

A

A

B

B

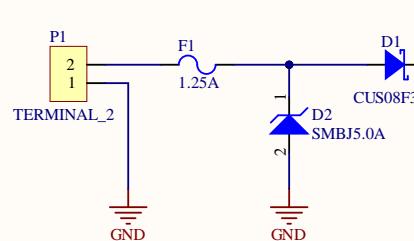
C

C

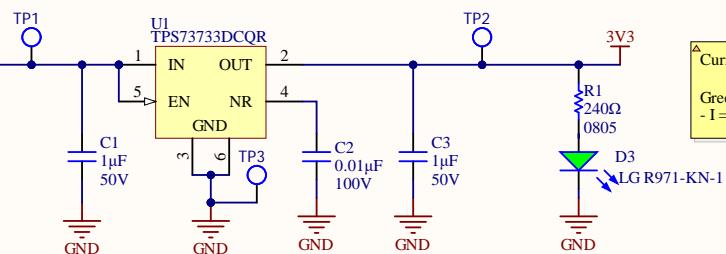
D

D

Power In



5V to 3V3 LDO



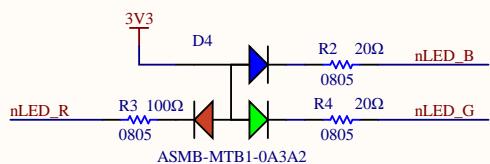
Current Calculations

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

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File: C:\Users\lance\GitHub\MarsRover2020-PCB\Projects\Robot Controller\Rev1\SH1 - POWER.SchDoc		



