THE

# electronics-lab
.com

# from ideas to
# boards

# Liquid-Level Monitoring Using a Pressure Sensor, Bar-Graph Display

SKU: EL140979

# Liquid-Level Monitoring Using a Pressure Sensor, Bar-Graph Display

This project allows users to monitor the liquid level on a Bar-Graph display. The liquid level is measured using a pressure sensor, the sensor is placed on top of the tank and is connected to an open-ended tube that is submerged in the water tank. The amount of water in the tank creates a proportional amount of pressure on the sensor via the trapped air in the tube. The pressure sensor produces an equivalent output voltage. This voltage is monitored by the ADC of ATMEGA328 microcontroller and displayed on a bar-graph of 16 LEDs connected to the I/O pins of the microcontroller. The project is based on an Arduino-compatible microcontroller. Example code is written using Arduino IDE and is provided below. This project can measure water levels up to 100 cm (1m). Users may use other LED colors. Trimmer potentiometer PR1 is optional for other applications, turn full CW.

MPXV5010DP pressure sensor from NXP is used to measure the liquid level. This is an analog pressure sensor and the output of this sensor is 0.2V to 4.7V which is proportional to the applied pressure range of 0-10kPa (0 to 1.45PSI). We have used MPXV5010DP which has dual ports, but a single port sensor can also be used.

## FEATURES

- Power Supply 5V DC
- 16 LEDs Display the Liquid Level
- Liquid Level Measurement up to 100Cm
- 2 X 3MM Mounting Holes
- PCB Dimensions 111.71X28.89MM
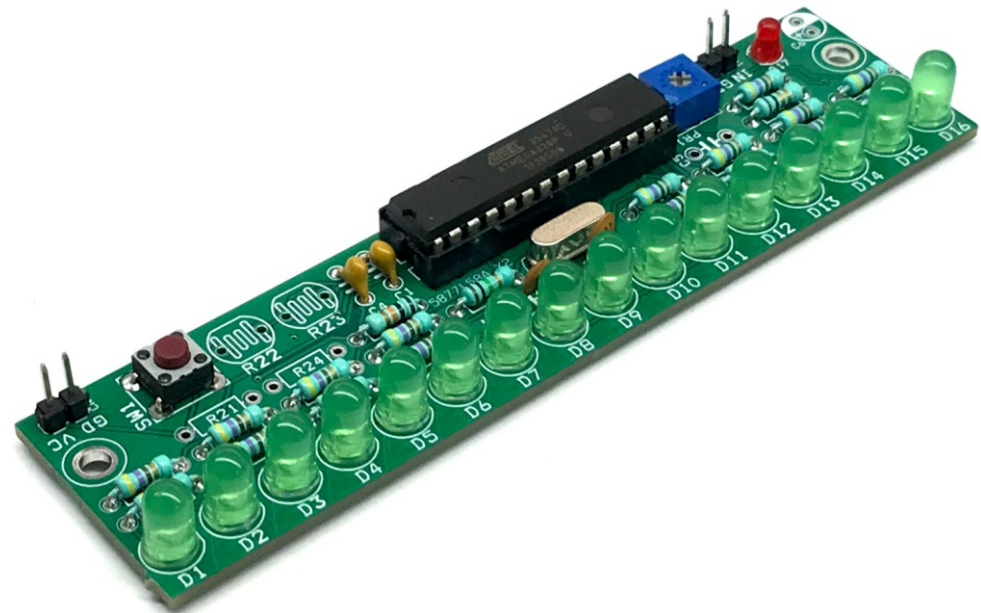
The MPXV5010DP series piezoresistive transducers are state-of-the-art monolithic silicon pressure sensors designed for a wide range of applications, particularly those employing a microcontroller or microprocessor with A/D inputs. This transducer combines advanced micromachining techniques, thin-film metallization, and bipolar processing to provide an accurate, high-level analog output signal that is proportional to the applied pressure. The axial port has been modified to accommodate industrial-grade tubing.

## ARDUINO HARDWARE

Arduino Code is available as a download and the code can be uploaded using Arduino UNO. The user will be able to display a 100cm water level, divided by 16 LEDs. The user can map analog value vs 16 LEDs as per requirement.

