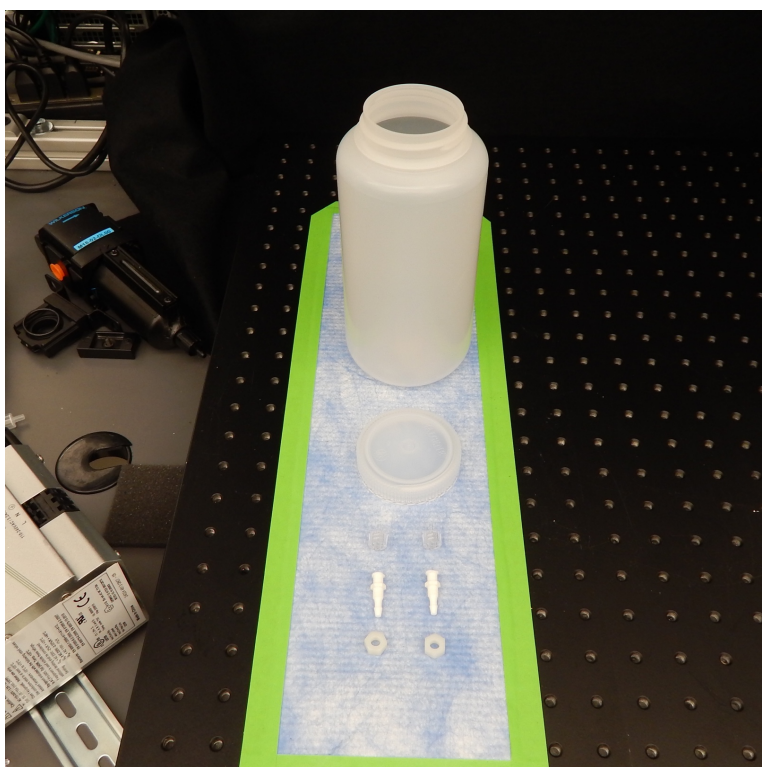


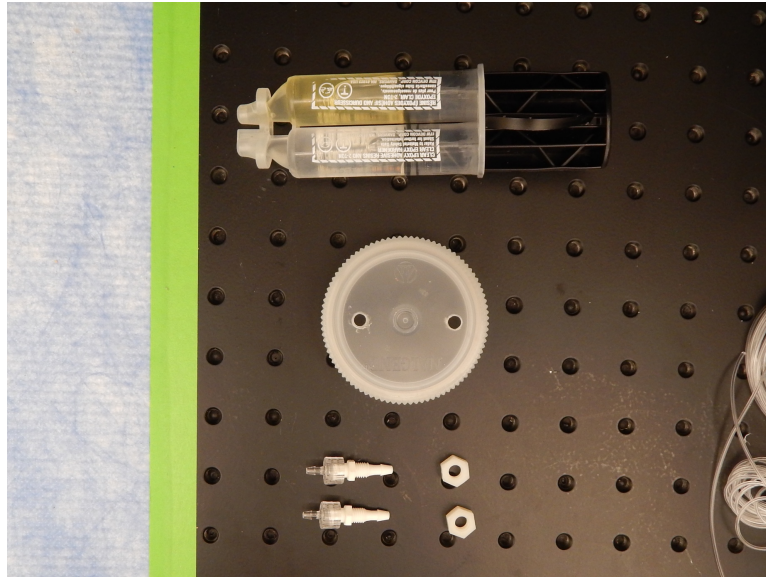
Step-by-Step Build Setup Guide # 4

Pneumatic Control System Module 4: Control Reservoir Loading Assembly

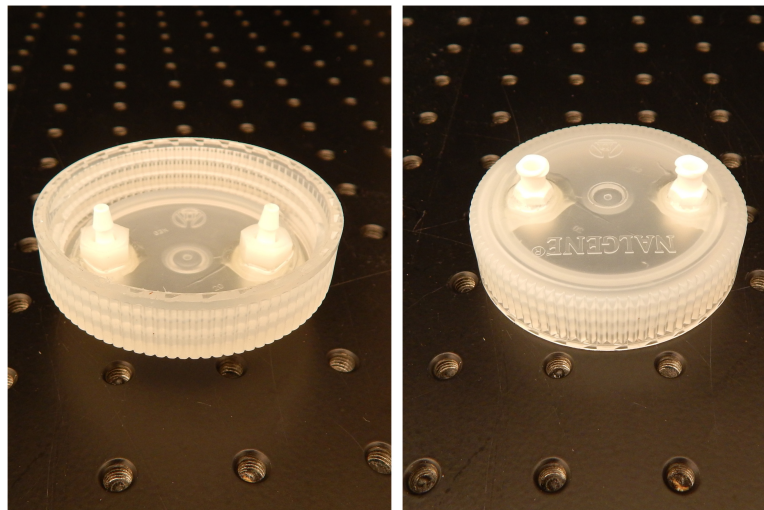
1. Begin by assembling **Parts i-k** and **Parts M, H, J, I** for the water reservoir assembly. This assembly is used to load the water reservoirs of the control manifolds built in **Module 3**. The reservoirs (**Module 3**) are then pressurized when the manifolds are in the active state. The water is pushed into the control lines and, eventually, control channels in the chip to actuate on-chip valves. This assembly replenishes lost water during device operation.



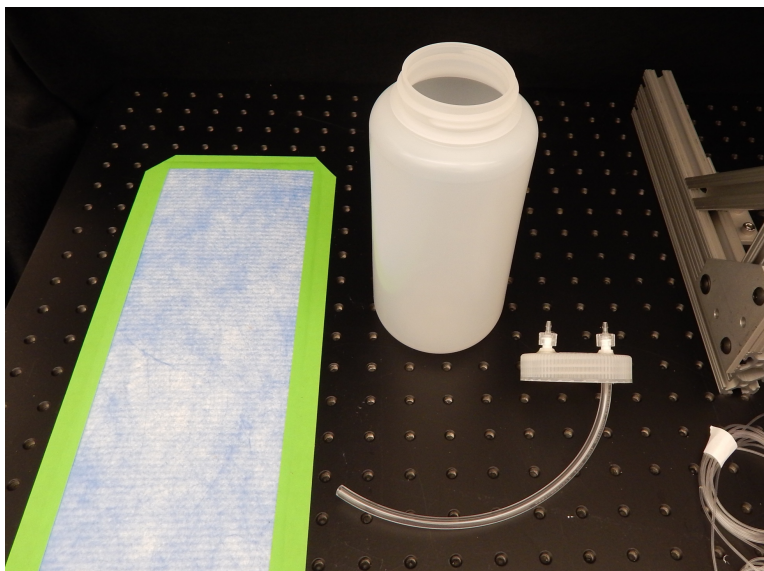
