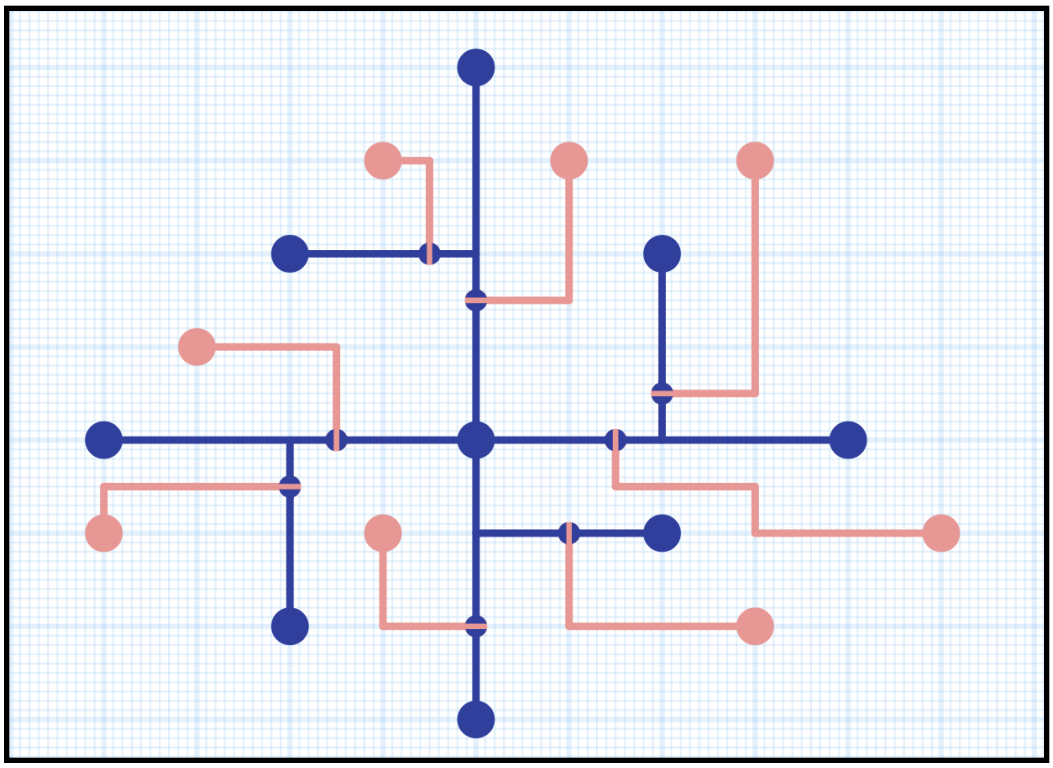
TERRA ADAPTER 3 OUTPUT CONTINUOUS FLOW SYSTEMS

Table of Contents

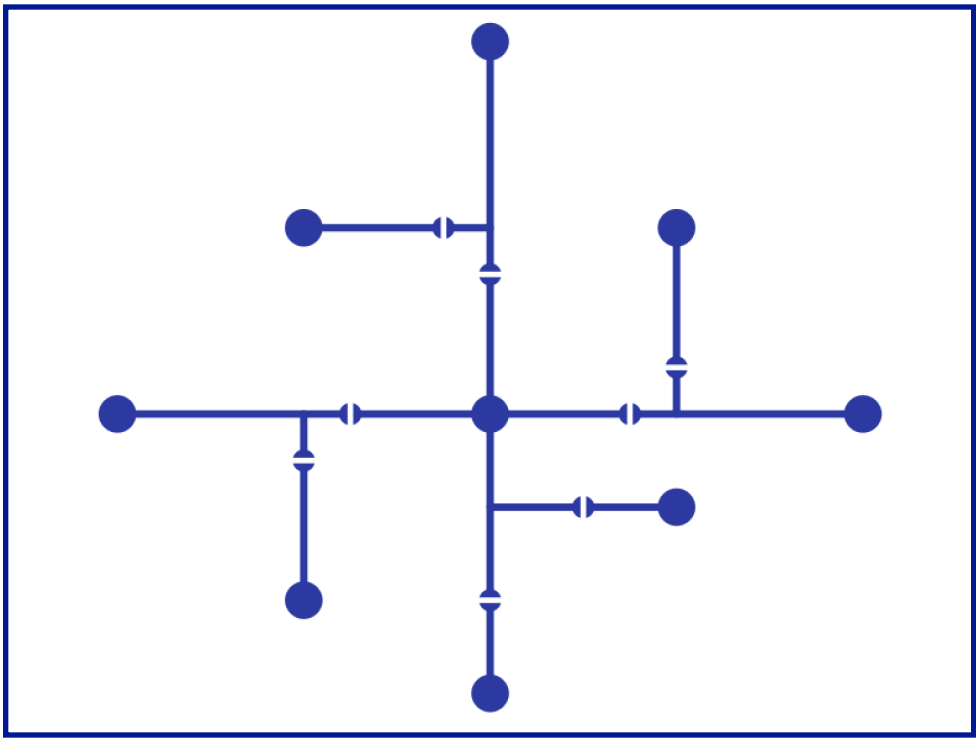
Overview



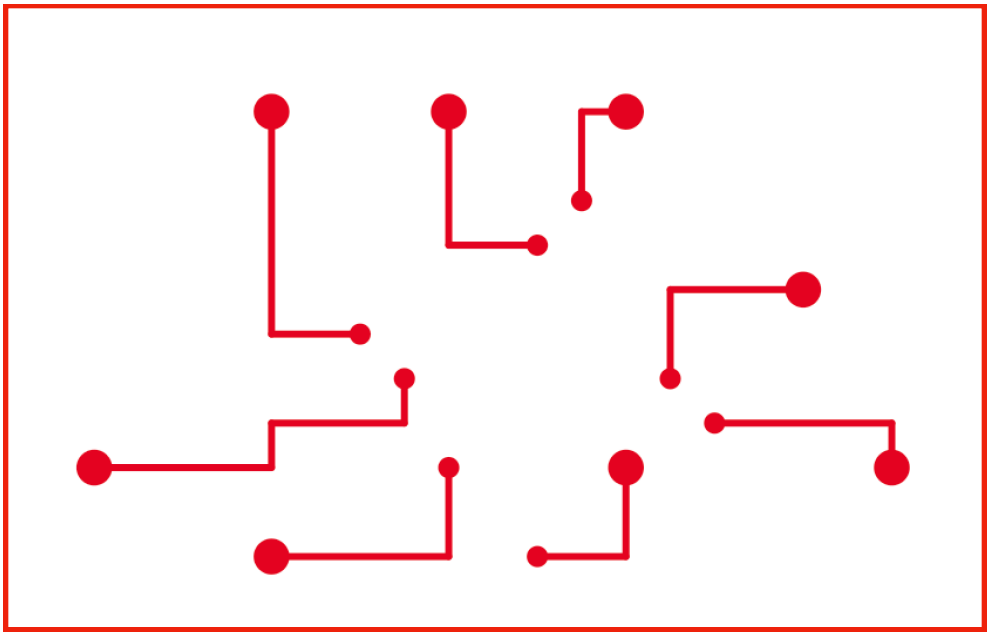
The TERRA Adapter is a scalable, predesigned chip that is capable of selectively dispensing the output of the microfluidic chip running the experiment into the intended lab vessel. The TERRA Adapter serves to increase the number of and types of microfluidic chips that are compatible with our system. This makes the system more user-friendly, as the user doesn't have to design a chip that both completes a biological experiment and is capable of selecting the proper output to be dispensed.

This chip is the TERRA Adapter for three output, droplet-based experiments. The outputs of your experimental microfluidic chip are the inputs of the TERRA Adapter. This chip controls when the desired output is dispensed into the wells of the plate, and when it is directed to waste. This gives direct control over when droplets are being dispensed so as to not continually drip the output and thus contaminate the samples.

