chord voicings. But in a mix they can function as:

- organ-like layering
- registral reinforcement
- pseudo-unison stacks
- overtone voices that track melody tightly

This is very effective for **melodic hooks** that need presence without sounding like a simple saw oscillator.

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3. Use one operator as the audible carrier and animate the others as hidden modulators

This is where the module becomes especially musical.

Patch idea

- Listen only to **Op1**
- Use Op2, Op3, Op4 as modulators by raising their sends into Op1
- Modulate their **Gain CVs** with envelopes or slow CV

Because gain affects both:

- operator output level
- modulation intensity sent to others

you can make the modulators “enter” dynamically.

Musical result

This creates:

- note attacks that brighten then settle
- velocity-like timbral articulation
- evolving melodies where each note has internal movement
- expressive basslines with attack transient complexity

This is one of the strongest melodic uses of the Quad Operator.

How to make musical FM sounds instead of noise

The manual gives a very clear starting recipe. For melodic material, begin here:

- **VCO mode**
- all operators in **lock**
- all **detune** at noon
- all **shape** fully counterclockwise (sine)
- all **modulation sends** fully counterclockwise

Then add complexity one step at a time.

Good order of operations

1. Tune the root melody with **coarse/fine** and **1V/oct**
2. Set operator ratios
3. Bring up one mod send only
4. Add another modulator if needed
5. Then experiment with shape changes
6. Add slight detune last

Why this matters

FM gets dissonant quickly when you combine:

- non-sine waves
- multiple modulators
- detuning
- free-running operators

For melodic use, restraint gives much better results.

Practical melodic patch recipes

A. FM lead voice

Goal: expressive mono lead

Setup

- All operators in lock
- Shapes = sine to slightly triangular
- Op1 = carrier
- Op2 ratio = 2
- Op3 ratio = 3
- Op4 ratio = 1 or 4 depending on brightness

Patch

- Sequencer CV -> 1V/oct
- Gate -> envelope -> external VCA for Op1 output
- Envelope or modulation source -> Gain CV on Op2 or Op3
- Raise Op2 -> Mod1
- Optionally raise Op3 -> Mod1 slightly

Result

- bright attack
- vocal or brass-like movement
- stable pitch
- classic melodic FM lead behavior

If using Algo: - Save mellow matrix to A - bright lead matrix to B - metallic/ aggressive matrix to C - crossfade during performance

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B. FM bassline

Goal: punchy, melodic low-end

Setup

- All operators in lock
- Op1 audible
- Op2 ratio = 2
- Op3 ratio = 1
- Minimal modulation

Patch

- Sequencer -> 1V/oct
- Gate -> short envelope -> VCA on Op1
- Raise Op2 -> Mod1 a little
- Use very slight Gain CV on Op2 for attack transient
- Keep shapes mostly sine/triangle

Result

- solid low fundamental
- clickless but articulate attack
- good tracking
- easy to fit in a melodic sequence

For cleaner bass, avoid too much saw/square shape.

C. Bell or mallet melody

Goal: tuned metallic melody

Setup

- Lock state
- Op1 carrier
- Op2 and Op3 as modulators at higher ratios
- Slightly more FM depth than bass/lead patch

Patch

- Sequencer -> 1V/oct
- Fast-decay envelope -> VCA for output
- Additional short envelope -> Gain CV of modulator operator
- Use a somewhat higher ratio on one modulator

Result

- struck bell tones
- gamelan-like lines
- metallic arps
- digital mallet melodies

This is a natural use case for FM and fits the Quad Operator well.

D. Evolving melodic timbre with Algo

Goal: one sequence, multiple harmonic colors

Patch

- Create 3 modulation matrices:
- **A** = almost no FM
- **B** = moderate harmonic FM
- **C** = brighter/denser FM
- Sequence pitch into 1V/oct
- Listen to one operator or a mix of several outputs
- Move Algo crossfade manually or via CV

Result

The melody remains the same, but the tone evolves through: - pure - bright - metallic - dense

This is excellent for: - verse/chorus changes - live transitions - long-form melodic techno or ambient development

This is probably the most performance-friendly reason to pair Quad Operator with Algo.

E. Four-oscillator melodic bank

Goal: multiple melodic roles from one module

Setup

Put some or all operators in **free state**.

Patch ideas

- Op1 = lead
- Op2 = bass drone
- Op3 = countermelody
- Op4 = LFO or modulation source in LFO mode

Since in free state: - ratio knob becomes coarse tune - ratio CV becomes 1V/oct

you can patch separate pitch CVs to operators.

Result

You can use the Quad Operator as: - a compact 4-oscillator composition hub - a semi-polyphonic source - a layered melodic machine

This is less “classic FM voice” and more “digital oscillator cluster,” but very useful musically.

Using the AR FM input musically

The **AR FM** input lets you bring in an external audio-rate signal and route it to any operators via its own modulation sends.

This is a huge melodic feature.

Melodic uses for AR FM

1. External oscillator as modulator

Patch a tuned external VCO into AR FM.

- Keep Quad Operator tracking a melody
- Tune external oscillator to a related interval
- Send AR FM to one or more operators

Result: - richer sidebands - harmonically shifting timbre - cross-module FM melodies

2. Feedback-like patches

The manual specifically suggests feedback-related experimentation, especially with locked operators.

Patch one Quad Operator output externally and return something into AR FM.

Result: - more aggressive but still pitch-centered timbres - animated sustained notes - unstable but expressive melodic tones

3. Use another voice to articulate timbre

Patch a drum, another sequence, or an oscillator into AR FM.

Result: - melody timbre reacts to external rhythm - pseudo-sidechain timbral sync - melodic line that changes character based on another voice

For melodic patching, keep the AR FM gain conservative to preserve pitch clarity.

