

A

A

B

B

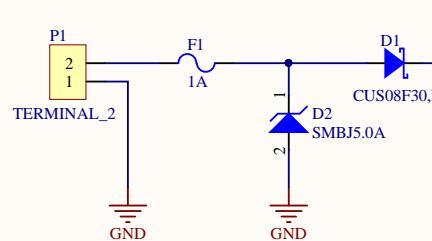
C

C

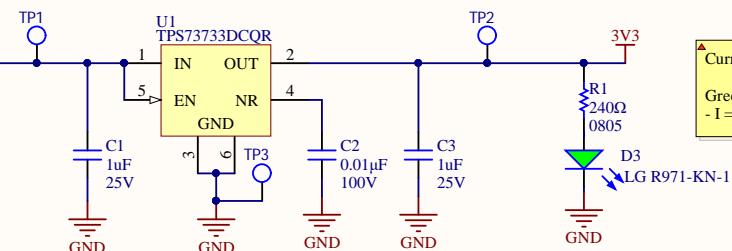
D

D

Power In



5V to 3V3 LDO

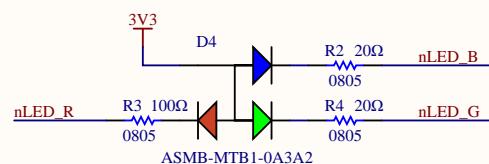


Current Calculations

Green LED voltage drop: 2.2V
 $- I = (3.3 - 2.2V) / 240 = 4.6mA$

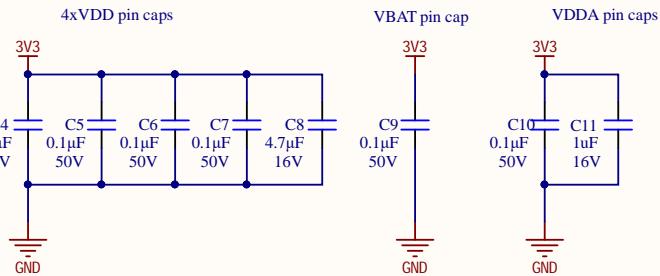
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Date: 2020-11-24	Sheet of	
File: C:\Users\pkmn0\Desktop\Document Archive\Other\Electrical Git Repo\MarsRover2020-PCB\Projects\Robot Controller\		

RGB LED

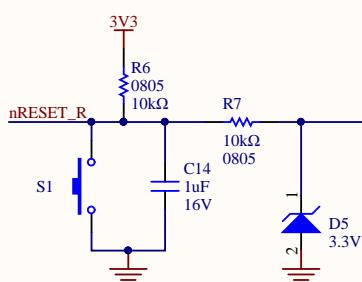


Current Calculations
 RGB LED voltage drops:
 - Red: 2.1V; $I = (3.3-2.1V)/100 = 12mA$
 - Blue: 3.1V; $I = (3.3-3.1V)/20 = 10mA$
 - Green: 3.1V; $I = (3.3-3.1V)/20 = 10mA$

