

UNITS AND PREFIXES

Volts, amps, ohms, farads, watts, and the metric prefixes (k, M, m, u, n, p) you read off every part. A plain-English start to electronics.

ONE THOUSAND DRONES ENGINEERING TEAM · VERIFIED 2026-07

Electronics runs on a small set of quantities and a ladder of prefixes. Get comfortable with volts, amps, and ohms, and with reading **4.7 uF** or **5.1 kΩ** off a part, and every later guide has a foundation to stand on. This is that foundation.

WHAT ARE THE BASIC UNITS?

A volt (V) measures electrical push, the pressure that moves charge. An amp (A) measures current, the rate charge flows. An ohm (Ω) measures resistance, how strongly a material fights that flow. A farad (F) measures capacitance, how much charge a part stores per volt. A watt (W) measures power, the rate energy is used. These five cover almost everything on a small board. Each is an SI unit with a fixed international definition set by the 2019 revision of the SI (BIPM 2019).

- [BIPM. The International System of Units \(SI\), 9th edition \(2019\).](#) [bipm.org](#)

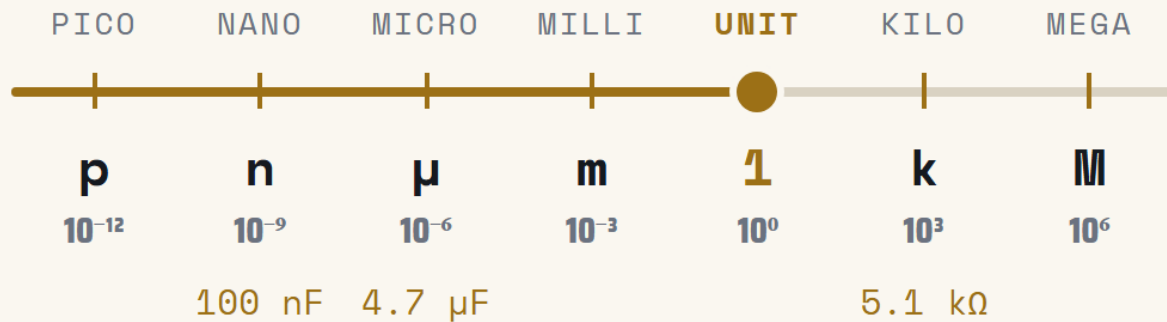
WHAT DO THE PREFIXES MEAN?

A prefix scales a unit up or down by powers of ten, so you rarely write a long string of zeros. Going down: milli (m) is a thousandth, micro (u) a millionth, nano (n) a billionth, pico (p) a trillionth. Going up: kilo (k) is a thousand, mega (M) a million. So **4.7 uF** is 4.7 millionths of a farad, and **5.1 kΩ** is 5100 ohms. Read the prefix first and the value stops being intimidating.

- [NIST SP 330. The International System of Units \(SI\), 2019 edition.](#) [nvlpubs.nist.gov](#)

► FUNDAMENTALS • UNITS

THE PREFIX LADDER



Slide either way from the unit; each step is a factor of a thousand.

Each step is a factor of a thousand. Read the prefix to place a value on the scale.

THE PREFIX LADDER: EACH STEP UP OR DOWN IS A FACTOR OF A THOUSAND.

READING A REAL PART VALUE

On a One Thousand Drones bill of materials you meet values like **100 nF**, **4.7 μF**, and **5.1 kΩ** next to real parts. A **100 nF** capacitor sits beside almost every chip. A **5.1 kΩ** resistor sets a USB-C port's role. Same units, same ladder, on parts you actually order and solder.

CHECKPOINT

1. What does **kΩ** mean?

- A thousand ohms
- A thousandth of an ohm
- A thousand volts

ANSWER • A

kilo (k) means a thousand, so 1 kΩ is 1000 ohms.

2. Which of these prefixes is the smallest?

- a. milli (m)
- b. micro (μ)
- c. **pico (p)**

ANSWER · C

pico is a trillionth, far smaller than milli (a thousandth) or micro (a millionth).

3.4.7 μF is a measure of what?

- a. Resistance
- b. **Capacitance**
- c. Current

ANSWER · B

The farad (F) is the unit of capacitance; μF is microfarads.

- [Next: voltage, current, and resistance](#)