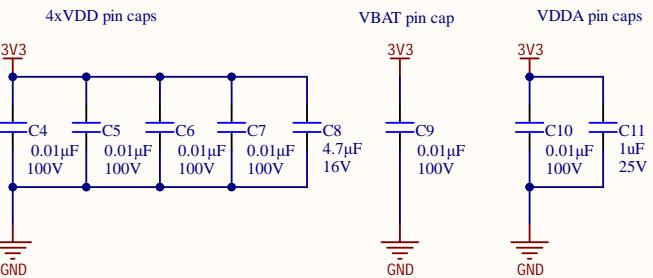
RGB LED



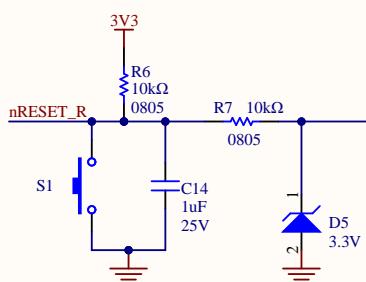
Current Calculations

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

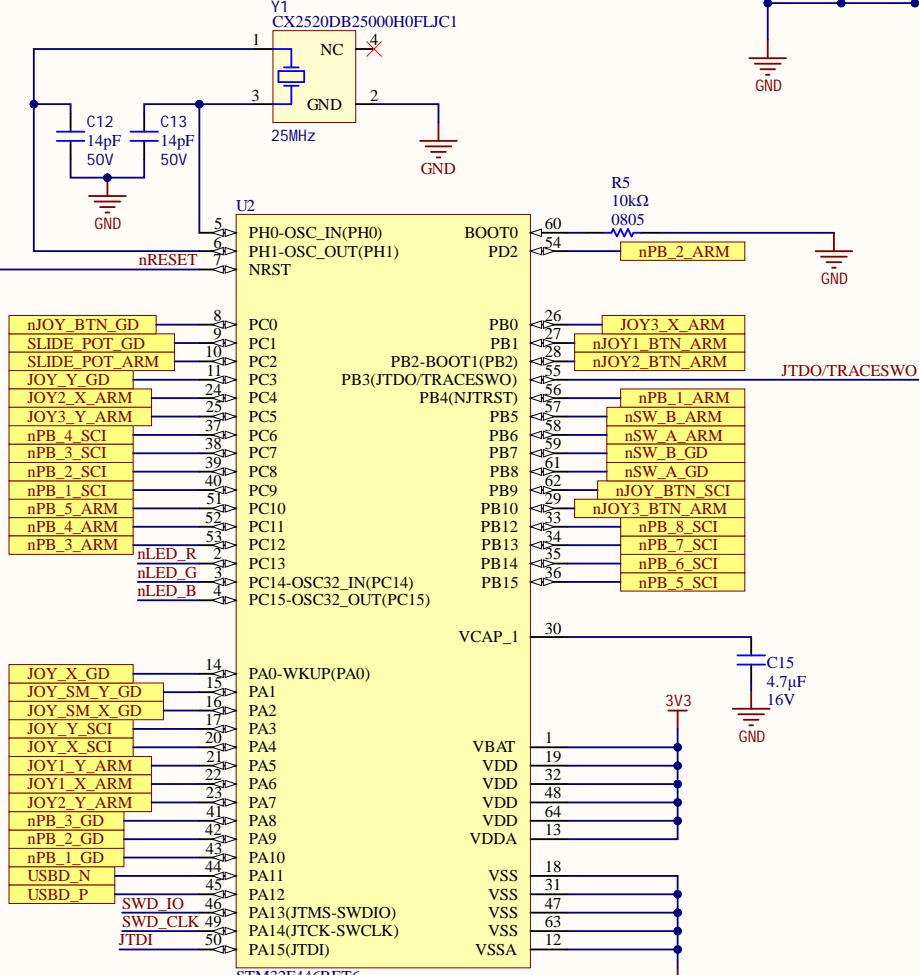


Reset Button

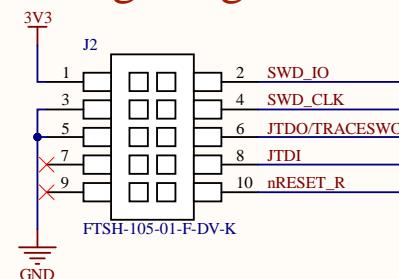


For Debounce Circuit:
 $T=RC \rightarrow C=T/R$
 $C=10ms/10k\Omega = 1uF$

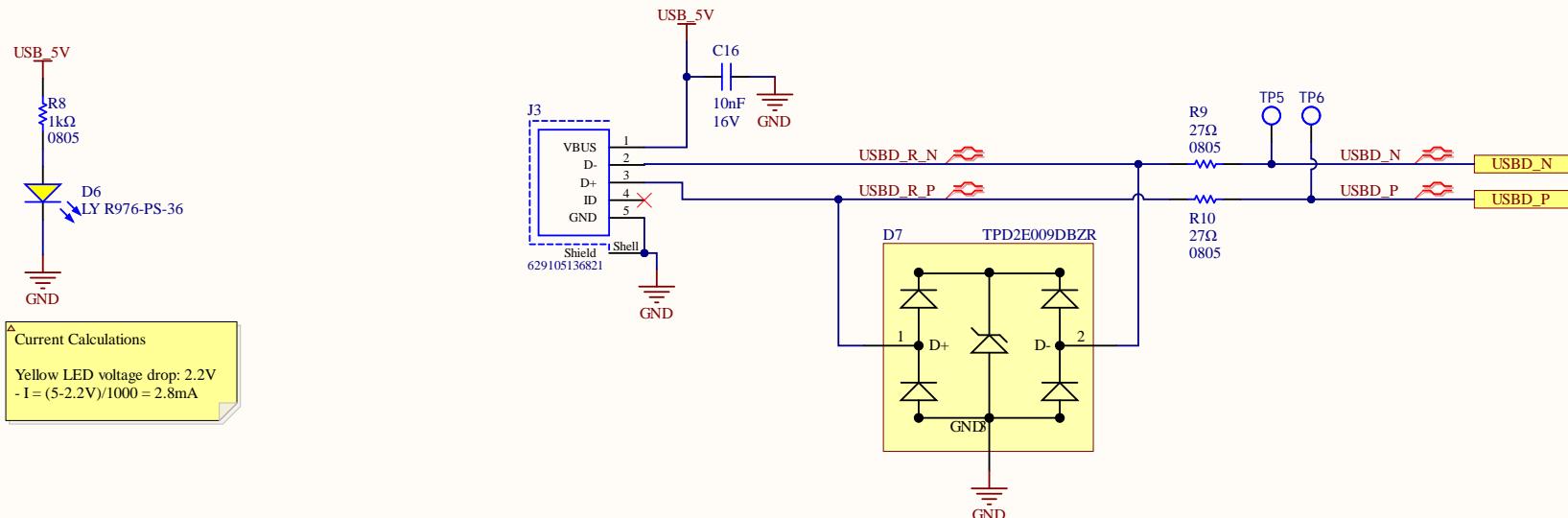
STM32F446RET6



Debug/Programming

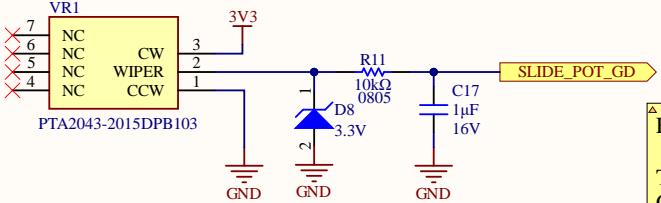


USB Connector