Decoupling Caps

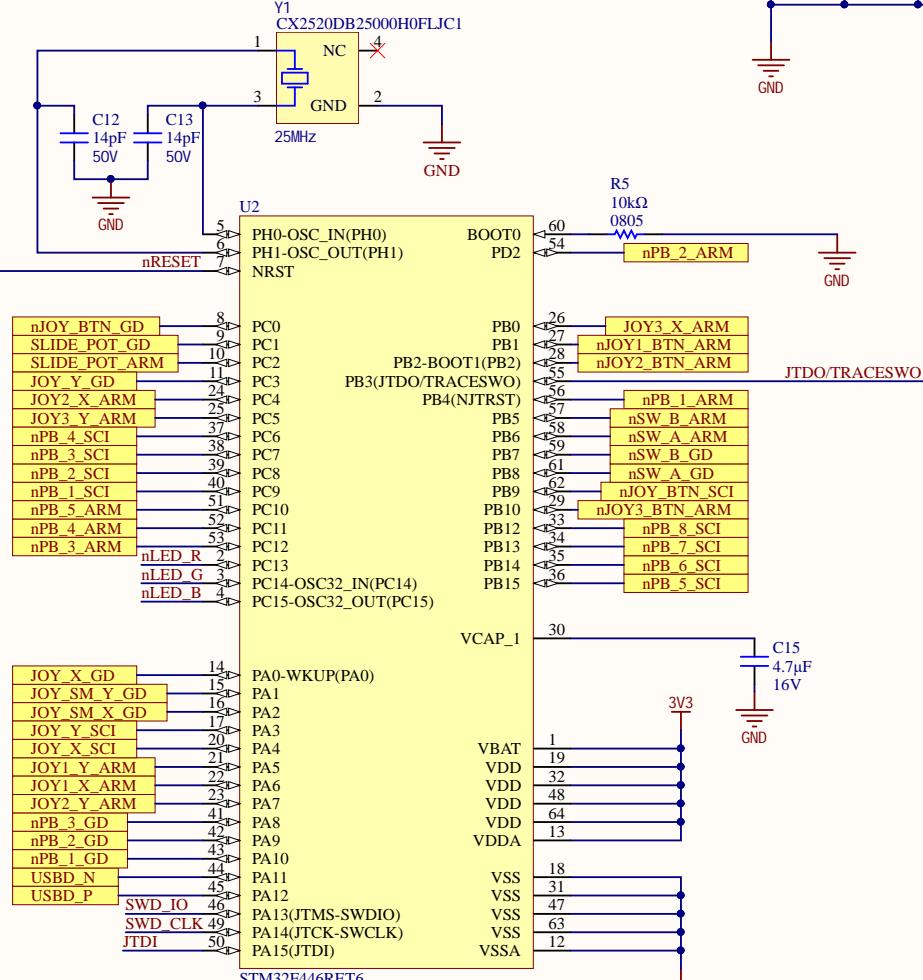


Reset Button

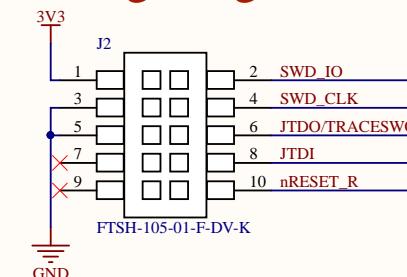


For Debounce Circuit:
 $T=RC \rightarrow C=T/R$
 $C=10ms/10k\Omega = 1uF$

STM32F446RET6



Debug/Programming



A

A

B

B

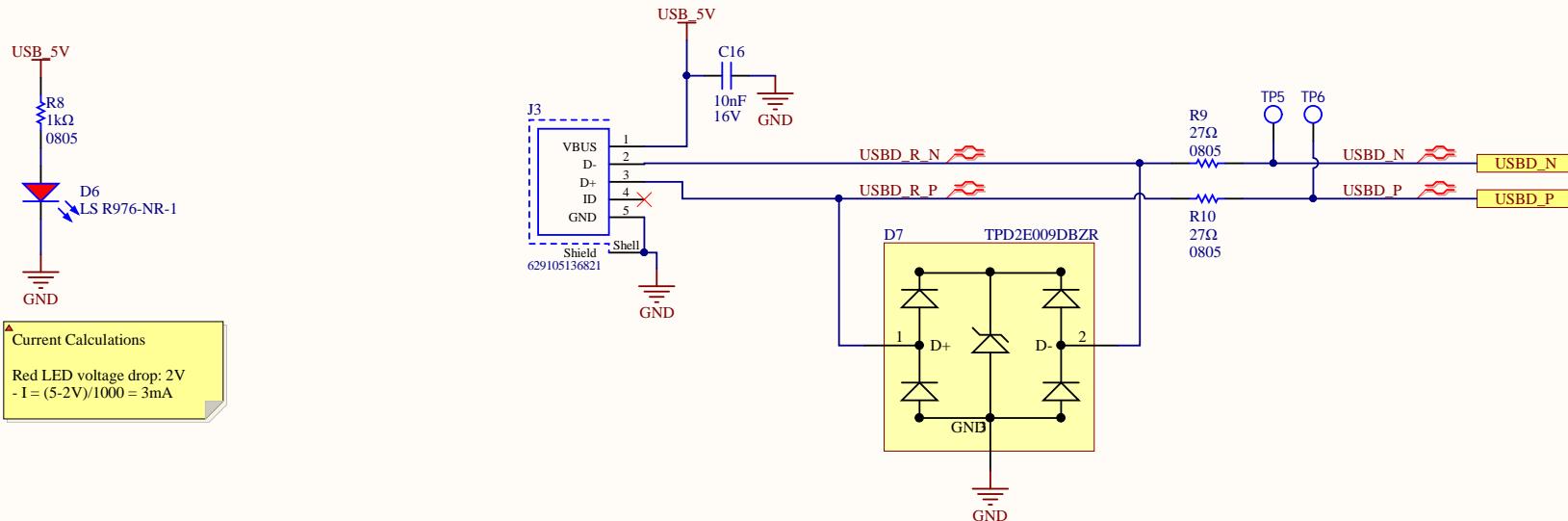
C

C

D

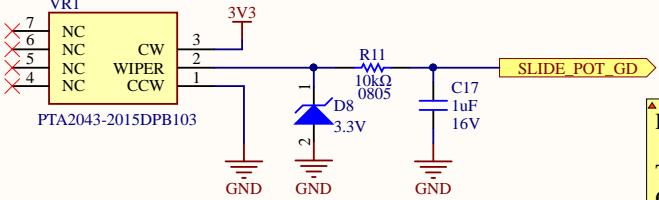
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USB Connector

