

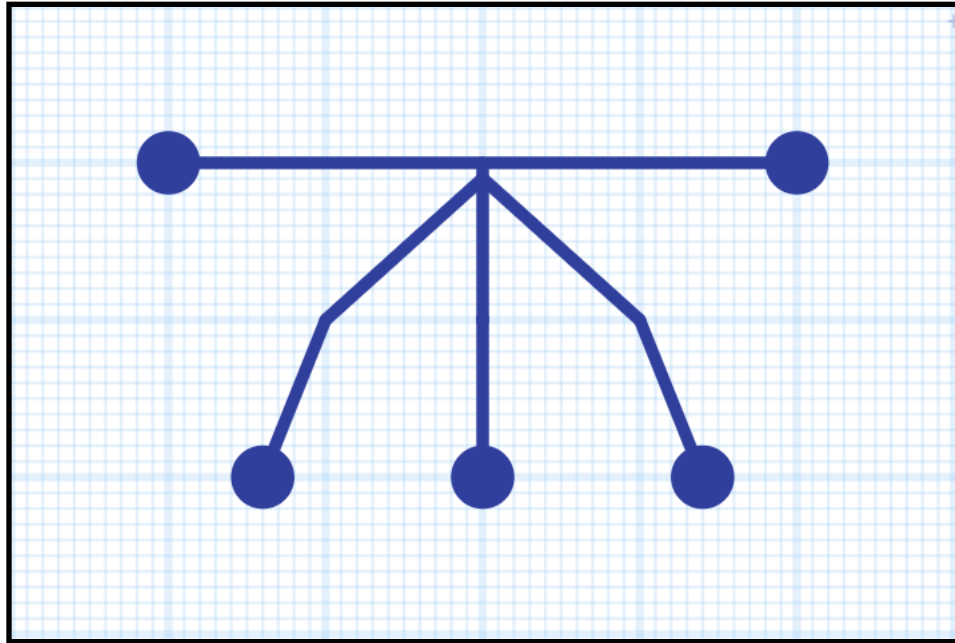


3 LIQUID DROPLET GENERATING T-JUNCTION CHIP

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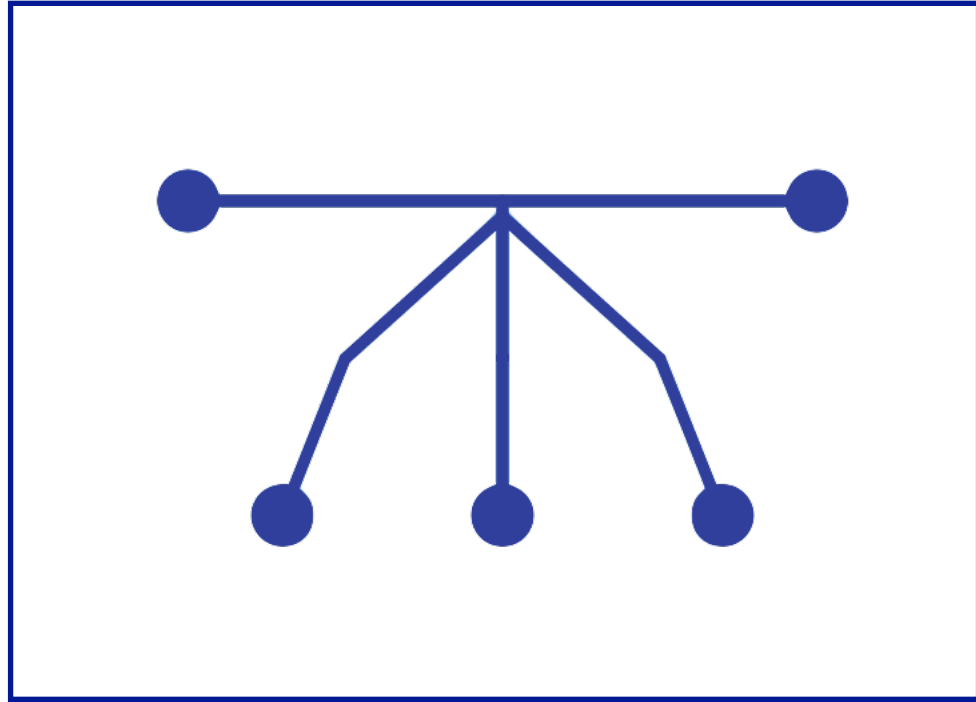
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Overview