Chip Design

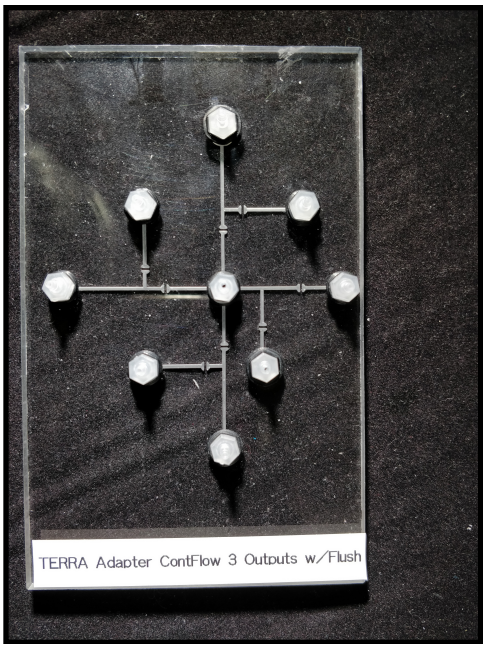


Flow Layer

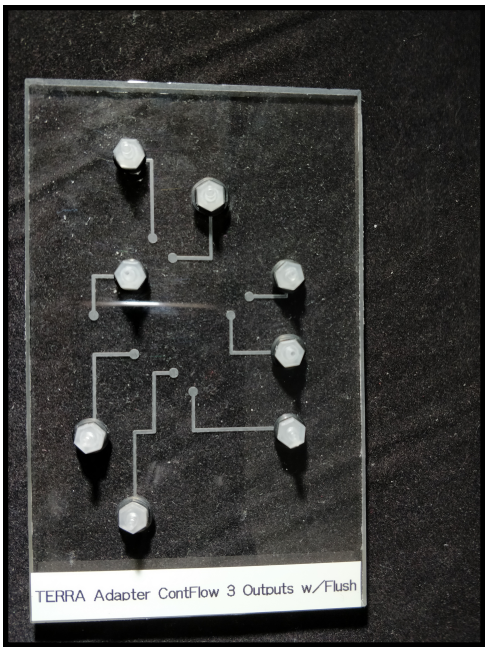


Control Layer

Milling Instructions



Flow Layer

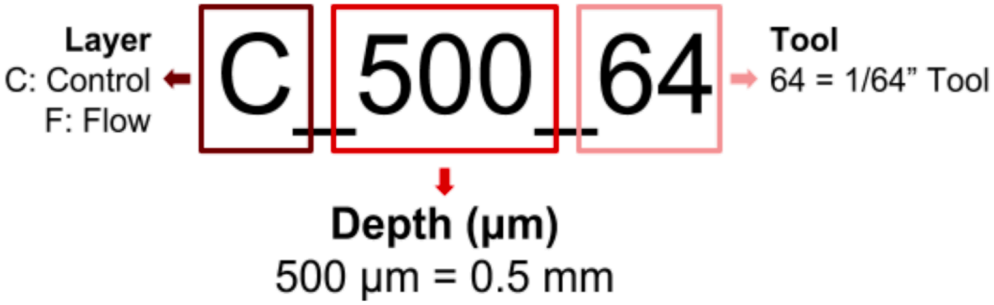


Control Layer

Notes:

- This chip should be milled on thick polycarbonate (5.00mm < $Z_{Polycarbonate}$)
- This chip should be used with thin PDMS (0.24mm < Z_{PDMS} < 0.26mm)

All the required SVGs for milling this chip are provided in the ZIP file. The layer, depth, and tool required for each SVG are listed in the file name. Below is the key describing how to read an SVG file name.



Milling Instructions

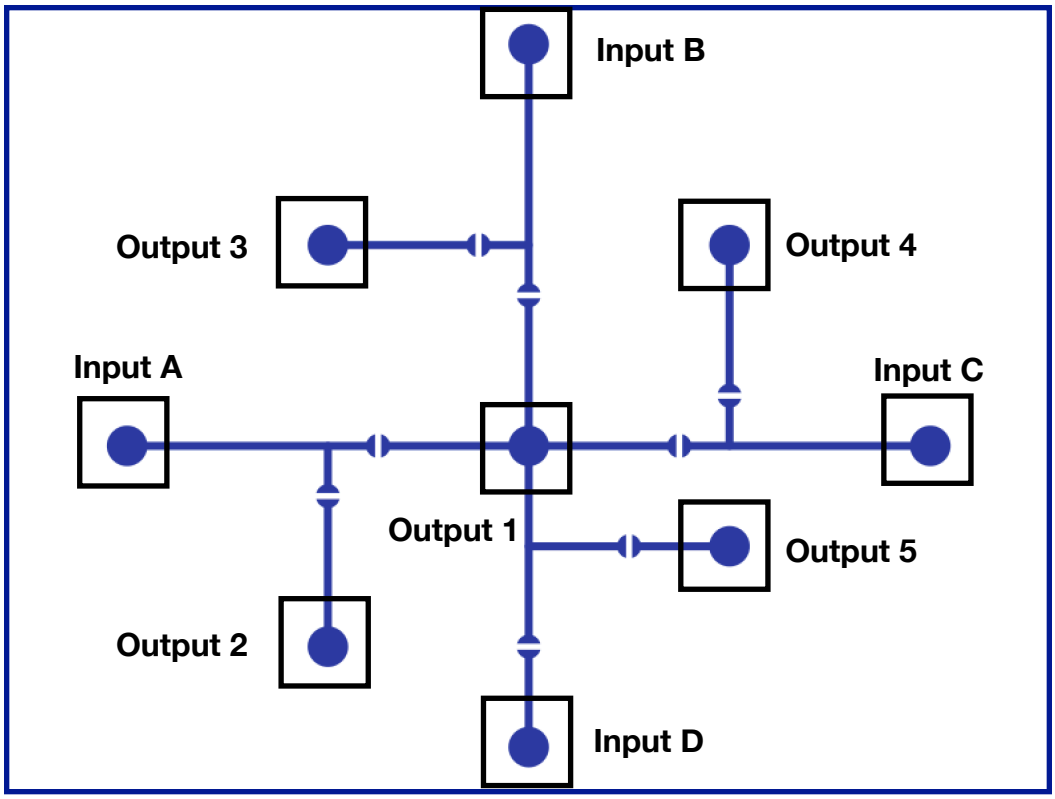
Mill the layers in the order they are listed with the correct depths and using the correct tool