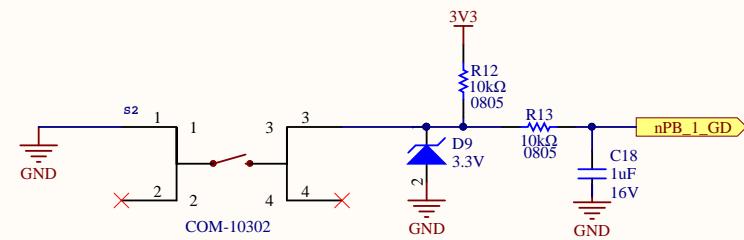


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Date: 2020-11-24	Sheet of	<i>Waterloo Ontario Canada N2L 3G6</i>
File: C:\Users\pkmn\Desktop\Document Archive\Other\Electrical Git Repo\MarsRover2020-PCB\Projects\Robot Controller\		ROBOTICS TEAM

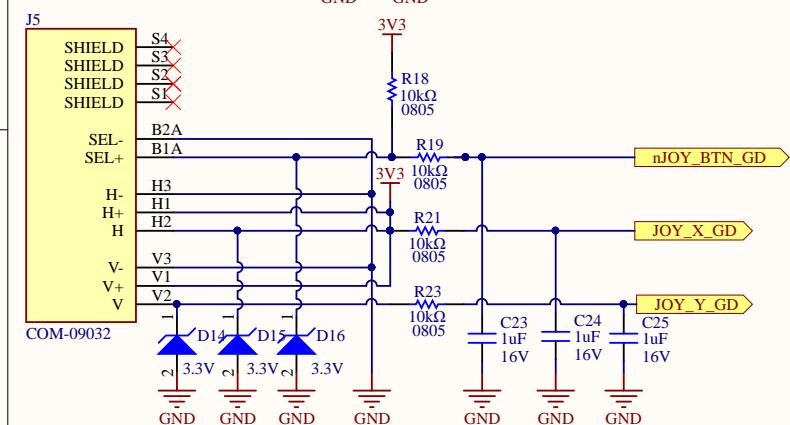
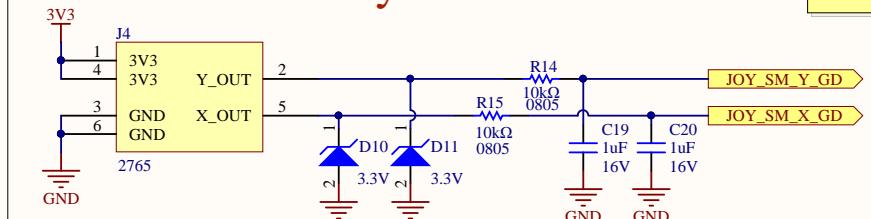
Slide Potentiometer



