

Power & Grounding

Electronics / Essential extra

A reliable power layout for mixed logic, sensors and motors.

01 Plan the rails

Logic

Use regulated rails appropriate to each board and sensor: commonly 3.3 V and 5 V.

Motor power

Use a supply and driver sized for startup/stall current. Keep motor current off MCU rails.

Budget

Add worst-case load currents and margin; check regulator temperature and battery capability.

02 Ground & noise

Reference

Join MCU, sensor and driver grounds for non-isolated signal connections.

Return paths

Route motor return directly to the power distribution point; avoid sharing thin sensor return wires.

Decoupling

Use local ceramic bypass capacitors and suitable bulk capacitance near motor drivers.

03 Before switching on

Polarity

Check connector polarity and voltage with a meter before attaching electronics.

Protection

Use appropriate fusing/current limiting and insulated connections.

Multiple supplies

Avoid back-feeding USB or tying regulator outputs together unless the board supports it.

Before you power on

A common ground does not make different signal voltages compatible; level shifting may still be required.

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Datasheets & further reading

SparkFun: voltage, current & resistance

<https://learn.sparkfun.com/tutorials/voltage-current-resistance-and-ohms-law/all>

ST L298 datasheet

<https://www.st.com/resource/en/datasheet/l298.pdf>