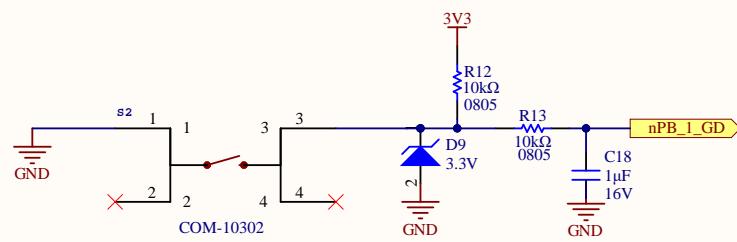


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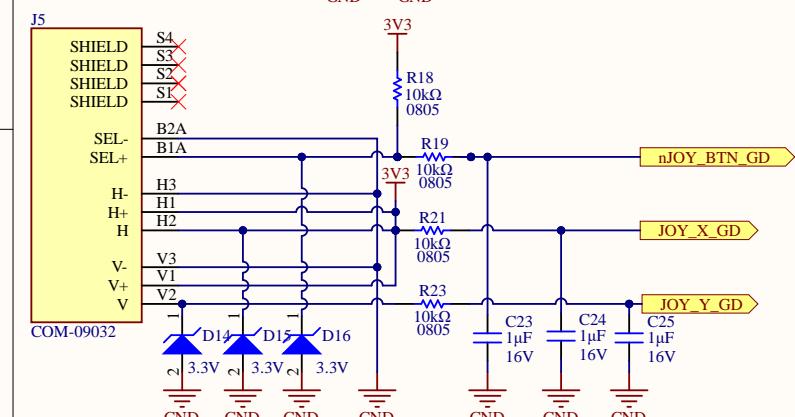
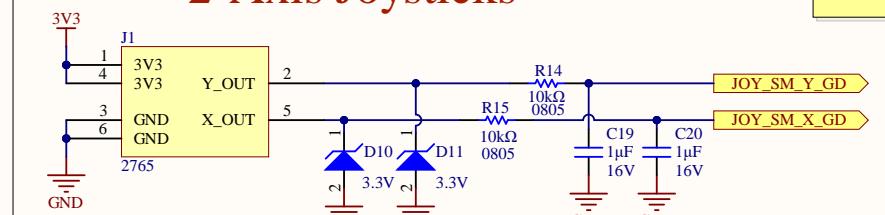
Slide Potentiometer



Pushbuttons



2-Axis Joysticks



Controls (subject to change)

- Joysticks:**
 - 1: Large joystick is used for driving
 - 2: Small joystick is used for gimbal

Potentiometer:

- Used for driving speed control

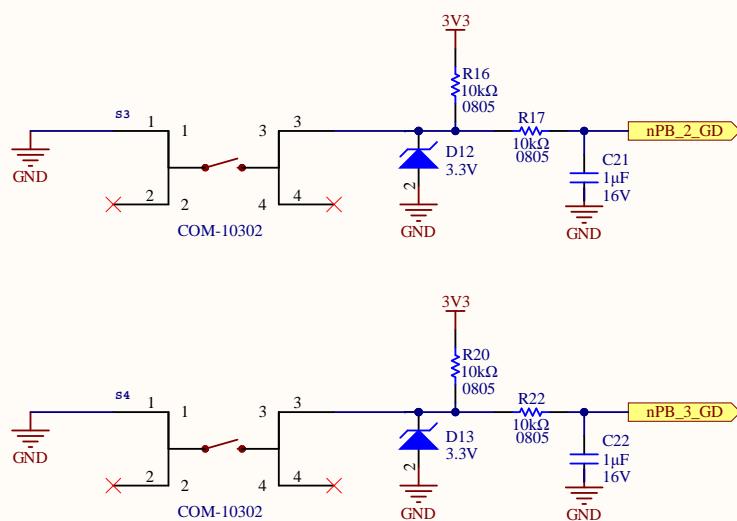
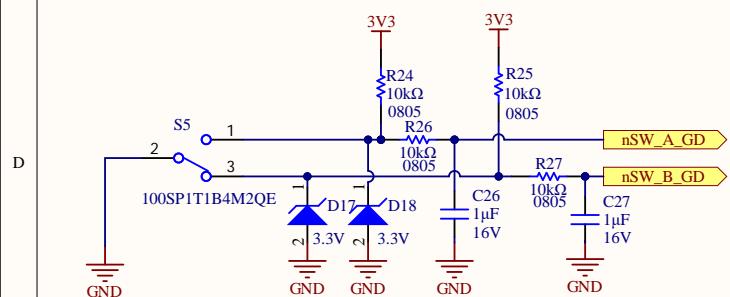
Switch:

- Used for reverse-mode toggle

Buttons:

- 1: Full-stop (halt all movement immediately)
- 2-3: Extra, in case additional functionality is requested

SPDT Switch



Title

Size: Letter

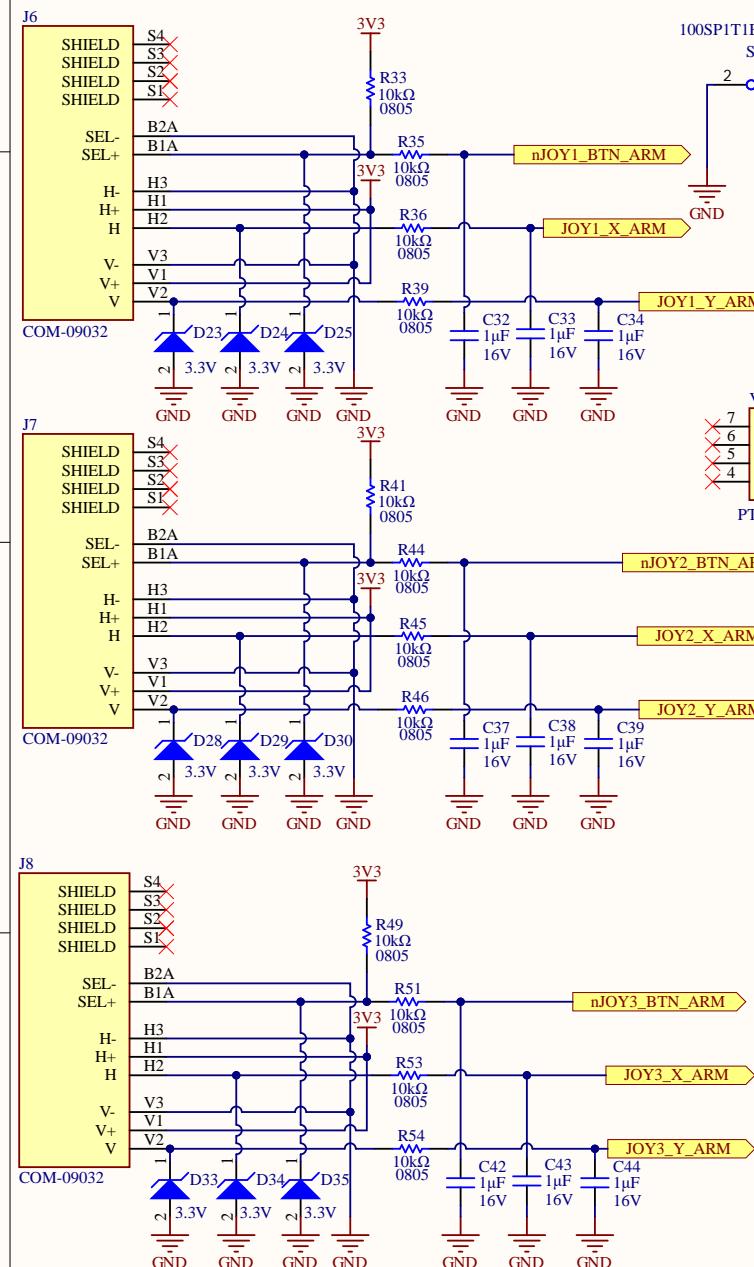
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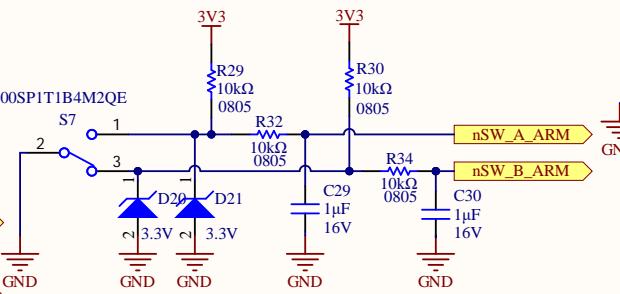
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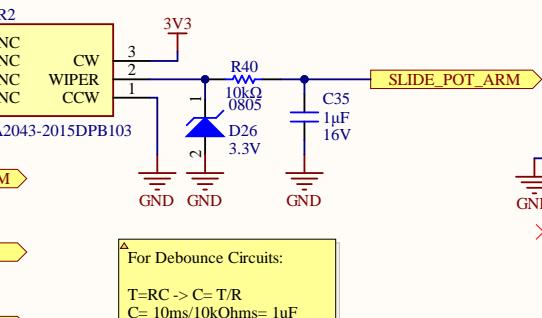
2-Axis Joysticks