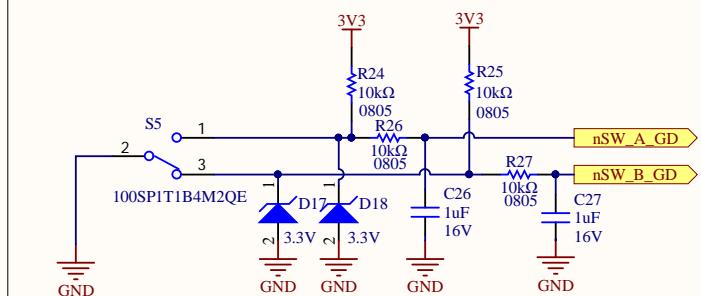
Pushbuttons



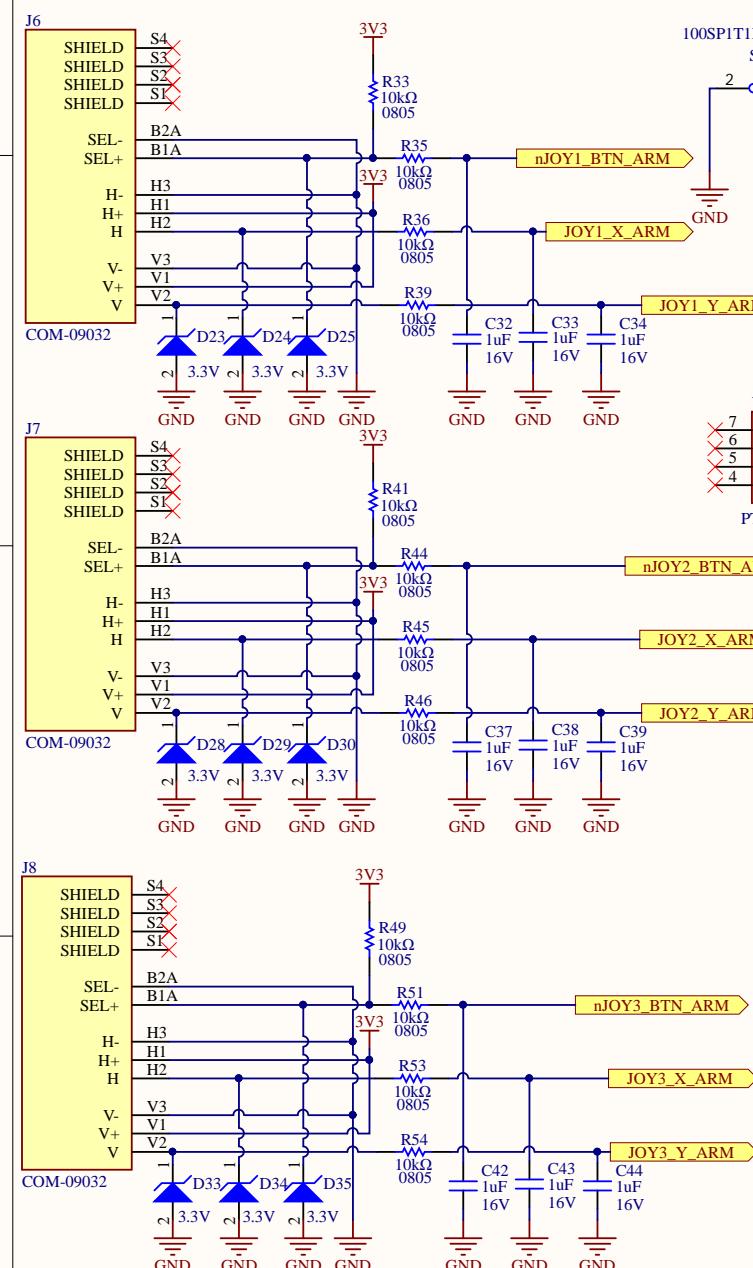
2-Axis Joysticks



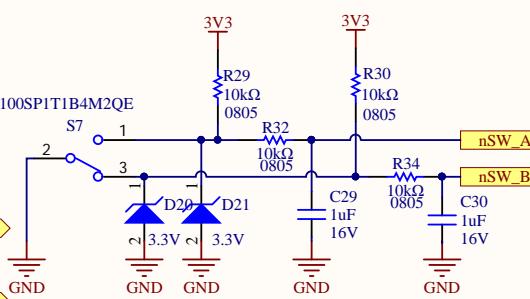
SPDT Switch



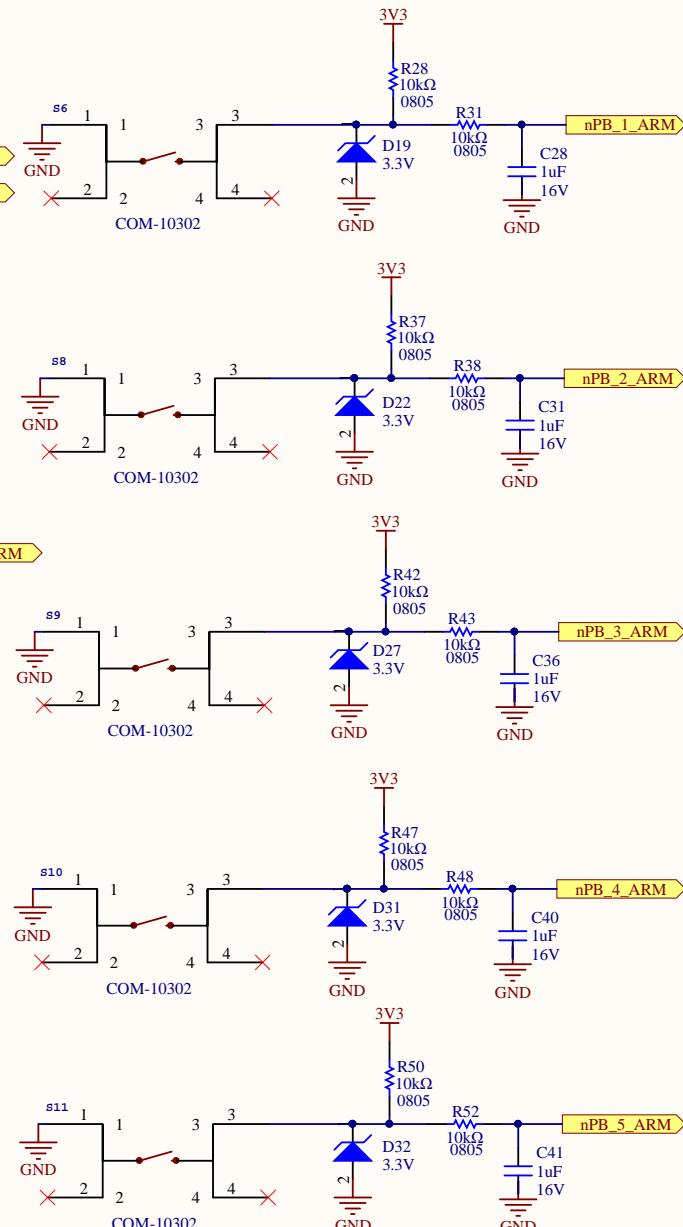
2-Axis Joysticks



SPDT Switch



Pushbuttons



Slide Potentiometer

Controls

- Joysticks: (in joint-control mode)
 - 1/2: Up/Down is for shoulder, Left/Right is for turntable
 - 2: Up/Down is for elbow
