MINI PROJECT ON

"SMART WATER TANK PUMP SWITCHER"

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Smart Water Tank Pump Switcher

Abstract:

For the residents who live in rural-areas, limited water-availability is a very common problem. Therefore, many people install a water tank on the roof of the building.

The water, stored in a water tank at the basement (ground) is pumped into the water tank on the roof using a pumping motor.

In this manner, the limited water-availability problem can be improved, and the water can be used in a more efficient way if an automatic water tank pump controller is included in the setup.

- Microcontroller Unit: The designed circuit shown here includes an Atmega328P-PU as the kernel, a number of LEDs to display the system status, a push button switches for auto/manual mode selection, an electromagnetic relay as the driver of the pumping motor, and a few other external components.

- Water Level Sensors: The roof (overhead) water tank level sensor is nothing, but a

(readymade/homemade) reed-switch actuated vertical-mount (2-point level) float switch consists of low and high-water level sensors, placed at two different heights in the overhead water tank. The basement water tank level sensor is another simple (1-point level) float switch, added as a dry-run protector.

System Description:
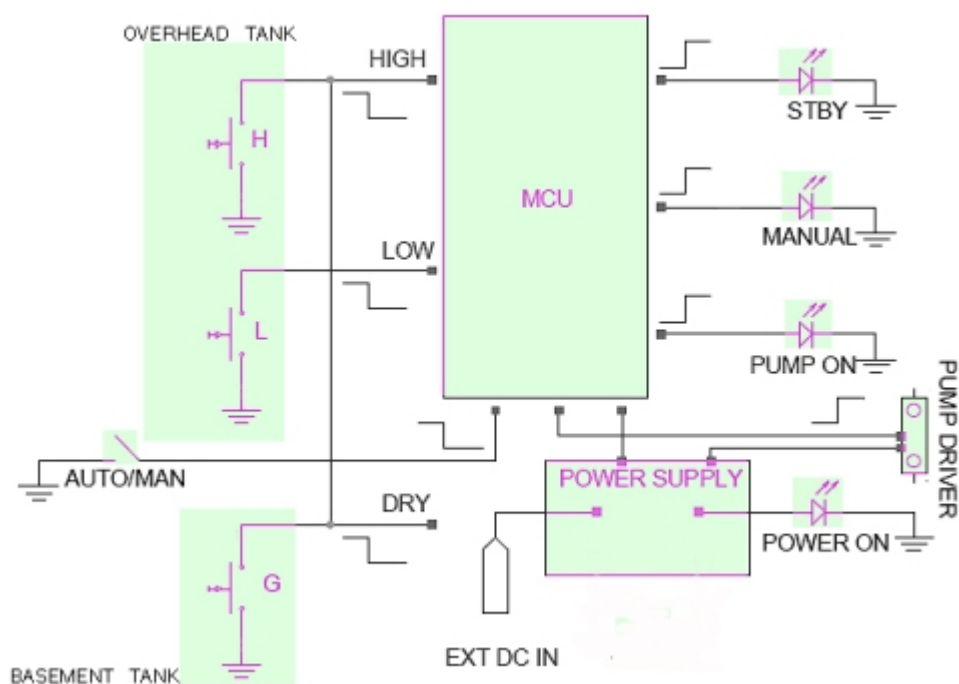
As stated, to read the water level of the overhead water tank there are two sensors, one for low level (L) and the other for high (H) level.

Try to use a magnetic float switch that activates two reed sensors so that the float (with magnet) should terminate its travel in front of L and H reed sensors pump is deactivated. Now the PUMP ON indicator goes off, and the STANDBY indicator lights up again

. Water pump is reactivated only when water drops back to L level.

Circuit Description:
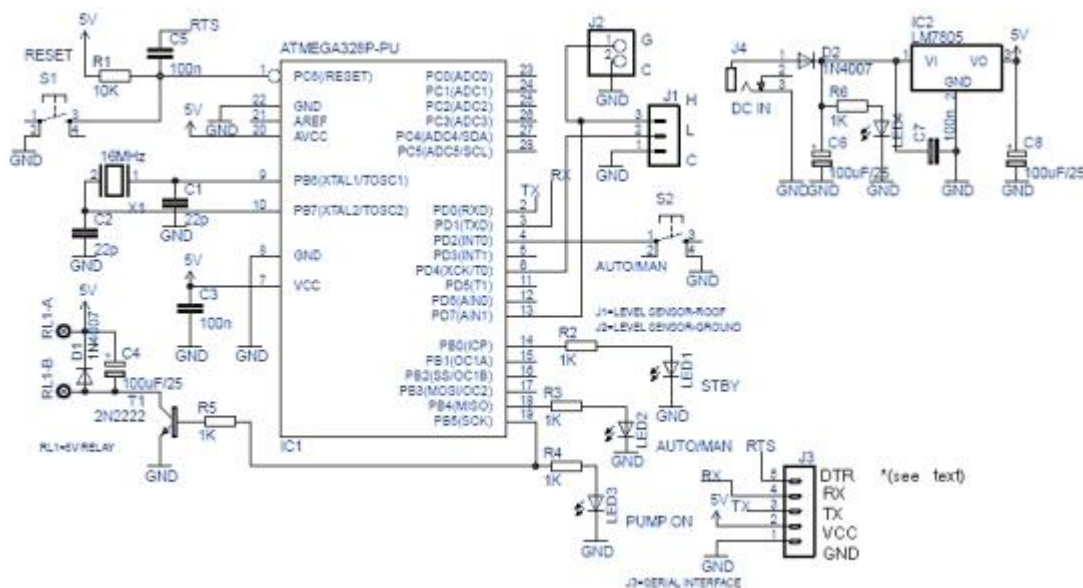
- The Atmega328P-PU (IC1) chip in this circuit is in fact an Arduino UNO chip, that is to say IC1 holds a small code prepared & processed using Arduino IDE.
- Switch S1 is the traditional reset switch as found in the Arduino board. Here, ports PD2, PD4 and PD7 of

IC1 (D2, D4, D7 of Arduino) are configured as input ports, and ports PB0, PB4 and PB5 (D8, D12, D13 of Arduino) are configured as output ports.

- PD2 port is connected to the AUTO/MAN mode selector switch. Water level sensors are read by ports PD4 and PD5.

- Port PB5 is used to control the water pump motor through a heavy-duty electromagnetic relay (RL1) with the help of the driver transistor (T1).

- Rest of the output ports (PB0 & PB5) are used to drive the system status indicators (LED1 & LED2).

Software Description

- From the circuit diagram (hardware), one can find that very few external components are needed.

- Moreover, one can also find that the software is very easy to be modify if more functions are to be added

- . This will increase the flexibility and liability of the design.