SPDT Switch

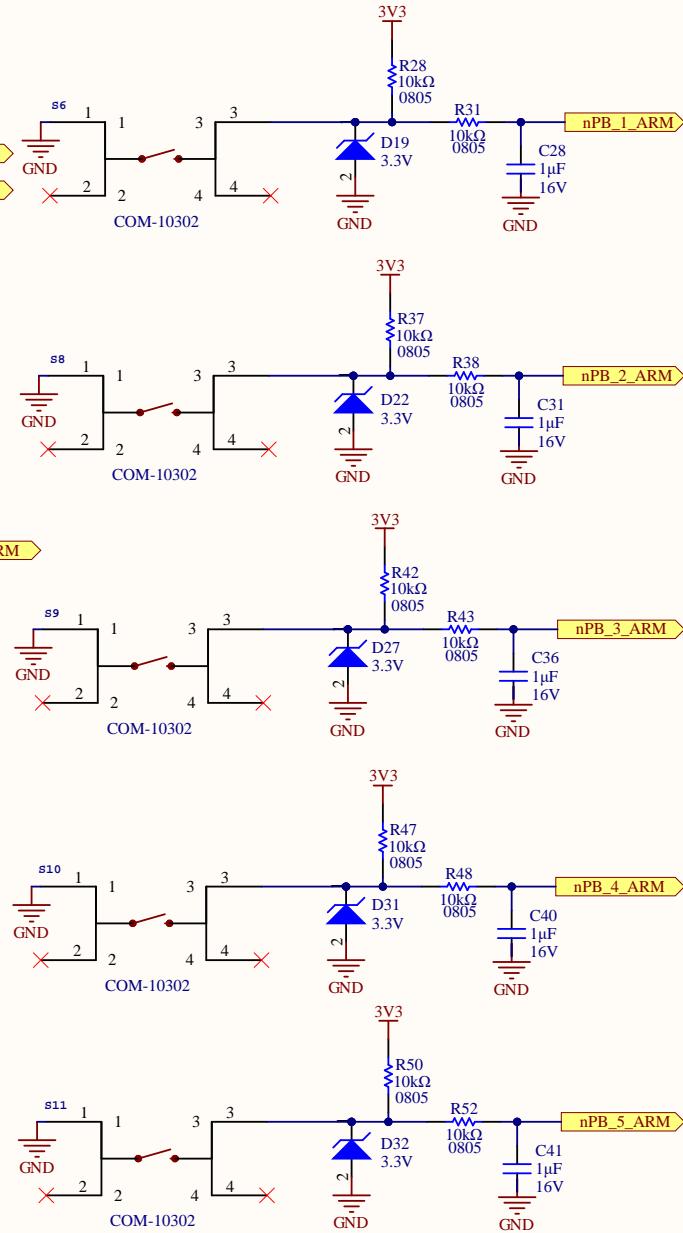


Slide Potentiometer

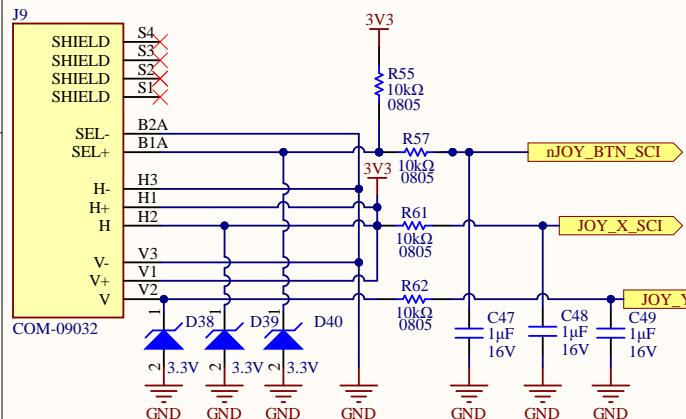


Controls
 Joysticks: (in joint-control mode)
 - 1: Up/Down is for shoulder, Left/Right is for turntable
 - 2: Up/Down is for elbow
 - 3: Up/Down is for wrist pitch, Left/Right is for wrist roll
 Switch:
 - Used to toggle between joint-control and inverse-kinematics
 Potentiometer:
 - Used to adjust movement 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

