

Circuit Diagram

The circuit diagram consists of 1 main PCB and 8 other PCBs that indicates the level of each liquid container.

Level indicator PCBs: Our designed project has the box for the electronics (front) far away from the pumps and solenoids (back), therefore for each container we need to put the ultrasonic sensor to read the liquid level and the LEDs to display it for the user. For this reason, it was created 8 separate PCBs with the LED and ultrasonic sensor included, which are able to communicate with the main PCB compatibles cables connected between the headers installed on the level indicator PCB and the main one. Inside of every one of these blue rectangles, there is a note written in blue also which clarifies which header of the level indicator PCB should be connected to the main one.

Main PCB: The main PCB is composed mainly of the DC/DC converter, MOSFETs, microcontroller and the headers to connect to the small PCBs. Here, the headers J9 and J10 are meant for the pump 1 and 2, while the headers J11 to J20 are for the solenoids. The pumps and solenoids are controlled by a MOSFET which is connected to the microcontroller pin that can produce a PWM signal in order to control the speed and power. Headers J21 to J28 are connected to the level indicator PCBs according to the following table 1.

Connector from level indicator PCB	Connector from main PCB
J1	J21
J2	J22
J3	J23
J4	J24
J5	J25
J6	J26
J7	J27
J8	J28

Table 1

Besides from these main components and connectors, there is the crystal oscillator to set the clock frequency, the display to interact with the user and the DC/DC converter. The switch, power supply and connector J29 (AC power entry connector) are not connected to the main PCB, but screwed into the enclosure.