 - 3: Up/Down is for wrist pitch, Left/Right is for wrist roll

Switch:

- Used to toggle between joint-control and inverse-kinematics

Potentiometer:

- Used to adjust movement speed of joints/arm (depending on control mode)

Buttons:

- 1/2: Open/close claw
- 3/4: Set/Go to home position
- 5: Extra, in case extra functionality is requested later

Title

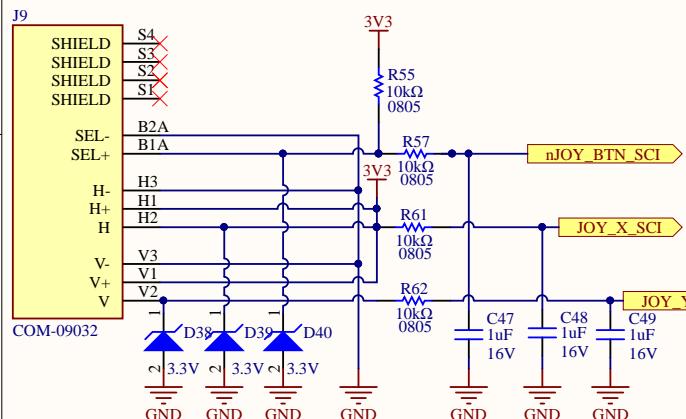
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2-Axis Joystick