> **Info:** The Arduino-compatible board contains a few optional components, and the same hardware can be used for other applications as per user requirements.
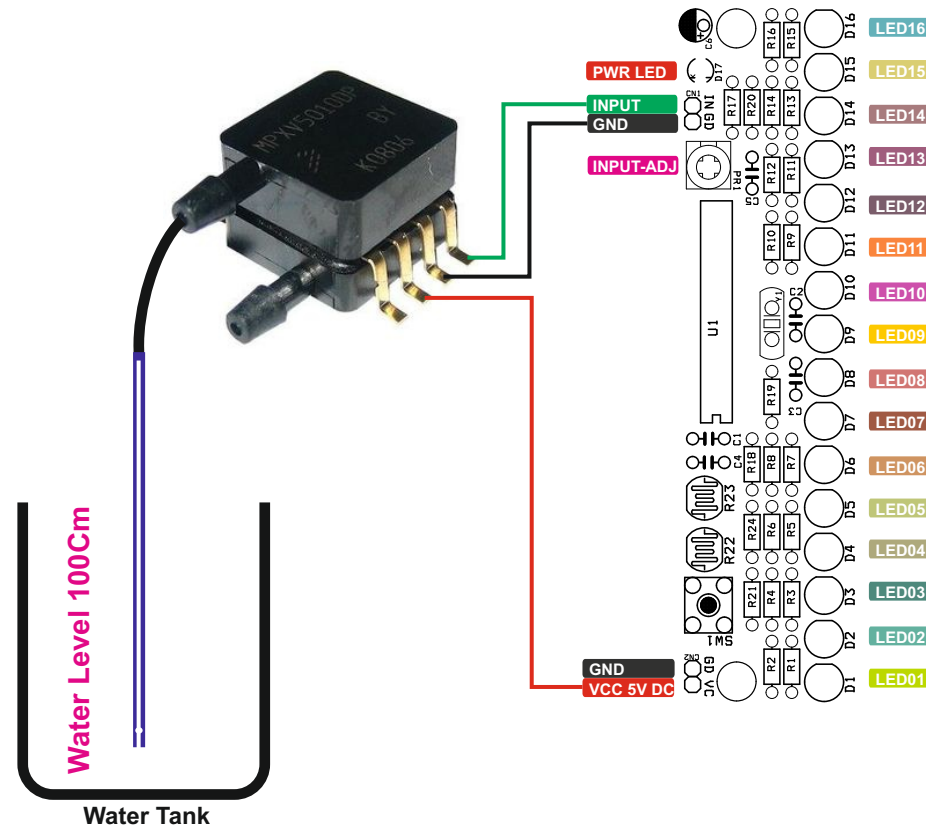
## APPLICATIONS

- Temperature Monitor
- Humidity Monitor
- Voltage Monitor
- LED Light Effects
- Gaming
- Battery Level Monitor
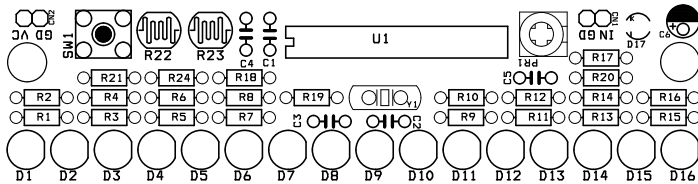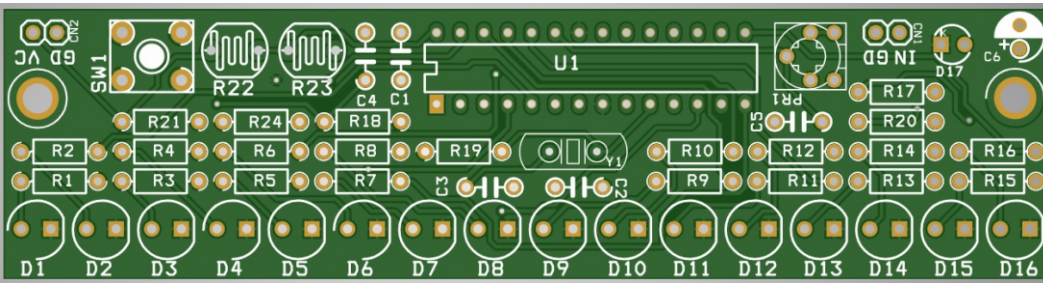- Current Monitor
- Tilt Monitor
- Light Monitor

Open Source Hardware Projects
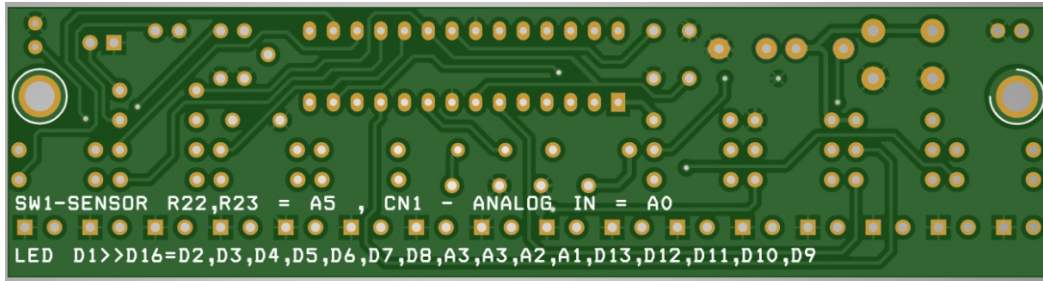
# Schematic

