**Power Consumption and Battery Life Calculations**

**Component Breakdown**

|  |  |  |  |
| --- | --- | --- | --- |
| Component | Active Time Per Minute | Current (mA) | Average Current (mA) |
| Arduino Uno (active) | 2 seconds | 50 | 1.667 |
| Arduino Uno (sleep) | 58 seconds | 1 | 0.967 |
| Ultrasonic Sensor | 10 ms (0.01 s) | 15 | 0.0025 |
| Moisture Sensor | 1 second | 35 | 0.583 |
| DHT11 Temperature Sensor | 1 second | 2 | 0.033 |
| LCD Backlight (on) | 5 seconds | 10 | 0.833 |
| Relay | 5 seconds every 5 hours | 90 | ~0.005 |
| Buzzer | 2 seconds per watering | 20 | ~0.033 |
| **Total Estimated Average Current** |  |  | **4.1235** |

**Battery Calculation**

**Main Power Bank**

* **Capacity**: 10,000 mAh
* **Effective Capacity** (considering 85% efficiency): 8,500 mAh

**Battery Life**

* **Formula**: Effective Capacity / Total Current
* **Calculation**: 8,500 / 4.1235 ≈ 2,061 hours (85 days)

**Water Pump Battery**

* **Capacity**: 700 mAh
* **Usage**: 5 seconds every 5 hours
* **Active Time per 5 hours**: 0.000278 seconds
* **Average Current**: 0.0834 mA

**Battery Life**

* **Formula**: Battery Capacity / Average Current
* **Calculation**: 700 / 0.0834 ≈ 8,392 hours (350 days)

**Summary of Battery Life**

* **Main System (Arduino + Sensors + LCD)**: ~85 days (2,061 hours) with a 10,000 mAh power bank.
* **Water Pump Battery**: ~350 days (8,392 hours) with a 700 mAh battery.