Shape control as a melodic tool

Each operator can morph continuously: - sine -> triangle -> square -> saw

This matters a lot for melodic use.

Best practices

Sine

Best starting point for: - clean FM - harmonic patches - stable melodic tone

Triangle

Good for: - slightly richer leads - rounded basses - soft animated timbres

Square / Saw

Good for: - bright leads - edgy basses - harmonically dense melodic lines

But with FM active, these can introduce: - noise - aliasing - harshness

So for melodic clarity: - start sine - move brighter only when needed

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Gain CV is secretly one of the most musical controls

The manual notes that **Gain CV affects both output level and modulation intensity**.

That means each operator behaves somewhat like it has a built-in modulation VCA.

Why this is great for melody

You can use envelopes, LFOs, or sequencer CV to make FM depth become dynamic per note.

Examples: - short envelope on modulator gain = percussive attack - slow LFO on modulator gain = timbral vibrato-like evolution - sequencer row into gain CV = different timbre on each step

This is one of the best features for turning static pitch sequences into **melodic phrases with articulation**.

Reset input for melodic precision

The **Reset CV** resets all operators' phase.

For melodic music this can help with:

- consistent attack transient
- repeatable plucks
- cleaner modulation when using LFO mode
- phase-locked rhythmic modulation

If your notes feel slightly inconsistent on repeated triggers, reset can tighten behavior.

Using VCO vs LFO mode for melodic composition

VCO mode

Use for: - pitched voices - melodies - basslines - harmonic stacks

LFO mode

Use for: - phase-locked modulation sources - slow complex modulation of filters, wavefolders, VCAs, or FM depth - creating melodic animation indirectly

A strong technique is:

- Put Quad Operator in **LFO mode**
- Use operators as complex, related modulation sources
- Patch outputs to:
- Gain CVs
- Shape CVs
- filter cutoff
- external VCA level

This won't directly generate melody, but it can create **coherent motion around a melody**.

How Algo makes melodic performance better

Without Algo, Quad Operator is already flexible. With Algo, it becomes much easier to use in songs.

What Algo stores

It stores the modulation matrix: - the positions of all **Mod x** knobs for all 4 operators - and the AR FM input sends

So Algo is essentially storing your FM routing/depth “algorithm.”

Musical applications

1. Instant timbre presets for the same sequence

Store: - A = bass - B = lead - C = bell

Then run the same melody and swap character.

2. Morphing between phrases

Crossfade from simple to complex FM over 8 or 16 bars.

3. Build song sections

- Verse = A
- Chorus = B
- Breakdown = Live
- Fill = C

4. Animate a static drone into a melody voice

Use saved matrices as macro-structure controls.

This is particularly powerful because FM patches are often hard to recreate exactly by hand.

Suggested melodic strategies

Strategy 1: Start with one carrier only

Use one operator output as your main voice first. Don’t listen to all outputs at once immediately.

Strategy 2: Use simple ratios

Begin with: - 1 - 2 - 3 - 4

These usually give more musically grounded results.

Strategy 3: Keep detune subtle

The manual says detune is available even in lock mode. For melody: - tiny detune = warmth/motion - large detune = inharmonicity

Strategy 4: Add modulation one send at a time

This module can get chaotic quickly. Small send amounts go a long way.

Strategy 5: Save usable states with Algo

Once you find: - a sweet bass - a good lead - a bright accent

save them immediately.

Limitations to keep in mind for melodic use

Based on the manual:

- CV inputs for most control are sampled at **6 kHz**
- Audio I/O is at **48 kHz**
- More overtone-rich waveshapes plus heavy FM can create aliasing/noise
- Free-state FM is often more inharmonic
- There is no built-in envelope/VCA for final amplitude shaping, so external utilities help a lot

So for best melodic results, pair it with: - envelopes - VCAs - filters - sequencers - mixers

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Best use cases in a musical rack

The Quad Operator + Algo combo is especially good for:

- **FM mono lead voice**
- **Melodic bass voice**
- **Bell/pluck/arpeggio generator**
- **Evolving techno sequence timbre source**
- **Harmonic drone with moving overtones**
- **4-oscillator melodic utility bank**
- **Crossfading timbral preset machine**

It is less about instant “DX7 preset nostalgia” and more about a **hands-on modular FM instrument**.

Simple starter melodic patch

If I were dropping this into a patch for immediate musical payoff, I'd do this:

Patch

- Sequencer CV -> 1V/oct
- Gate -> envelope -> VCA
- Op1 output -> VCA -> mixer
- All operators in lock
- Ratios:
- Op1 = 1
- Op2 = 2
- Op3 = 3
- Op4 = 1
- All shapes = sine
- All detunes = noon
- Raise Op2 -> Mod1 slightly
- Envelope or slow CV -> Gain CV on Op2
- Save to Algo A
- Make a brighter version with some Op3 -> Mod1 and save to B
- Make a metallic version with more FM and save to C

Outcome

You now have: - a playable tuned melodic FM voice - dynamic note articulation - three performable timbral states - crossfading between them with Algo

That's enough for an entire melodic part in a track.

Bottom line

The **Quad Operator** is best understood as a **modular 4-op FM engine** that can be either:

- a single rich melodic voice,
- a bank of harmonically related oscillators,
- or four independent oscillators.

The **Algo expander** makes it far more practical in actual music by letting you **save, recall, and morph FM routing states**. Together, they are very strong for melodic work because they let you separate:

- **pitch** from
- **timbre evolution**

That means a simple sequence can become expressive, articulate, and song-structured without changing the notes themselves.

If you want, I can also turn this into: 1. a **patch cookbook** with 10 specific melodic patches, or
2. a **quick-start guide** organized by genre: ambient, techno, electro, and IDM.

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