Flow Layer	
Order	**Layer Name**
1	F_1000_32
2	F_1000_64
3	F_100_100
4	F_THRU_8
5	Border

Control Layer	
Order	**Layer Name**
1	C_100_32
2	C_THRU_8
3	Border

Testing Protocol

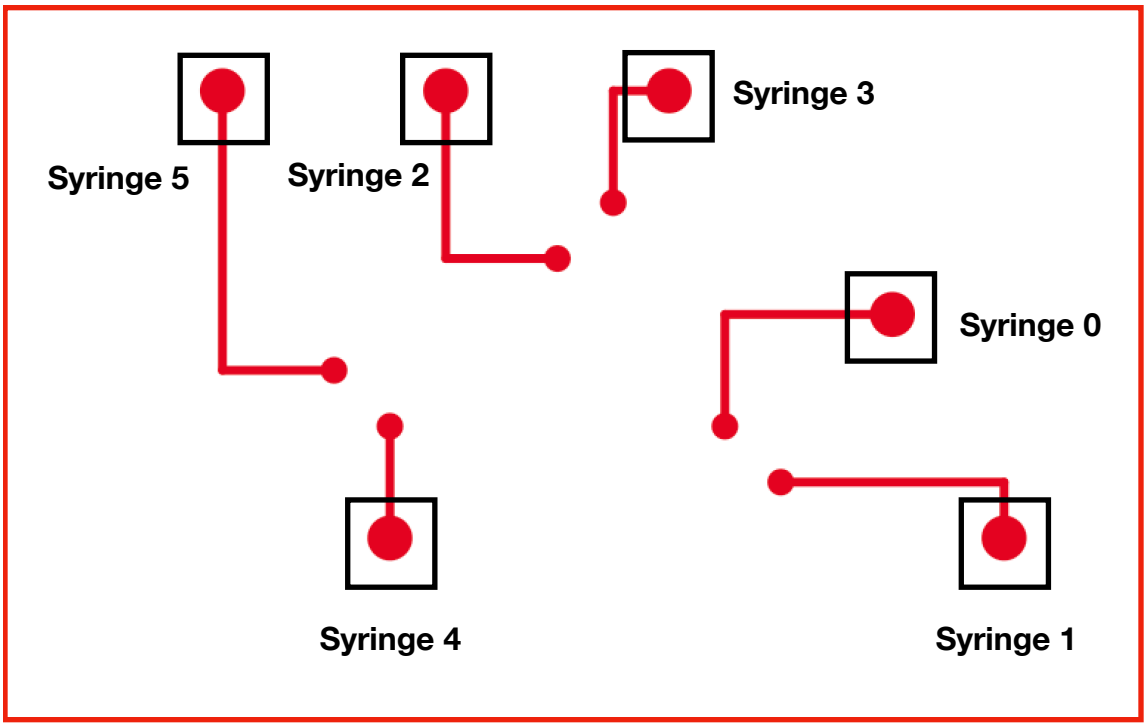
Flow Layer Set Up



Inputs	
Name	**Liquid**
A	Experimental Output 1
B	Experimental Output 2
C	Experimental Output 3
D	Flush

Outputs		
Name	**Liquid**	**Location**
1	Experiment Output 1 or Experiment Output 2 or Experiment Output 3	TERRA Nozzle
2	Experiment Output 1	Waste
3	Experiment Output 2	Waste
4	Experiment Output 3	Waste
5	Flush	Waste

Control Layer Set Up



Testing the Chip: Set Up and Protocol

1. Prepare your experimental microfluidic chip and run until stabilized
2. After setting all control syringe pumps to origin state, attach syringes according to the above diagram
3. Open syringes 1, 3, and 5 and close syringes 0, 2, and 4
4. Attach the output of the experimental chip to the input of the TERRA Adapter
5. Let flush for 5-10 minutes
6. Hit “Start Run” button on the UI

Cleaning the Chip

1. Carefully disconnect tubing and dispose of all liquid waste
2. Disconnect all syringes
3. Clean the chip following the MARS protocols
4. Store the chip following the MARS protocols