2. Using a drill cut out two 1/4" holes through the cap of the Nalgene bottle, **Part j**. Assemble one set of male integral ring (**Part M**) and female luer to barb (**Part J**) connectors and one set of male integral ring, Series 400, (**Part H**) and female luer to barb (**Part J**) connectors, according to the schematic.



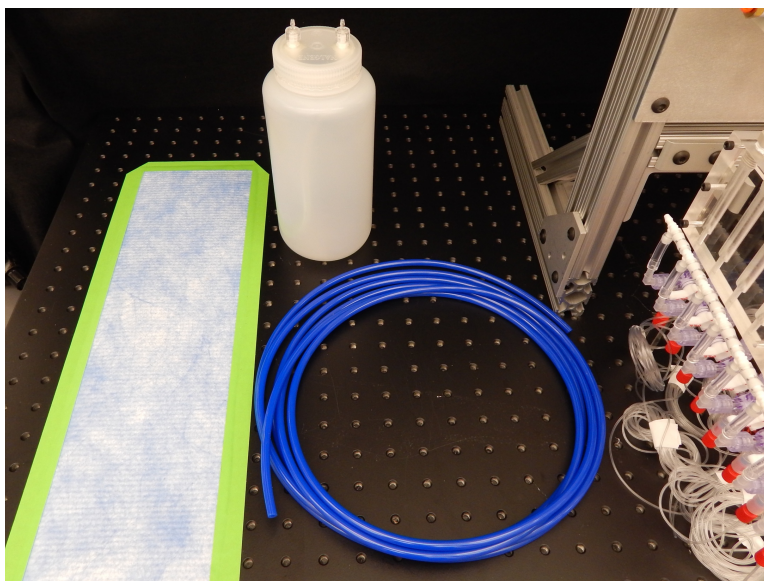
3. Feed the **Part M** and **J** assembly through the cap on both sides and lock with the Nylon hex nut (**Part i**) as shown below, such that the female luer $\frac{1}{4}$ " connector is facing outward from the cap (note: **Part M** was removed for purposes of demonstration). Apply epoxy or Super Glue to seal the holes on both sides of the cap. This helps prevent leaks. Let dry 1 hour.



