

MCP3208 – 8-channel 12-bit SPI ADC (reads pots + DIP)

Microchip · SOIC-16 · SPI · ~\$2

WHAT IT IS

An Analog-to-Digital Converter: turns a voltage (0–Vref) into a 12-bit number (0–4095) the MCU can read. 8 input channels, selected over SPI. We use it to read the front-panel pots and the DIP address – clean, off-chip, away from the noisy on-MCU ADC.

KEY SPECS (what matters to us)

8 channels · 12-bit (4096 steps) · ~100 ksps
SAR architecture · ratiometric (Vref = Vdd = 3.3 V)
SPI interface (shares SCK/MOSI/MISO, own ~CS)

SIGNALS / PINS WE USE

CH0–7 = analog inputs (pots, DIP) · Vref/Vdd = 3.3 V
CLK/Din/Dout/~CS = SPI · AGND/DGND = grounds

ELECTRICAL · GOTCHAS

Vref tied to Vdd = ratiometric: supply ripple cancels in the math, so a noisy 3.3 V doesn't corrupt the reading. Drive inputs from a low-impedance source (a buffer) so the sampling cap settles.

WHY IT'S IN OUR SYSTEM

Reading the C3's on-chip ADC was noisy (session-3 pain), and the mux-plus-ADC plan didn't fit the C3's pins. Going to 2× MCP3208 fixed BOTH: SPI became the spine (pin count dropped) and the ADC noise vanished. 2 chips = 16 channels = 12 pots + 4 DIP. Also the heart of the calibration fixture (8-ch CR resistance read-back).