

# Happy Nerding — FM AID

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- [Manual PDF](#)
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[FM AID Manual PDF](#)

## Happy Nerding FM AID: using it for melodic musical parts

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The attached manual covers **one module: Happy Nerding FM AID**.

So rather than discussing a multi-module system from the PDFs, I'll explain how **FM AID works with the other kinds of Eurorack modules you likely already have** to build melodic voices, leads, basses, plucks, bells, and evolving tonal parts.

### What FM AID does musically

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FM AID is an **analog through-zero linear FM processor**. In practice, it takes:

- a **Carrier** signal at the **CAR input**
- a **Modulator** signal at the **MOD input**
- optional FM-depth control at the **CV input**

and gives you **four simultaneous outputs**:

- **Square**
- **Saw**
- **Sine**
- **Triangle**

If the **carrier is a saw wave**, those outputs behave like wave-shaped versions of the FM result: - sine = mellowest - triangle = slightly brighter - saw = bright - square = brightest

That makes FM AID especially useful for **melodic duties**, because you can keep one pitch structure but choose different harmonic flavors from the outputs.

## Important manual points that matter in patching

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From the manual:

- Preferred signal levels are roughly **-5V to +5V**
- The **FM knob** sets modulation depth/index
- The **CV knob** is **bipolar** and adds/subtracts incoming CV from the FM amount
- **CAR is normalised to MOD** when nothing is plugged into MOD
- so one oscillator can act as both carrier and modulator
- It works best with **saw as carrier** if you want the named output shapes to behave as labeled
- There is an **onboard trim** for carrier amplitude calibration if the saw output shows artifacts
- Feedback patching from an output back into MOD can produce more aggressive/noisy/digital-like textures

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## Best ways to use FM AID for melodic components

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### 1. Simple 1V/oct melodic voice

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This is the most direct use.

## Patch

- VCO A saw output → **CAR**
- VCO B output (sine or triangle is a great start) → **MOD**
- Same **1V/oct pitch sequence** → VCO A and VCO B
- FM AID output (start with **Sine** or **Triangle**) → VCA → filter or straight to mixer
- Envelope → VCA CV
- Optional envelope/LFO/sequencer lane → **CV input**

## Musical result

This gives you a very playable FM voice where: - pitch remains melodic and trackable - harmonic complexity comes from the modulator - different outputs give multiple timbral versions of the same note line

## Why it works

Sending the same melodic pitch CV to both oscillators keeps their ratio fixed, which is ideal for **stable, tonal FM melodies**.

## Good ratios to try

Tune the modulator relative to the carrier: - **1:1** = solid, centered, classic FM tone - **2:1** = brighter, more overtone-rich lead or bass - **3:2** = musical and slightly more complex - **3:1 / 4:1** = bell-like or metallic - **1:2** = hollow, subtler upper structure

For melodic writing, start with: - bass: **1:1** or **2:1** - lead: **1:1, 3:2, 2:1** - bells/mallets: **3:1** or **4:1**

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## 2. Single-oscillator melodic folding voice

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Because **CAR is normalised to MOD**, you can patch only one oscillator.

## Patch

- One saw VCO → **CAR**
- Leave **MOD unpatched**
- Pitch sequence → that oscillator's 1V/oct
- FM AID **Sine/Triangle/Saw/Square output** → VCA → mixer
- Envelope or LFO → **CV input** or manually use FM knob

## Musical result

This gives you a compact melodic voice with a kind of **self-FM / wavefolding-adjacent behavior**.

It's not ratio FM in the classic two-oscillator sense, but it can produce: - animated basses - growling leads - harmonically rich mono lines

## Best use

Great if you only have one primary oscillator available but still want a more complex melodic timbre.

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## 3. Envelope-controlled FM plucks

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One of the most musical uses of FM AID is making the FM amount dynamic.

## Patch

- Carrier VCO saw → **CAR**
- Modulator VCO sine/triangle → **MOD**
- Shared pitch CV to both oscillators
- Short decay envelope → **CV input**
- Set **CV knob positive**
- FM AID output → VCA → mixer
- Another envelope → VCA

## Musical result

At the attack, the FM index is high, so the sound is bright.

As the envelope falls, the tone becomes purer and more focused.

This is excellent for: - plucks - electric piano-ish tones - marimba-like tones  
- expressive sequences

## Why this is especially good

This is one of the classic FM behaviors that reads immediately as “musical.”

You get transient brightness without the note staying harsh.

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## 4. Velocity-sensitive melodic phrasing

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The manual specifically suggests **note velocity** into the CV input.