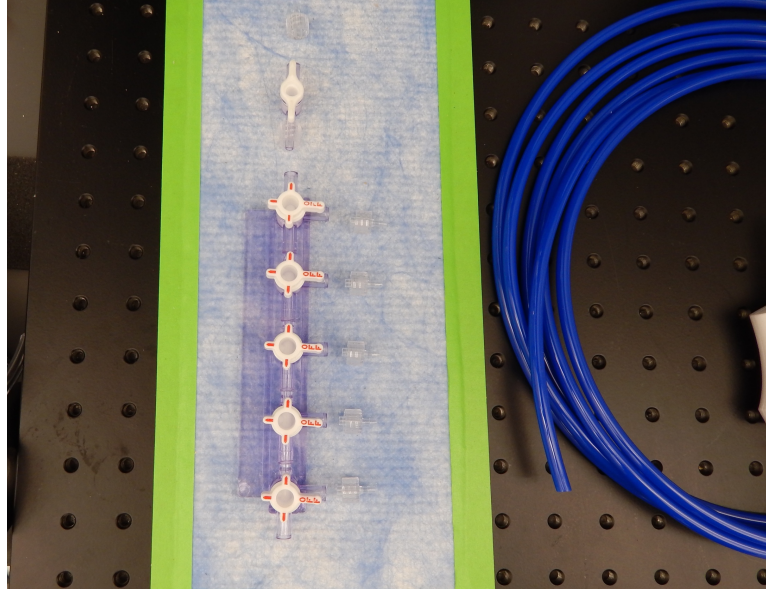
4. Attach ~4" of **T2 Tubing** to one side of the bottle on the inside of the cap as shown. Note the side you choose.



5. Assemble the Nalgene bottle (**Part j**) and cap assembly, noting the side with the tubing. This side will be used as a straw for moving water to load the control reservoirs while the other side will be used as a pressurization port to pressurize the bottle for pressure-driven loading when connected to a regulator.

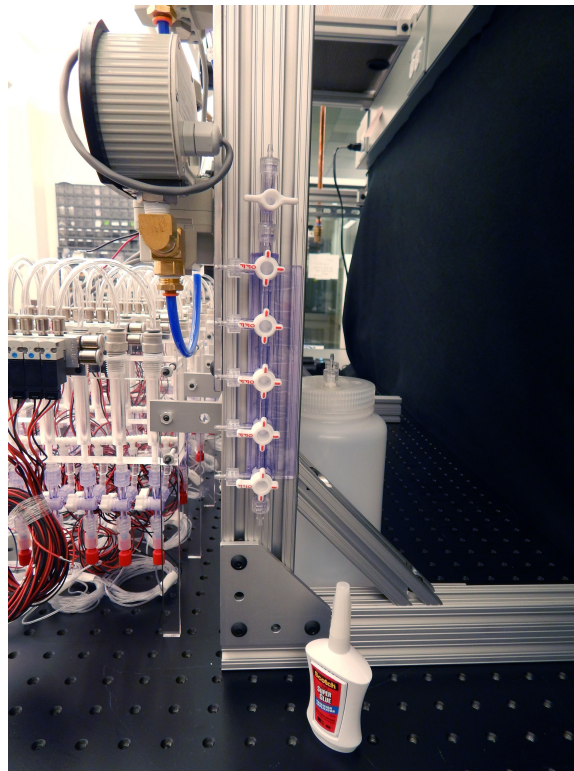


6. Assemble a 5-way manifold (**Part k**) and 1-way stopcock assembly (**Parts I, H**). Connect male integral rings (**Parts M**) to each outlet as shown below. Assemble according to the Module schematic. Scale accordingly to the number of control manifolds you chose to build in **Module 3** (each stopcock controls 1 manifold).