Pushbuttons

For Debounce Circuits:

$$T=RC \rightarrow C= T/R \\ C= 10ms/10k\Omega = 1\mu F$$

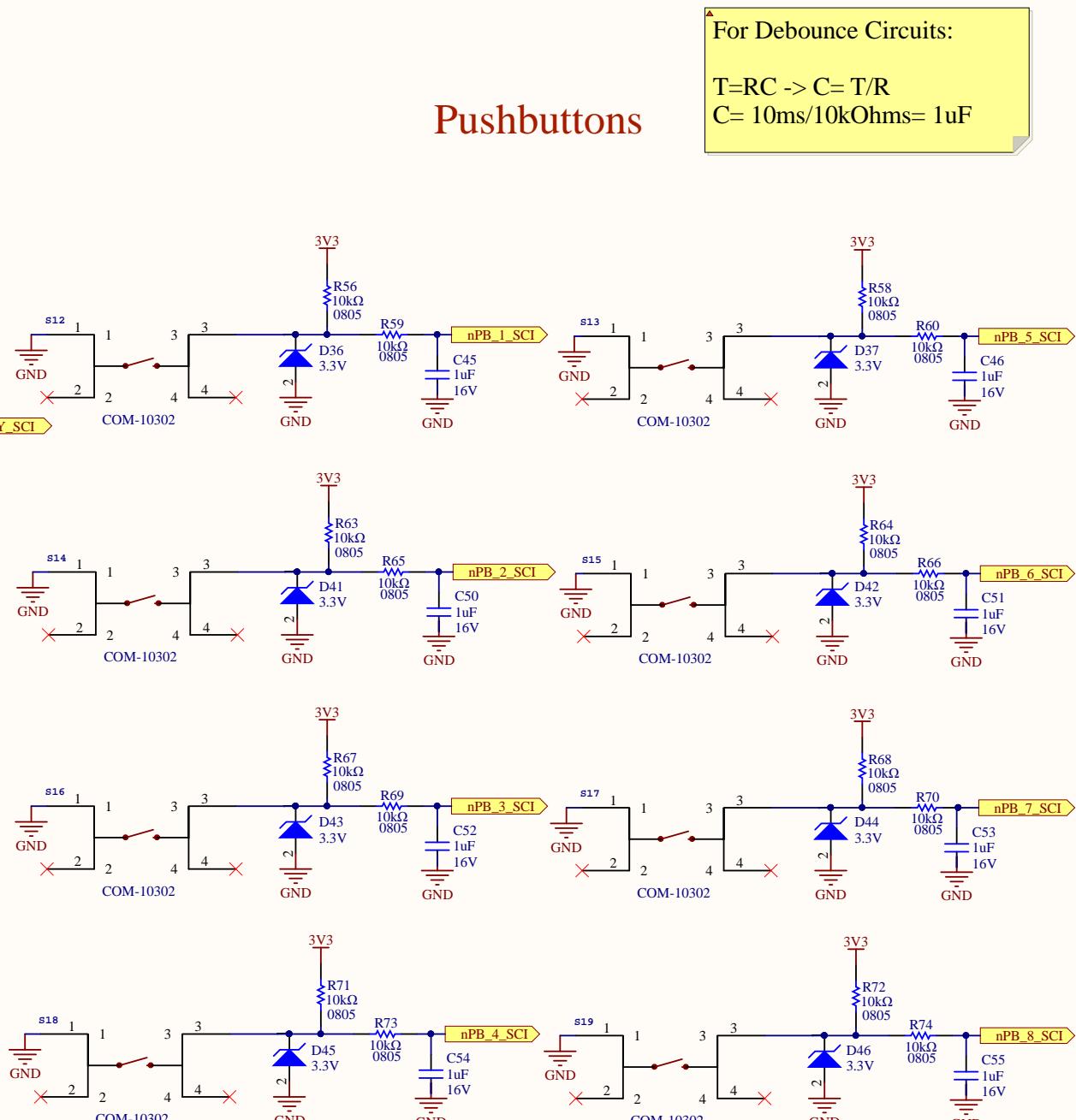
Controls

Joystick:

- Up/Down is for elevator, Left/Right is for opening/closing shovel
- Button should be used to choose between L/R and U/D, since the science mechanism may be damaged if too many things are moving at once

Buttons:

- 1/2: Move left/right 1 index
- 3/4: Move to leftmost/rightmost index
- 5/6: Open/close lid
- 7: Pre-programmed mixing sequence
- 8: Extra, in case additional functionality is requested later



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