3. Why is ADC Needed in Embedded Systems?

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The real world is **analog** — all physical phenomena (temperature, light, sound, pressure, humidity) are continuous signals. However, microcontrollers and computers can only process information in **digital** form (0 and 1).

ADC acts as a **bridge** between the physical world and the digital world:

1. **Sensors produce analog signals** → For example, an LDR produces a voltage that changes according to light intensity.
2. **Microcontrollers only understand digital numbers** → Without an ADC, a microcontroller cannot "read" that voltage value.
3. **ADC converts** → An analog voltage of 0–5V is converted into a number from 0–1023 (for a 10-bit ADC).
4. **Programs can process the result** → For example: if the ADC value is < 500, turn on the LED.

Examples of ADC usage in daily life:

- Reading temperature sensor values (LM35) → conversion to degrees Celsius
- Reading light intensity (LDR) → automatic screen brightness control
- Reading a potentiometer → audio volume control
- Voice recording (microphone) → audio digitization

- Battery measurement → displaying power percentage

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