Happy Nerding — FM AID

- Manual PDF

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Happy Nerding FM AID (2020) — Cheat Sheet

Overview

FM AID is an analog Eurorack module for through-zero linear FM synthesis. Any signal can be used as Carrier or Modulator for wild, aliasing-free wave shaping and FM tones. Saw-tooth input recommended for "classic" FM outputs, but all source types yield unique results.

Panel Reference

Top Controls

- **FM Knob:** Sets modulation depth (FM index).
- **CV Knob:** Bipolar attenuator for CV input, mixes with FM knob.

Jacks

1. **CV IN**
2. *Voltage Range:* -5V to +5V (accepts AC or DC)
3. *Purpose:* Controls FM depth (modulation index) via external voltage.
4. **MOD IN (Modulator)**

5. *Voltage Range:* Preferably -5V to +5V (accepts -1V to +1V up to -12V to +12V with trimmer adjustment)
6. *Purpose:* Signal input that frequency-modulates the Carrier.
7. *Note:* Carrier is normalled to Mod if no patch present.
8. **CAR IN (Carrier)**
9. *Voltage Range:* Preferably -5V to +5V (trimmable up to ±12V)
10. *Purpose:* Main signal to be modulated.
11. *Note:* Sawtooth gives most "classic" FM outputs.
12. **Outputs (All: -5V to +5V, 1kΩ impedance)**
13. **Sine:** Smoothest output, classic sine when fed sawtooth.
14. **Triangle:** Brighter than sine.
15. **Sawtooth:** Bright, reproduces saw input when fed saw.
16. **Square:** Brightest, gives square when fed saw.

Quick Start

1. **Install in 4HP space, connect 10–16 pin power (red stripe = -12V).**
2. **Feed sawtooth to CAR IN for "classic" FM output shapes.**
3. **Plug MOD IN for external modulation, or use default (normalled) for wavefolding.**
4. **Use FM knob to set FM index (intensity).**
5. **Use CV knob to add/shape modulation from the CV input.**
6. **Patch outputs to get Sine, Triangle, Saw, or Square variants.**

Tricks

- **Self-patch any output to MOD IN** for feedback tones and analog noise.
- **Patch velocity or pitch CV to CV IN** for dynamic, keyboard-driven timbres.
- **Hard-sync both carrier & modulator sources** to eliminate frequency beating.
- **Lower carrier/modulator octave or switch to sine/triangle to restore low end** if the main tone gets lost at high FM depth.

Calibration

- Onboard trimmer adapts module for input voltage ranges from ±5V to ±12V.
- To calibrate: Feed saw into Carrier, set FM fully CCW, monitor Saw output, and trim for cleanest output.

Input/Output & Control Summary Table

Function	Jack/ Control	Type	Typical Voltage Range	Description
FM depth	FM knob	Knob	Manual	Sets FM index
CV attenuator	CV knob	Knob	Manual	Mixes CV with FM knob
FM depth CV	CV IN	Jack	-5V to +5V	Modulates FM depth
Modulator	MOD IN	Jack	-5V to +5V (adj. up to ±12V)	Frequency modulation input
Carrier	CAR IN	Jack	-5V to +5V (adj. up to ±12V)	Source to be FM-modulated
Sine out	Output	Jack	-5V to +5V	Sine-like output
Triangle out	Output	Jack	-5V to +5V	Triangle-like output
Sawtooth out	Output	Jack	-5V to +5V	Sawtooth output
Square out	Output	Jack	-5V to +5V	Square output

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