### Patch

- Velocity CV from MIDI-to-CV or sequencer → **CV input**
- Set **CV knob** to positive or negative amount
- Normal melodic FM voice patch as above

## Musical result

Harder-played notes become: - brighter - more complex - more aggressive

Softer notes stay: - rounder - cleaner - more sine-like

This is extremely useful for expressive: - bass lines - leads - keyboard performance patches

It's one of the easiest ways to make an FM voice feel alive in a track.

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## 5. Pitch-dependent timbre compensation

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The manual also points out using **pitch CV** in the CV input.

### Why do this?

FM timbre often changes across the keyboard. Sometimes higher notes get too bright or too thin.

### Patch

- Mult your pitch CV
- One copy to oscillator 1V/oct inputs
- Another copy to **CV input**
- Use the **CV knob**:
- **positive** = brighter as notes go higher
- **negative** = less FM as notes go higher

### Musical result

This helps balance a melodic patch across its range.

### Practical uses

- **Negative CV setting** is great for bass/lead patches where high notes otherwise get too glassy
- **Positive CV setting** is useful when you want a more synth-pop or digital-style brightness curve

This is a very strong “make it sit in the mix” trick.

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## 6. Stable melodic intervals with synced oscillators

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The manual recommends **hard-synced oscillators** to reduce beating and keep the tone static.

## Patch

- Carrier oscillator as the master melodic oscillator
- Modulator oscillator hard-synced to carrier
- Both tuned to a chosen ratio
- FM AID patched normally

## Musical result

You get a more locked, stable harmonic tone, which is especially useful when: - writing tonal melodies - layering with other harmonic instruments - recording repeated sequences that need consistency

## Best for

- tight basses
- precise arpeggios
- repeated melodic hooks

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# Understanding the four outputs in a musical context

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A big advantage of FM AID is that it gives **four tonal variants at once**.

## Sine output

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Use for: - bass fundamentals - mellow leads - sub-rich melodic support - layering under brighter outputs

It's the safest starting point for tonal material.

## **Triangle output**

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Use for: - woody leads - rounded arps - melodic lines that need clarity without too much bite

This is often the sweet spot for melodic content.

## **Saw output**

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Use for: - cutting hooks - bright sequences - acid-adjacent lines - melodic parts that need to stand in front of a mix

Good when you want the FM motion to remain obvious.

## **Square output**

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Use for: - very bright lead tones - chiptune-adjacent melody colors - aggressive arps - heavily articulated riffs

Can get intense quickly, especially at higher FM settings.

## **Very useful trick**

Mult or record multiple outputs: - Sine for body - Triangle for definition - Saw or Square for edge

Then mix to taste.

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# Patch recipes for actual melodic roles

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## A. FM bassline

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### Patch

- Carrier saw VCO → CAR
- Modulator sine VCO → MOD
- Same pitch CV to both
- Modulator tuned **1:1** or **2:1**
- FM AID **Sine** or **Triangle** out → lowpass filter → VCA
- Snappy envelope to VCA
- Small positive envelope to CV input

### Result

Punchy, harmonically rich bass that still tracks well and keeps low-end focus.

### Tips from the manual

If the bass loses weight as FM increases: - lower the carrier octave - lower modulator pitch - use sine or triangle as modulator

These are directly recommended in the manual and are very effective.

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## B. Glassy lead

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### Patch

- Carrier saw → CAR
- Modulator sine/triangle → MOD
- Shared pitch CV

- Tune modulator to **2:1** or **3:1**
- Use **Triangle** or **Saw** output
- Add moderate FM
- Add aftertouch/velocity/mod wheel CV to CV input

## Result

Expressive FM lead with playable timbral dynamics.

## Performance idea

- low FM for verses
- increase FM manually for choruses or solos
- use velocity for accent notes

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## C. Bell or mallet sequence

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### Patch

- Carrier saw → CAR
- Modulator sine → MOD
- Ratio **3:1, 4:1, or 5:1**
- Short decay envelope into CV input
- Set FM knob low to medium
- Use **Sine** output first
- Fast VCA envelope

### Result

Tonal percussive sequence with a bright attack and cleaner tail.

### Why it works

Classic FM bell behavior comes from: - nontrivial frequency ratios -  
decaying modulation index

FM AID is ideal for this.

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## D. Animated arp with audio-rate CV modulation

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The manual explicitly notes that **audio-rate signals can be patched into the CV input**.

### Patch

- Normal melodic FM voice
- Additional oscillator or audio LFO → **CV input**
- CV knob to taste
- Arpeggiator or step sequencer driving pitch

### Result

A moving, animated harmonic texture where the FM index itself is being modulated at audio rates.

