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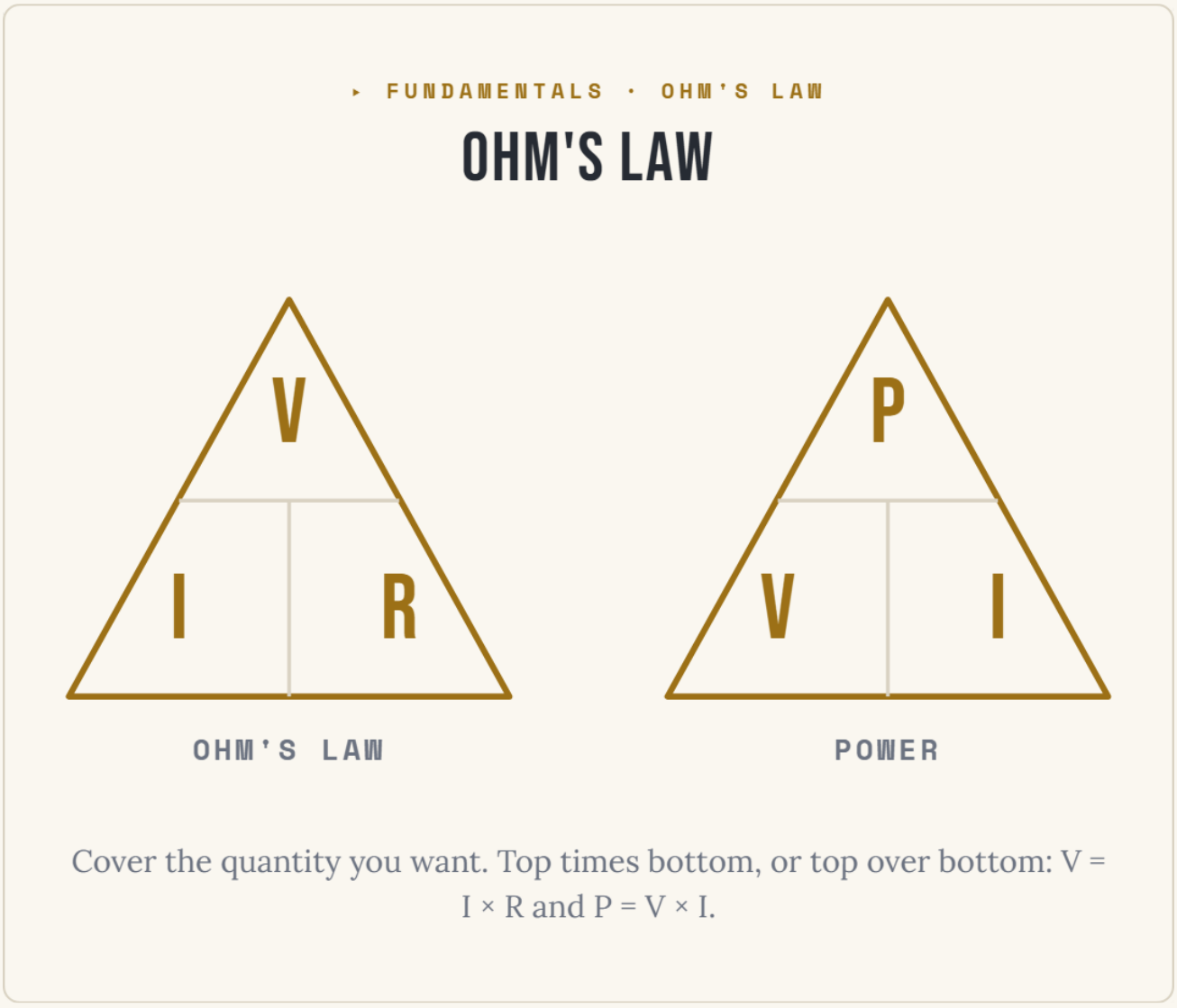
OHM'S LAW

What Ohm's law is, how to rearrange V = I x R for voltage, current, or resistance, and the power it sets. With a live calculator and a worked board example.

ONE THOUSAND DRONES ENGINEERING TEAM · VERIFIED 2026-07

Ohm's law relates voltage, current, and resistance in one equation. Rearranged, it gives you current or resistance, and the power follows. Know any two and you have the rest. Georg Ohm published the relationship in 1827, and it holds for the resistive parts on every board here.



COVER THE QUANTITY YOU WANT: THE TRIANGLE GIVES ITS FORMULA.

$$V = I \times R$$

CALCULATOR · OHM'S LAW CALCULATOR (V, I, R, AND POWER)

Solve Ohm's law for voltage, current, or resistance, and get the power. Enter any two of V, I, R. Worked from a real ESP32 board's indicator LED.

Interactive calculator: academy.onethousanddrones.com/tools/ohms-law

SOLVE FOR VOLTAGE, CURRENT, OR RESISTANCE, AND READ THE POWER.

THE THREE FORMS

They are one equation, written for whatever you are missing. Know the current and the resistance and you want the voltage. Know the voltage and the resistance and you want the current. Know the voltage and the current and you want the resistance. Keep the units honest, volts and amps and ohms, and the arithmetic is exact.

$$I = V / R, \quad R = V / I, \quad P = V \times I$$

WHY IT MATTERS

Almost every small design decision is an Ohm's-law step. Sizing a pull-up resistor on a One Thousand Drones L1.01 board is one: the resistor sits between the `3.3 V` rail and a signal pin, and its value sets how much current flows when the pin pulls low. Pick the resistance and Ohm's law tells you the current; pick a target current and it tells you the resistance.

CHECKPOINT

1. Ohm's law says voltage equals what?

a. Current divided by resistance

b. Current times resistance

c. Resistance divided by current

ANSWER · B

V = I x R: voltage is current multiplied by resistance.

2. To find the current when you know the voltage and resistance, you divide what by what?

a. Resistance by voltage

b. Current by voltage

c. Voltage by resistance

ANSWER · C

I = V / R, voltage divided by resistance.

3. The power a simple resistive part uses is which of these?

a. Voltage times current

b. Voltage plus current

c. Voltage minus current

ANSWER · A

P = V x I for a resistive load.

- Prerequisite: voltage, current, and resistance
- Calculate it: the Ohm's law calculator
- Next: power and heat