



Smart Water Quality Monitoring System

A portable water quality monitoring device that measures pH, TDS (Total Dissolved Solids), and temperature in real time. Built with an Arduino Uno, pH sensor probe, TDS sensor, temperature sensor, and an optional LCD display. Data can be logged to an SD card or streamed over serial for further analysis.

📁 Repository Structure

Smart-Water-Quality-Monitoring/

```
|--- README.md          # Project overview, setup, usage  
|--- hardware/         # Wiring diagrams and photos  
|   |--- breadboard_photo.jpg  
|--- docs/             # Detailed specifications and datasheets  
|   |--- sensor_datasheets.pdf  
|--- code/             # Source code  
|   |--- water_quality.ino # Arduino sketch
```

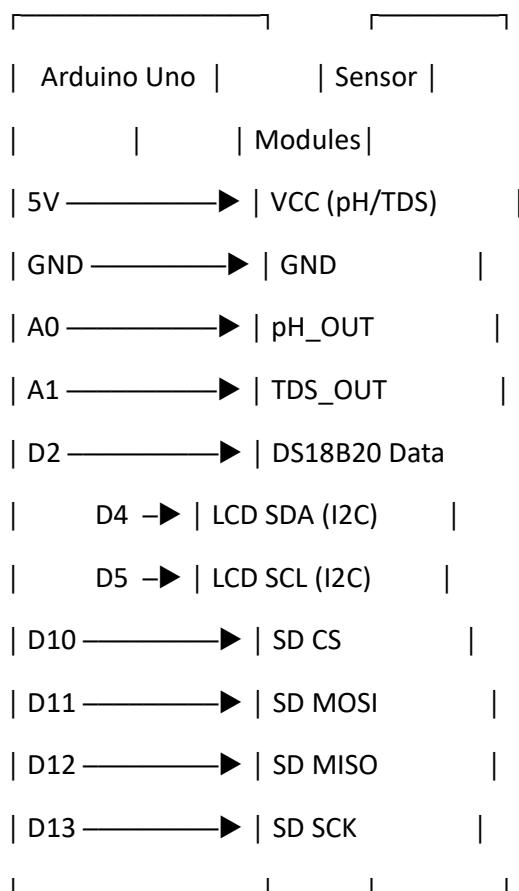
⌚ Project Overview

- **Goal:** Continuously monitor and display water quality parameters (pH, TDS, temperature).
 - **Use Cases:** Aquariums, hydroponics, environmental monitoring, home water testing.
 - **Features:**
 - pH measurement via analog pH probe
 - TDS measurement via analog TDS sensor module
 - Temperature measurement using DS18B20
 - Optional LCD display (I2C)
 - Serial output (USB) and SD card data logging
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✳️ Components List

Component	Qty	Notes
Arduino Uno R3	1	ATmega328P, 5V
pH Sensor Probe + Module	1	Analog output, BNC connector
TDS Sensor Module	1	Analog output
DS18B20 Temperature Sensor	1	1-Wire, waterproof
LCD 16x2 with I2C Adapter	1	Optional, I2C address 0x27
SD Card Module	1	SPI interface (CS, SCK, MOSI, MISO)
Breadboard & Jumper Wires	Set	
Power Supply (5V)	1	USB or battery pack

Hardware Wiring



- **pH Probe:** BNC → pH board → analog A0

- **TDS Module:** VCC/GND → 5V/GND, analog → A1
 - **DS18B20:** Data on D2 with 4.7kΩ pull-up to 5V
 - **LCD I2C:** SDA→A4, SCL→A5
 - **SD Card:** CS→D10, MOSI→D11, MISO→D12, SCK→D13
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Software Setup

1. **Arduino IDE** (or VSCode with PlatformIO)
 2. Install libraries via Library Manager:
 - OneWire
 - DallasTemperature
 - LiquidCrystal_I2C
 - SD
 3. Open code, configure pin definitions if needed.
 4. Upload to Arduino Uno.
 5. Open Serial Monitor at 9600 baud.
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Usage

1. Connect all sensors and SD module per wiring.
 2. Power the Arduino via USB or external 5 V.
 3. View readings on LCD and Serial Monitor.
 4. Retrieve datalog.txt from SD card for analysis.
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