

# Hardware Software Interfacing

## Milestone #1

### Project Definition

#### Smart Dispenser using Digital Valve Positioner

#### Purpose of the Project

In this project we are designing a smart dispenser which uses our digital valve positioner which is used to control the flow rate of a fluid in an efficient way which includes the control of down tank pump with a good mechanical setup for the positioning.

This can be used at any place where the flow rate should be controlled more precisely.

When the user turns the electronic control knob (the flow rate scale with units, embossed around the knob of the flow control) to the level he wants to and the process starts,

- The **DC motor** connected with the fluid tank starts to pump the fluid with the suction rate depending on the set flow rate with the help of scaling formula.
- For an indication purpose, a **multi color LED** will glow in a particular color depending on the set flow rate with the scaling calculations.
- Now the **valve positioner** which is connected at the end point where the fluid has to be dispensed, will spin to a certain angle for a period of time depending on the set flow rate and now the fluid now starts to dispense. This is made possible with the help of a stepper motor
- Once the dispensing process is done, the suction pump stops right away.
- The **valve positioner** goes back to the original position where it was before.
- The indication light will go off.

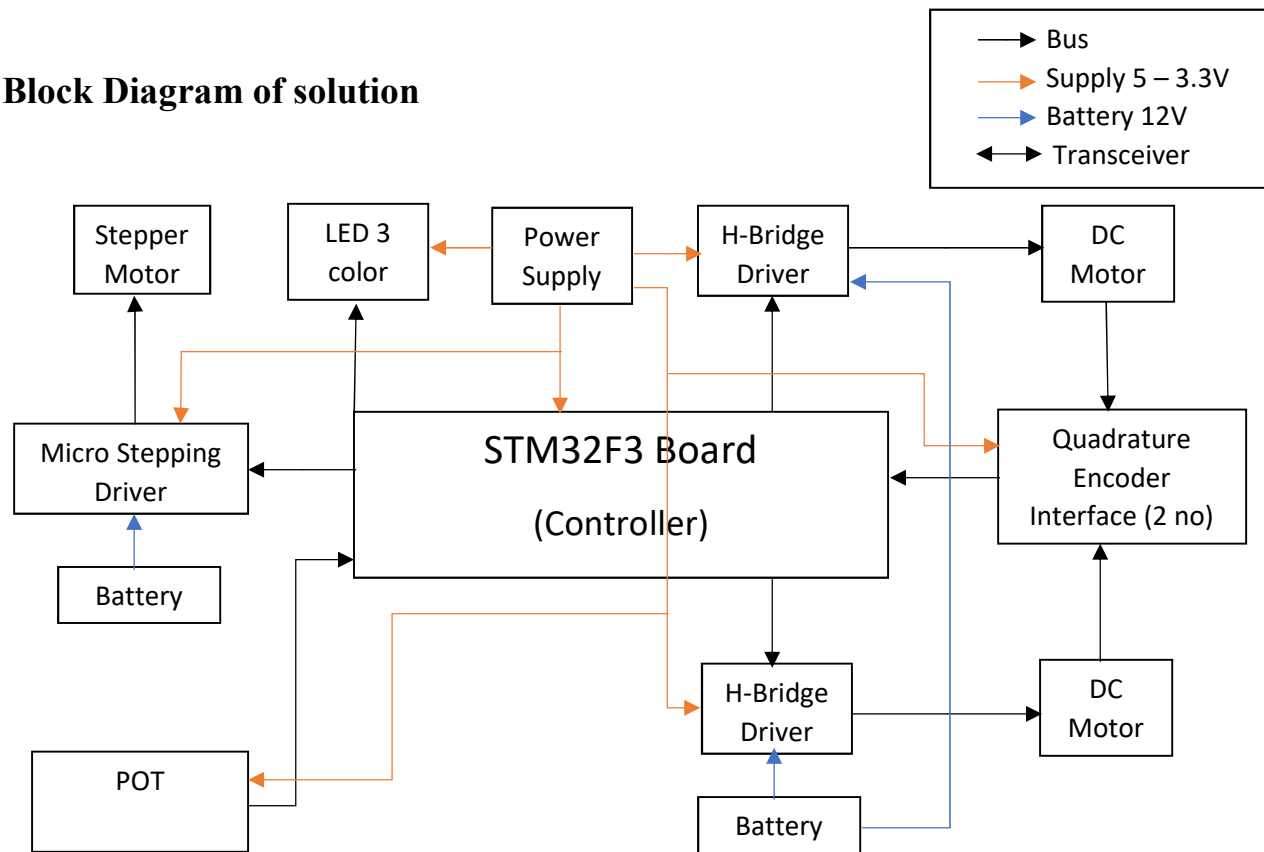
All the timing calculations are prefixed and made precisely with some scaling formulas.

#### Scope of the Project

In this project all the dispensing level are calculated with the help of timing and speed, there will be no other sensors to cross check the flow rates of the fluid. So to make it more precise some level switches should be placed in the fluid tank to check whether the fluid is available or not and a magnetic pickup or other flow rate sensor should be placed to cross check the flow rate matches the set flow rate.

Since we are dealing with pumps, valves and other mechanical things, we should concentrate more on the mechanical setup and the calculations of each item should be correct and should match with the physical world and units. Calibrations should be made frequently.

## Block Diagram of solution



## Intended Audience

This project can be used in different field and application where people need a control in flow rate of a fluid. The following are the field and application where this system can be implemented,

- Petrol stations
- Bio-medical industries
- Chemical industries
- Hospitals
- Hand wash pipes
- Power plants
- Oil and gas industries
- Automobile industries

There is really huge application available worldwide in for this system with adding all the other functionalities and components which are mentioned in the scope of the project.