This can produce: - vocal-like shifting tones - unstable digital-esque arps - richly animated sustained notes

Keep this subtle for musical melodic use.

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## E. Self-feedback lead/noise edge patch

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The manual describes sending an output back into **MOD** for feedback.

### Patch

- Oscillator saw → CAR
- FM AID output (start with triangle or saw) muffled:
- one copy → mixer/VCA
- one copy → **MOD**
- Increase FM gradually

## Result

Starts as aggressive self-FM and can become noisy, tearing, or quasi-digital.

## Musical use

Best for: - climactic lead lines - industrial melodies - transitions - high-intensity fills

This is usually less “clean melodic” and more “expressive special effect,” but very useful in arrangement.

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# How to pair FM AID with common Eurorack module types

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## With oscillators

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Best pairing. You usually want: - a **saw carrier** - a **sine or triangle modulator** to start

If your oscillators have stable tracking, FM AID becomes a strong melodic voice core.

## With quantizers/sequencers

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Excellent. Use them to: - keep pitch ratios musical - automate melodic movement - send accent/velocity lanes to CV input

A sequencer with extra CV lanes makes FM AID much more expressive.

## With envelopes

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Essential for melodic articulation: - one envelope for amplitude - another for FM depth via CV input

This is one of the best pairings.

## **With filters**

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Very useful, though not always necessary. FM already creates harmonic motion, but a filter helps: - tame harshness - emphasize sweet spots - shape bass vs lead role

## **With VCAs**

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Important if you want dynamic control over: - output loudness - modulator amplitude before FM AID - CV depth sent to the CV input

A VCA on the modulator path can be extremely musical.

## **With mixers/attenuverters**

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Helpful for: - blending outputs - controlling modulation depth - offsetting the CV input - creating parallel voices

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# **Practical melodic strategies**

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## **Keep ratios simple first**

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For tonal music, start with: - 1:1 - 2:1 - 3:2

These are easier to tune and sit better harmonically.

## **Use the CV input like a “brightness animation” input**

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Think of FM AID's CV input less as abstract modulation and more as: - note attack brightness - expression - phrase accent - register compensation

That mindset makes it much easier to use musically.

## **Start from the sine or triangle outputs**

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If the patch feels unruly, switch to: - **Sine** first - then **Triangle**

These outputs preserve musicality better in many melodic contexts.

## **Use a saw carrier when you want predictable results**

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The manual is clear that the module is designed around a saw carrier for the indicated output shapes.

## **If the low end disappears, reduce complexity**

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Again from the manual: - lower carrier octave - lower modulator pitch - use sine/triangle modulator

This is especially important for bass melodies.

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# **A few complete example melodic setups**

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## **Minimal melodic voice**

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- 2 VCOs
- 1 sequencer
- 1 envelope
- 1 VCA
- FM AID

Patch shared pitch CV to both VCOs, saw to carrier, sine to modulator, triangle out to VCA.

This gives a clean, controllable FM lead or bass.

## Expressive performance voice

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- 2 VCOs
- keyboard/sequencer with velocity
- 2 envelopes
- VCA
- filter
- FM AID

Velocity to CV input, envelope to VCA, optional second envelope to FM depth.

Great for performable melodic phrasing.

## Evolving melodic drone/sequence

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- 2 VCOs
- slow modulator to CV input
- quantized pitch sequence
- FM AID multiple outputs mixed together

This creates a harmonically shifting tonal line that remains melodic but keeps moving.

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## Calibration note

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If the module sounds oddly distorted even at low FM, especially when using a saw carrier, the manual says the **carrier calibration trimmer** may need adjustment.

Basic manual procedure: - nothing patched to CV or MOD - saw into CAR - FM knob fully CCW - monitor the **saw output** - adjust trim until the saw is clean and not “two-toothed”

This matters because poor calibration can make melodic patches sound artifacty in an unintended way.

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## Bottom line

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**FM AID is best thought of as a melodic timbre engine for oscillators.**

It is especially strong for:

- FM basses
- expressive leads
- bell/mallet tones
- plucks with animated attack
- evolving arpeggios
- layered tonal textures from the four simultaneous outputs

Its most musical strengths are:

1. **stable ratio-based FM with two oscillators**
2. **self-patched single-oscillator complexity**
3. **dynamic FM index control via envelopes, velocity, or pitch CV**
4. **multiple simultaneous output flavors from one melodic line**

If you want, I can also turn this into: - a **set of specific patch diagrams** - a **“starter patches” cheat sheet** - or a **module pairing guide** for FM AID with your exact rack.

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