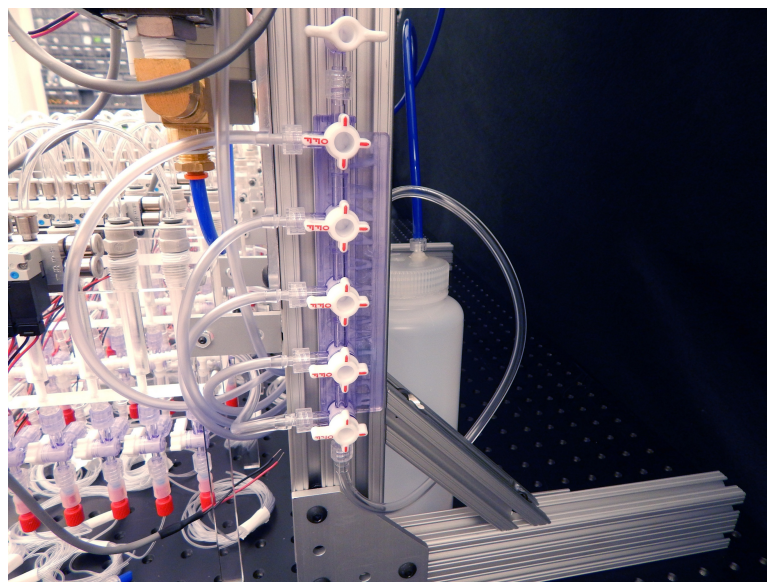
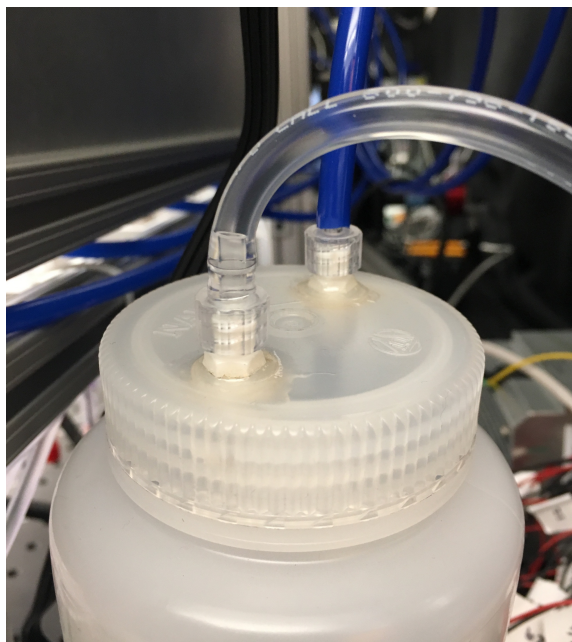
7. Using epoxy or Super Glue mount the assembly to the right 80/20 rail closest to the digital gauges.

(!) Tip: We use Scotch Super Glue or High Performance repair glue for mounting this assembly directly to the 80/20. We've also had success with 2-Ton epoxy, but not 30-minute fast-dry epoxies.



Module 4 Guide: Control Loading Assembly

8. Connect **T2 Tubing** to from the bottle connector that contains the ‘straw’ to the bottom of the assembly as shown. Connect **T1** tubing from the bottle to left Regulator 3 (Control Loading Regulator) of **Module 1** as shown in the schematic. This regulator will be used to pressurize the control reservoir loading. Connect **T4** tubing from each stopcock of the 5-way manifold and the end of the 1-way stopcock to the loading port of the Control Manifolds built in Module 3. Write down the manifold order of connections to use when loading the reservoirs. Each stopcock loads water to 1 manifold. You will load the water into the reservoirs in the **Operation Guide**.



You're finished with Module 4!