Low-Power Modes

Electrical Engineering

Where the microamps go, what each sleep depth costs, and what saves battery.

Average current is what drains a battery, not peak current.

Typical modes

- **Run: core and peripherals both active**
- **Sleep: core stopped, peripherals running**
- **Stop: clocks off, RAM contents retained**
- **Standby: almost everything powered down**
- **Wake sources shrink as depth increases**

What actually saves

- **Sleep between events instead of busy-waiting**
- **Let DMA move data while the core sleeps**
- **Turn off clocks to unused peripherals**
- **Configure every pin; leave none floating**
- **Finish fast and sleep, rather than idle slowly**

Measure the average over a full duty cycle. A brief burst at high current often beats a long, slow, low-current alternative.