**Pin Layout**

|  |  |  |
| --- | --- | --- |
| **Component** | **Pin Number** | **Purpose** |
| LCD Display (LiquidCrystal\_I2C) | SDA (A4) | I2C data |
|  | SCL (A5) | I2C clock |
| Ultrasonic Sensor (HC-SR04) | TRIG (Pin 3) | Trigger pin |
|  | ECHO (Pin 2) | Echo pin |
| DHT11 (Temperature & Humidity) | Pin 4 | Data pin for DHT11 |
| Relay (Watering Control) | Pin 5 | Relay control (on/off) |
| LED (Water Level Indicator) | Pin 7 | LED for water level indicator |
| Buzzer | Pin 10 | Buzzer control for signaling completion of watering |
| Soil Moisture Sensor | A0 | Analog input for soil moisture |

**Battery Connections**

|  |  |  |
| --- | --- | --- |
| **Component** | **Battery Connection** | **Current Draw** |
| Water Pump | 700mA Battery (Lithium 7.4V) | 700mA |
| LCD Display, Sensors, Buzzer | 10000mA Battery (Lithium 12V) | Various, Low Current |

**Connections Summary**

**Water Pump (700mA Battery)**

* **Relay Pin (Pin 5):** Controls the water pump through a relay.
* **Relay Module:**
  + **VCC:** Connect to 5V (Relay's power pin).
  + **GND:** Connect to GND (Relay's ground pin).
  + **IN (Input):** Connect to Pin 5 on the Arduino (Controls relay state: HIGH turns on the pump).
  + **Common (COM):** Connect to the negative terminal of the water pump.
  + **Normally Open (NO):** Connect to the negative terminal of the battery.
  + **Normally Closed (NC):** Unused.
* **Water Pump:**
  + Positive terminal → Connect to the positive terminal of the 700mA battery.
  + Negative terminal → Connect to the COM terminal on the relay.

**LCD Display (LiquidCrystal\_I2C)**

* **Powered by:** 10000mA battery.
* **I2C Communication:**
  + **SDA:** Connect to A4 (Data pin for I2C).
  + **SCL:** Connect to A5 (Clock pin for I2C).
  + **VCC:** Connect to 5V on Arduino (or VCC pin on the I2C LCD).
  + **GND:** Connect to GND on Arduino (or GND pin on the I2C LCD).
* **LCD Backlight:** Automatically powered by the 5V supply from the Arduino.

**Ultrasonic Sensor (HC-SR04)**

* **Powered by:** 10000mA battery.
* **Connections:**
  + **Pin 3 (TRIG):** Connect to Trigger pin (TRIG) on the HC-SR04 sensor.
  + **Pin 2 (ECHO):** Connect to Echo pin (ECHO) on the HC-SR04 sensor.
  + **VCC:** Connect to 5V (Power supply for the ultrasonic sensor).
  + **GND:** Connect to GND (Ground for the ultrasonic sensor).

**DHT11 (Temperature & Humidity Sensor)**

* **Powered by:** 10000mA battery.
* **Connections:**
  + **Pin 4:** Connect to Data Pin of DHT11 sensor.
  + **VCC:** Connect to 5V (Power supply for the DHT11 sensor).
  + **GND:** Connect to GND (Ground for the DHT11 sensor).

**Soil Moisture Sensor**

* **Powered by:** 10000mA battery.
* **Connections:**
  + **A0 (Analog Pin):** Connect to Analog Output Pin of the Soil Moisture Sensor.
  + **VCC:** Connect to 5V (Power supply for the moisture sensor).
  + **GND:** Connect to GND (Ground for the moisture sensor).

**LED (Water Level Indicator)**

* **Powered by:** 10000mA battery.
* **Connections:**
  + **Pin 7:** Connect to the Anode (+) terminal of the LED (through a suitable resistor for current limiting, typically 220 ohms to 330 ohms).
  + **Cathode (-) terminal:** Connect to GND.

**Buzzer**

* **Powered by:** 10000mA battery.
* **Connections:**
  + **Pin 10:** Connect to the positive terminal of the buzzer.
  + **GND:** Connect to GND on the Arduino (Ground for the buzzer).

**Power Supply Connections**

**Water Pump Power (700mA Battery)**

* **700mA Battery:**
  + Connect the positive terminal to the positive terminal of the water pump.
  + Connect the negative terminal to the COM terminal of the relay (as described in the relay section above).

**Sensors, LCD, and Buzzer Power (10000mA Battery)**

* **10000mA Battery:**
  + Connect the positive terminal to the 5V pin on the Arduino.
  + Connect the negative terminal to GND on the Arduino.