LM324 — quad op-amp on 12 V (CV-out 0–10 V)

TI / generic · SOIC-14 · single-supply, up to 32 V · ~$0.3

WHAT IT IS

The classic workhorse quad op-amp. Runs on a single high supply (we use 12 V), which lets its output swing high enough to make a 0–10 V Eurorack CV. We use it as the gain stage after the DAC.

KEY SPECS (what matters to us)

4 op-amps · single-supply up to 32 V · ~1 MHz
Output swings to ~Vcc–1.5 V (≈10.5 V on 12 V)

SIGNALS / PINS WE USE

Per amp: +IN, –IN, OUT · V+ (12 V), V– (GND)

ELECTRICAL · GOTCHAS

NOT rail-to-rail: its output cannot reach 0 V on its own — needs a PULL-DOWN resistor so it can sink to ground (this was a design-review catch). Gain ×2.44 takes the DAC's 0–4.096 V up to 0–10 V.

WHY IT'S IN OUR SYSTEM

CV-OUT needs to swing to 10 V; the 6 V-max MCP6004 can't. The LM324 on the 12 V rail can (with the pull-down fix). Cheap, single-supply, and slow-is-fine for DC CV. The review caught the 0 V issue before fab — a textbook LM324 gotcha.