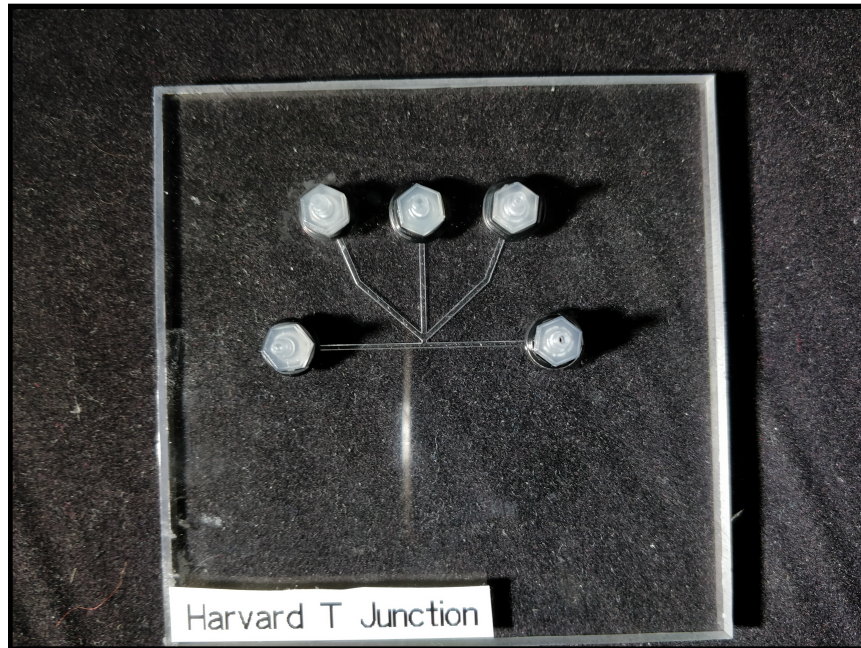
This chip was designed to encapsulate sodium alginate, calcium chloride, and cells suspended in media in droplets for use in the Harvard iGEM team's keratin skin patches. These chips consist of three aqueous inputs that combine without mixing into one input that is then pinched by the oil channels at the droplet generator to create droplets.

Chip Design



Flow Layer

Milling Instructions

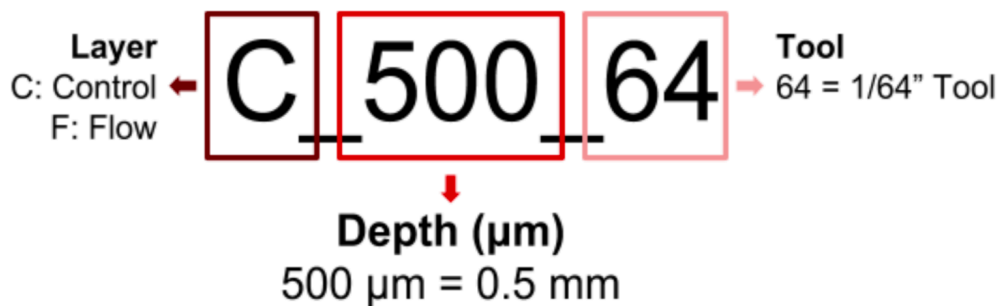


Flow Layer

Notes:

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

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.



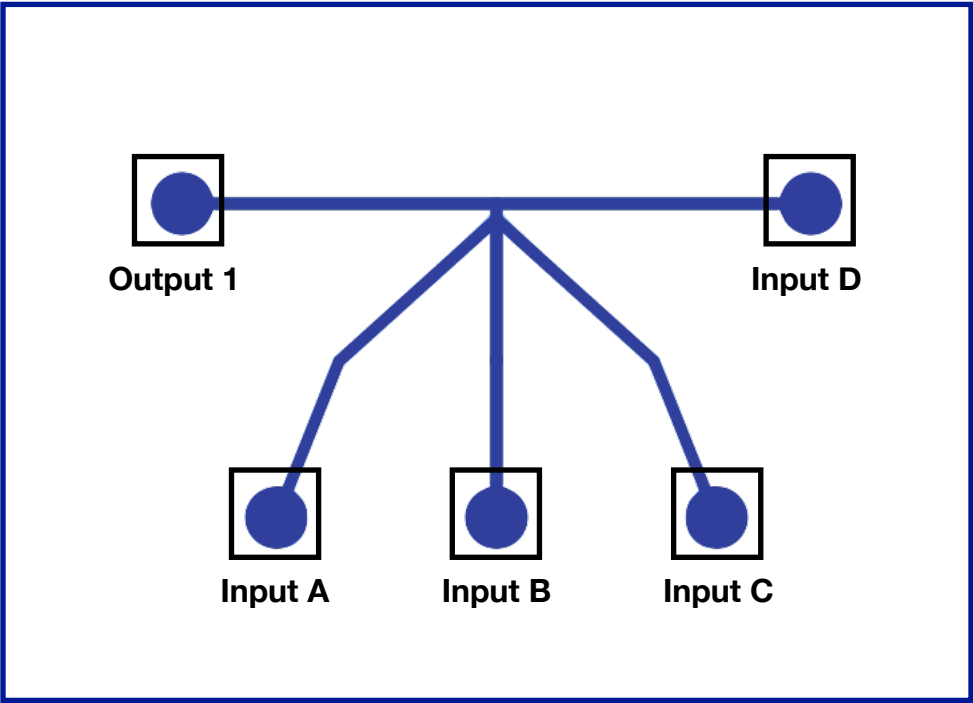
Milling Instructions

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_400_32
3	F_THRU_8
4	Border

Testing Protocol

Flow Layer Set Up



Inputs		
Name	Liquid	Flow Rate
A	Sodium Alginate + Cell Media Solution	0.15 mL/hour
B	Water	0.30 mL/hour
C	Calcium Chloride Cross-Link Solution	0.15 mL/hour
D	Mineral Oil	4.0 mL/hour

Outputs		
Name	Liquid	Location
1	Mixed Droplets in Mineral Oil	Chip Output

Testing the Chip: Set Up and Protocol

1. Attach all the syringes to their correct inputs and set each to the desired flow rate indicated in the above table
2. Attach the output tubing to the chip's output
3. Start flowing water and oil through the chip
4. When a constant sheet of water has been achieved, begin flowing the other two inputs
5. Let stabilize
6. Collect output from tubing in a test tube or attach the output to a TERRA Adapter to run on the system

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