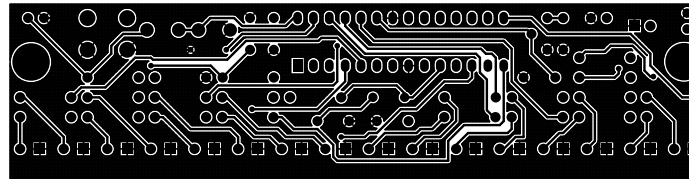# Connections



**Water Level 100Cm**

**Water Tank**
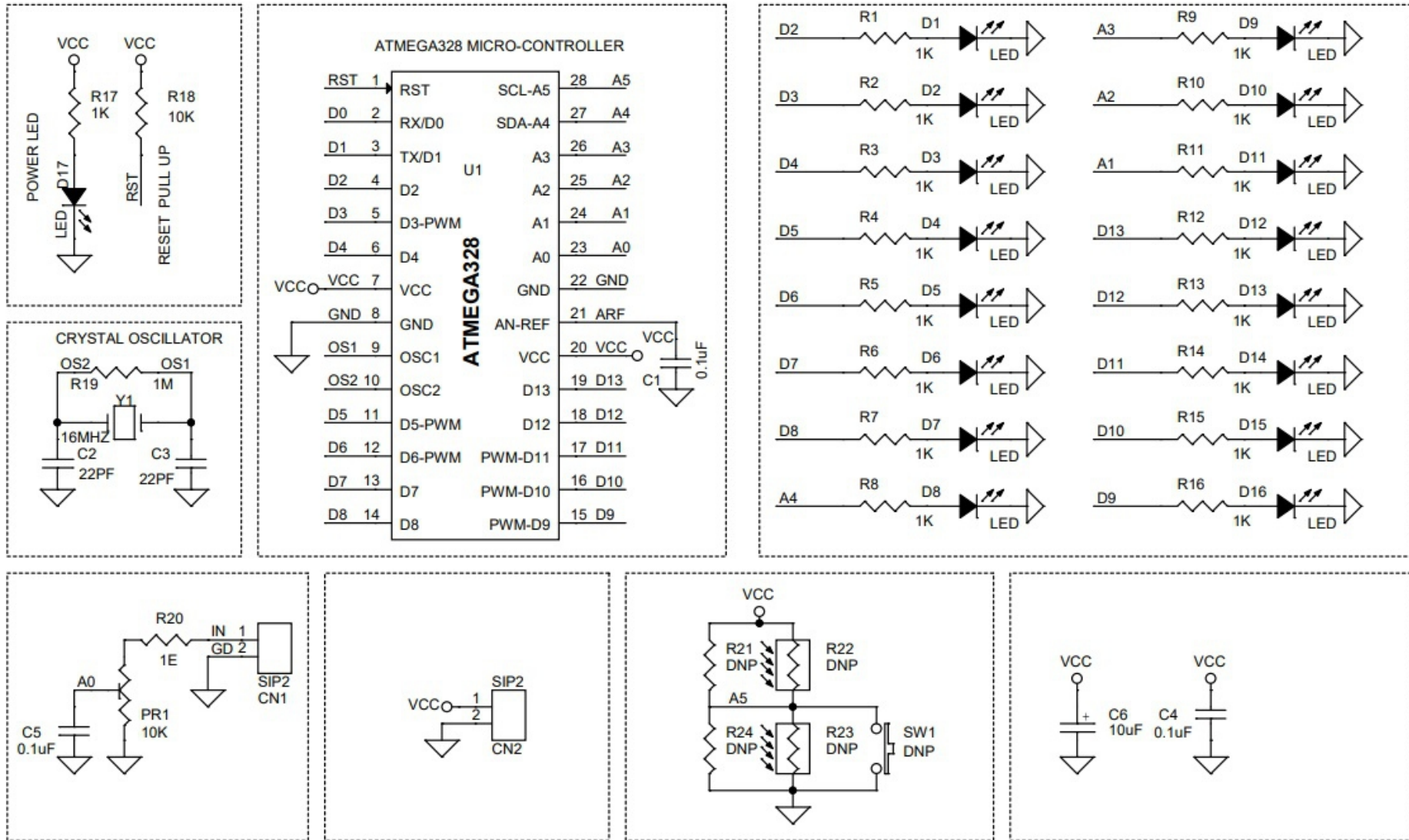
## Connections and Other Details

- CN1: Pin 1 = Sensor Input Arduino A0, Pin = GND
- CN2: Pin 1 = VCC 5V DC, Pin 2 GND
- LED D2 to D16 LEDs, Bar-Graph
- D1 LED: Power LED
- R22, R23: Sensor, Optional (Not used in this application) , NTC, LDR or any other sensor
- Sw1: No Use, Optional

