

MCP6004 – quad op-amp (CV-in buffer / scaler)

Microchip · SOIC-14 · rail-to-rail, single 3.3 V · ~\$0.5

WHAT IT IS

Four op-amps in one chip. An op-amp is the universal analog building block – buffer, amplify, scale, compare. "Rail-to-rail" = its output can swing nearly all the way to both supply rails. We use it to buffer and scale incoming CV before the ADC reads it.

KEY SPECS (what matters to us)

4 op-amps · rail-to-rail in & out · single-supply 1.8–6 V
~1 MHz bandwidth (plenty for slow CV) · low offset

SIGNALS / PINS WE USE

Per amp: +IN, –IN, OUT · V+ (3.3 V), V– (GND)

ELECTRICAL · GOTCHAS

Max supply 6 V → it CANNOT run on 12 V (that's why CV-OUT uses the LM324 instead). Perfect for the 3.3 V CV-input side.

WHY IT'S IN OUR SYSTEM

On the CV-INPUT: each channel's 0–10 V is divided down + clamped, then this buffers it (low-impedance) so the SAR ADC samples cleanly. 4 amps = 4 CV channels, one chip. Rail-to-rail on 3.3 V means it uses the full ADC range.