Pushbuttons



2-Axis Joystick



Pushbuttons

For Debounce Circuits:

$$T = RC \rightarrow C = T/R$$

$$C = 10\text{ms}/10\text{kOhms} = 1\mu\text{F}$$

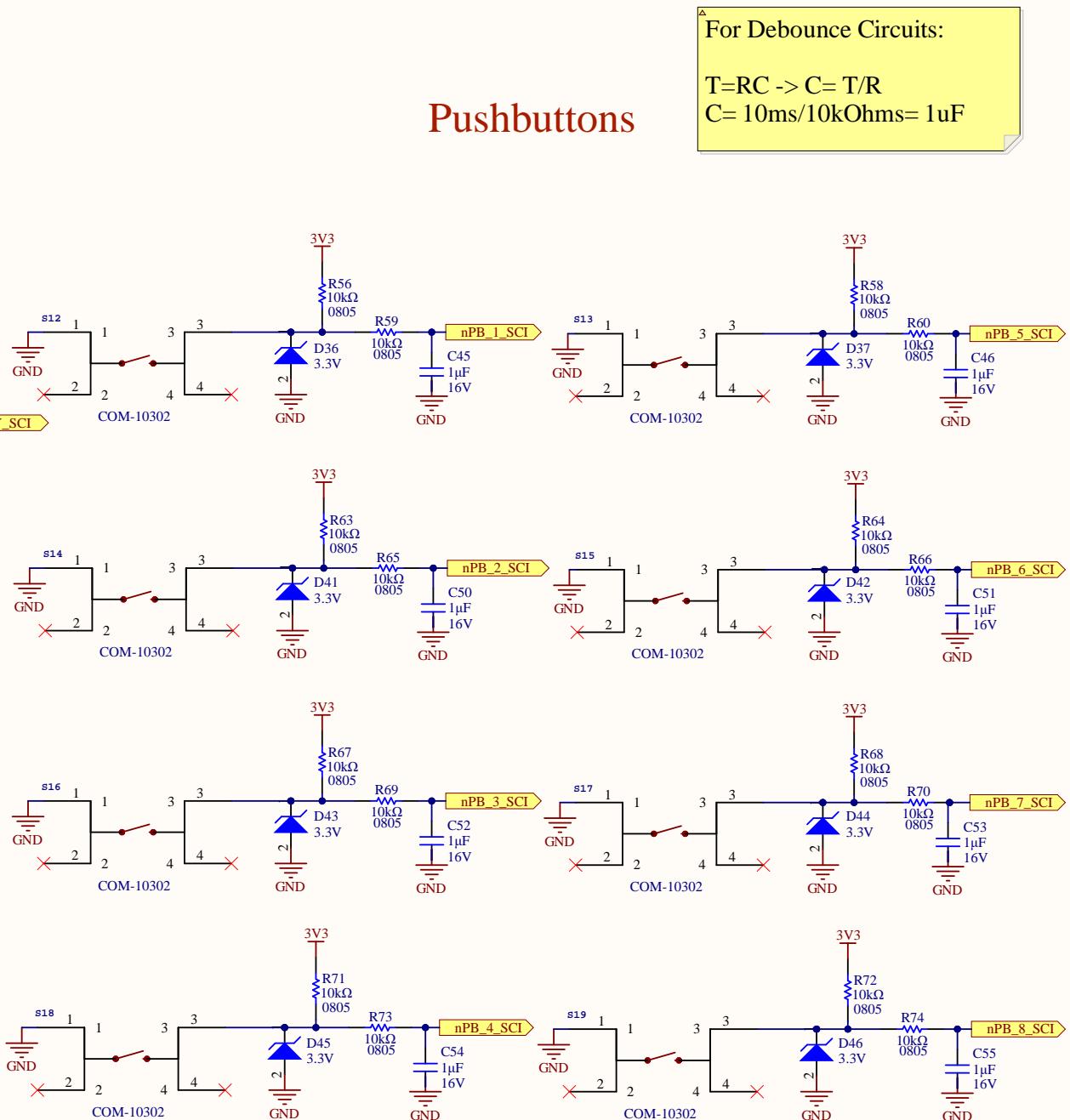
Controls

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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