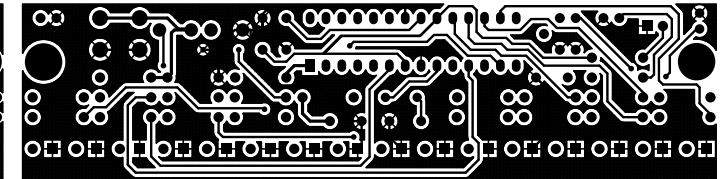Open Source Hardware Projects
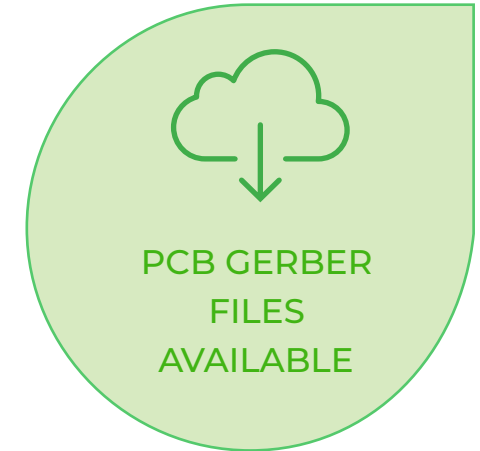
# PCB



SW1-SENSOR R22,R23 = A5 , CN1 - ANALOG IN = A0

LED D1>>D16=D2,D3,D4,D5,D6,D7,D8,A3,A3,A2,A1,D13,D12,D11,D10,D9

PCB GERBER FILES AVAILABLE



SILK SCREEN TOP

BOTTOM LAYER

TOP LAYER

**PCB DIMENSIONS 111.71X28.89MM**

# Parts List

| BOM | | | | | | |
|---|---|---|---|---|---|---|
| BOM | QNTY | REF | DESC | MANUFACTURER | SUPPLIER | SUPPLIER PART NO |
| 1 | 2 | CN1,CN2 | 2 PIN MALE HEADER PITCH 2.54MM | WURTH | DIGIKEY | 732-5315-ND |
| 2 | 3 | C1,C4,C5 | 0.1uF/16V CERAMIC SMD SIZE 0805 | YAGEO/MURATA | DIGIKEY | |
| 3 | 2 | C2,C3 | 22PF/25V CERAMIN DISC THT | YAGEO/MURATA | DIGIKEY | |
| 4 | 1 | C6 | 10uF/25V ELECTROLYTIC | YAGEO/MURATA | DIGIKEY | |
| 5 | 16 | D1,D2,D3,D4,D5,D6,D7,D8,D9,D10,D11,D12,D13,D14,D15,D16 | LED GREEN 5MM | KINGBRIGHT | DIGIKEY | 754-1263-ND |
| 6 | 1 | PR1 | 10 TRIMMER POTENTIOMETER | BOURNS | DIGIKEY | 3362P-103LF-ND |
| 7 | 17 | R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15,R16,R17 | 1K OR 470E 5%  1/4W THT | YAGEO/MURATA | DIGIKEY | |
| 8 | 1 | R18 | 10K 5% THT 1/4W | YAGEO/MURATA | DIGIKEY | |
| 9 | 1 | R19 | 1M 5% 1/4W THT | YAGEO/MURATA | DIGIKEY | |
| 10 | 1 | R20 | 1E 5% 1/4W THT | YAGEO/MURATA | DIGIKEY | |
| 11 | 5 | SW1,R21,R22,R23,R24 | DNP | | DIGIKEY | DO NOT INSTALL |
| 12 | 1 | U1 | ATMEGA328 DIP28 | MICROCHIP | DIGIKEY | ATMEGA328-PU-ND |
| 13 | 1 | Y1 | 16MHZ | ECS INC | DIGIKEY | X1103-ND |
| 14 | 1 | SOCKET FOR MICROCONTROLLER ATMEGA328 | 28 DIP NARROW SOCKET | ON SHORE TECH | DIGIKEY | ED3050-5-ND |
| 15 | 1 | D17 | RED LED 3MM | KINGBRIGHT | DIGIKEY | 754-1895-ND |

Open Source Hardware Projects

# Notes

## APP

—

### Android App

DOWNLOAD

Android App launched in 2017 and has 100k+ downloads - rated with 4.5 stars.

**SCAN QR CODE**

# Keep
# In touch..

## electronics-lab
.com

## from ideas to **boards**