ESP32-S3-WROOM-1 — the host / high-GPIO brain

Espressif · SMD module · Wi-Fi + BLE · ~$3-4

WHAT IT IS

The bigger sibling: dual-core Xtensa @240 MHz, lots more GPIO, native USB. Used where one board needs to do many things at once — the Brain (Ethernet + USB-MIDI + OLED + bus master) and the CV-bidirectional expander (ADC + DAC + bus + USB all at once).

KEY SPECS (what matters to us)

2× Xtensa @240 MHz · 8/16 MB flash · optional PSRAM
~36 GPIO (vs the C3's ~15) · multiple SPI/I2C/UART
Native USB (IO19/20) for USB-MIDI + flashing

SIGNALS / PINS WE USE

SPI → W5500 · I2C → OLED · UART → RS-485 master · USB IO19/20
GND on multiple pads + thermal EP

ELECTRICAL · GOTCHAS

Strapping pins 0/3/45/46 + the octal-PSRAM pins (26-32 on -N16R8) are off-limits. Same USB-JTAG auto-download as the C3.

WHY IT'S IN OUR SYSTEM

Reserved for the two boards the cheap C3 can't fit: the Brain (it masters the whole system) and CV-both (ADC+DAC+bus+USB need the GPIO). Pick the brain by channel/peripheral count — C3 for the many simple modules, S3 for the few dense ones.